

North Karanpura Transco Limited

(Program Under Government of India)

Jayprabha Nagar, Behind Celebration Marriage Hall

Near Markham College Hazaribagh 825301

Email Id: northkaranpuratransco@gmail.com

Ref: NKTL/NKG/2024-25/8648

Date: 13.10.2025

To,

Divisional Forest Officer

Chatra South Forest Division

Chatra, Jharkhand-825401

Divisional Forest Officer

Chatra North Forest Division

Chatra, Jharkhand-825401

Divisional Forest Officer

Latehar Forest Division

Latehar, Jharkhand-829206

Sub: Diversion of 197.0115 Ha. (Chatra South – 119.8806 Ha., Chatra North – 61.772 Ha., & Latehar – 15.3589 Ha.) forest land in favour of North Karanpura Transco Limited for construction of **400 KV D/C Transmission Line from North Karanpura (Tandwa) to Gaya Transmission Line** under Chatra South, Chatra North & Latehar Forest Division in Chatra and Latehar Districts of Jharkhand – Reg.

EDS Raised by IRO, MOEFCC, Ranchi vide letter no 443 dated 15th July 2024 on Stage 1 Compliances Report submitted for 400 KV D/C NK-Gaya line Jharkhand Section.

(Proposal No: FP/JH/TRANS/41236/2019)

- Ref:** 1. MOEFCC, IRO, Ranchi letter no. FP/JH/TRANS/41236/2019/1154 Dated: 6th June 2023.
2. MOEFCC, Ranchi letter no. 443 dated 15th July 2024.
3. State Govt. Letter no. वन भूमि-31/2022-2999 dated 29.07.2024
4. PCCF Cum ED, WLDB, Jharkhand, Ranchi Office Letter No 799 dated 13.10.25

Dear Sir,

With reference to online EDS raised by IRO MOEFCC, Ranchi vide letter no. 443 dated 15.07.2024 and PCCF Cum ED Office letter no 799 dated 13.10.25, we are submitting herewith the point wise compliance as below for kind consideration to grant of Stage II approval please.

S. No.	EDS by MOEFCC, Ranchi	NKTL Response
1	The condition no. A (4) of in-principal approval prescribes, "As recommended by the Regional Empowered Committee, a Wildlife Management Plan and Soil & Moisture Conservation Plan should be prepared by concerned DFO/Project Proponent and approved by the PCCF (Wildlife) &	<u>Wildlife Management Plan:-</u> 1. PCCF (Wildlife) & Chief Wildlife Warden, Jharkhand already approved the Wildlife Management Plan for Rupees 1909.89 lakhs for 400 KV D/C NK-Gaya transmission line vide his office order no. 26 dated 22.03.2024 (Copy of approval letter along with WLMP report is enclosed as Annexure – 1A).

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S. No.	EDS by MOEFCC, Ranchi	NKTL Response
	Chief Wildlife Warden, Jharkhand for getting implemented at project cost. The duly approved plan should be submitted in IRO, MoEF&CC, Ranchi before issuance of Final approval." But duly approved Wildlife Management Plan and Soil & Moisture Conservation Plan has not been uploaded on Parivesh portal. Therefore, it needs to be uploaded before issuance of Final Approval.	2. We hereby confirmed that the payment towards approved WLMP of Rupees 1909.89 lakhs has already been paid in Jharkhand CAMPA account as detailed below: a. Rs. 4,17,50,499/- vide RTGS UTR No. UTIBR52023110600359191 has been paid towards (lumpsum 2.5% of project cost for WLMP and SMCP) on 06.11.2023. Out of which Rs. 3,34,02,400/- is towards for WLMP (Lumpsum 2% of project cost.) b. Rs. 15,75,86,600/- vide RTGS UTR No. UTIBR52025030400358796 on 04.03.2025 (Balance amount) Copy of Payment details towards WLMP is enclosed as Annexure – 1B Soil & Moisture Conservation Plan: - 3. PCCF, Van Bhawan, Doranda, Ranchi Jharkhand has already approved the Soil and Moisture Conservation Plan for amount of Rupees 1453.755 lakhs vide the office order no. 142 dated 12.09.2025 (Copy of approval letter along with SMCP report is enclosed as Annexure – 2A) 4. We hereby confirmed that the payment towards approved SMCP of Rupees 1453.755 lakhs has been paid in Jharkhand CAMPA account as detailed below: a. Rs. 4,17,50,499/- vide RTGS UTR No. UTIBR52023110600359191 has been paid towards (lumpsum 2.5% of project cost for WLMP and SMCP) on 06.11.2023. Out of which Rs. 83,48,099/- was paid towards for SMCP (Lumpsum 0.5% of project cost.) b. Rs. 13,70,27,401/- vide RTGS UTR No. UTIBR52025092600368249 on 26.09.2025 (Balance amount) Copy of Payment details towards SMCP are enclosed as Annexure – 2B
2	The condition no. A (7) of in-principal approval prescribes, " The	Complied. Details enclosed as Annexure - 3

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S. No.	EDS by MOEFCC, Ranchi	NKTL Response
	KML files of the area to be diverted and the CA area shall be uploaded on the e-Green watch portal with all requisite details and submitting compliance report for seeking Stage-II approval." Entire CA area relating to the proposal must be uploaded on e-green watch and be informed with relevant details to this office.	

In view of the above compliances, we humbly request to kindly grant Stage – II approval at the earliest please.

Yours Faithfully

for, North Karanpura Transco Limited



(Authorized Signatory)

Encl: Payment details along with Annexures as above.

CC:

- 1. IRO, MoEFCC Ranchi**
Ministry of Environment, Forest and Climate Change
Integrated Regional Office, East Central Region
Harmu Chowk, Ranchi- 834 002, Jharkhand
- 2. Principal Chief Conservator of Forests cum Nodal Officer,**
Van Bhawan, Doranda, Ranchi – 834 002
- 3. Principal Chief Conservator of Forests cum Executive Director**
Banjar Bhoomi Vikas Board,
Jharkhand, Ranchi

North Karanpura Transco Limited

(Program Under Government of India)

Jayprabha Nagar, Behind Celebration Marriage Hall

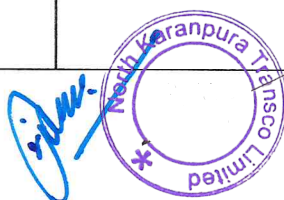
Near Markham College Hazaribagh 825301

Email Id: northkaranpuratransco@gmail.com

Payment summary towards approved WLMP and SMCP

Summary of Wildlife Management Plan Payments					
Sl. No	Particulars	Chatra North Forest Division (in Rs)	Chatra South Forest Division (In Rs)	Latehar Forest Division (In Rs)	Total (In Rs)
A	Sanctioned Amount by office of PCCF cum Wildlife & Chief Wildlife Warden, Ranchi, Jharkhand vide office order no. 26 dated 22.03.2024	7,17,78,000	7,22,11,000	4,70,00,000	19,09,89,000
1	Lump-sum amount deposited by NKTL (2.0% of Project Cost) towards Wildlife Management Plan on 06.11.2023	1,04,90,000	2,03,07,200	26,05,200	3,34,02,400
2	Balance amount deposited towards Wildlife Management plan order dated 22.03.2024 and payment dated 04.03.2025	6,12,88,000	5,19,03,800	4,43,94,800	15,75,86,600

Summary of Soil and Moisture Conservation Plan Payments					
Sl. No	Particulars	Chatra North Forest Division (in Rs)	Chatra South Forest Division (In Rs)	Latehar Forest Division (In Rs)	Total (In Rs)
B	Sanctioned Amount by office of PCCF(Hoff), Ranchi, Jharkhand vide office order no. 142 dated 12.09.2025	6,25,77,500	6,25,96,000	2,02,02,000	14,53,75,500
1	Lump-sum amount deposited by NKTL (0.5% of Project Cost) towards Soil & Moisture Conservation Plan on dated 06.11.2023	26,20,000	50,76,800	6,51,299	83,48,099
2	Balance amount deposited towards Soil & Moisture Conservation Plan order dated 12.09.2025 and payment dated 26.09.2025	5,99,57,500	5,75,19,200	1,95,50,701	13,70,27,401





AXIS BANK LIMITED

Date : 06-NOV-23

To

North Karanpura Transco Limited

REMITTANCE ADVICE

UTR /REFERENCE NUMBER : UTIBR52023110600359191

Processed at SOL : 3414 - SHANTIGRAM TOWN SHIP, ADALAJ

We confirm having received your request for outward payment on 06-NOV-23, as per below details.

Payment Mode	RTGS	Beneficiary Bank Details	
Debit Account	916020044459475	Bank name	UNION BANK OF INDIA
Debit account name	North Karanpura Transco Limited	Bank IFS code	UBIN0996335
Remittance Details		Beneficiary Details	
Remittance Amount	41750499	Beneficiary Name	Jharkhand Campa
Processing Date	06-NOV-23	Beneficiary Account Number	150726441236504

Please note that all payment are processed subject to Bank's terms and conditions.

This is a system generated advice and does not require signature.


Divisional Forest Officer
Chatra South Forest Division


Mukesh Kumar IFS

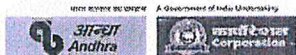
Divisional Officer
Chatra South Forest Division




Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

AGENCY COPY

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NEFT / RTGS CHALLAN for CAMPA Funds

Date : 03-11-2023

Agency Name.	NORTH KARANPURA TRANSCO LIMITED
Application No.	6441236504
MoEF/SG File No.	FP/JH/TRANS/41236/2019
Location.	JHARKHAND
Address.	Sunita Sadan 1st Floor Ashram Marg Bariatu Near Military Firing Range Ranchi
Amount(in Rs)	41750499/-

Amount in Words : Four Crore Seventeen Lakh Fifty Thousand
Four Hundred and Ninety-Nine Rupees Only

NEFT/RTGS to be made as per following
details;

Beneficiary Name:	JHARKHAND CAMPA
IFSC Code:	UBIN0996335
Pay to Account No.	150726441236504 Valid only for this challan amount.
Bank Name & Address:	Union Bank Of India FCS Centre, 21/1, III Floor, Jelitta Towers, Mission Road, Bengaluru-560027

- This Challan is strictly to be used for making
payment to CAMPA by NEFT/RTGS only

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यूनियन बैंक Union Bank of India



NEFT / RTGS CHALLAN for CAMPA Funds

Date : 03-11-2023

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Beneficiary Name:	JHARKHAND CAMPA
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Pay to Account No.	150726441236504 Valid only for this challan amount.
Bank Name & Address:	Union Bank Of India FCS Centre, 21/1, III Floor, Jelitta Towers, Mission Road, Bengaluru-560027

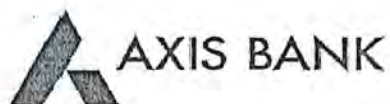
- This Challan is strictly to be used for making
payment to CAMPA by NEFT/RTGS only

Note: After making the required payment through challan, if the payment status has not been updated even after 7 working days, then kindly mail a copy of your challan with transaction date and reference id to Email: fcsblr@unionbankofindia.bank, epurse@unionbankofindia.bank, ubin0903710@unionbankofindia.bank

Mukesh Kumar I.F.S.
Divisional Forest Officer
Chatra South Forest Division

Divisional Forest Officer
Chatra South Forest Division

Ragendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh



AXIS BANK LIMITED

Date : 04-MAR-25

To

North Karanpura Transco Limited

REMITTANCE ADVICE

UTR /REFERENCE NUMBER : UTIBR52025030400358796

Processed at SOL : 3414 - SHANTIGRAM TOWN SHIP, ADALAJ

We confirm having received your request for outward payment on 04-MAR-25, as per below details.

Payment Mode	RTGS	Beneficiary Bank Details	
Debit Account	916020044459475	Bank name	UNION BANK OF INDIA
Debit account name	North Karanpura Transco Limited	Bank IFS code	UBIN0996335
Remittance Details		Beneficiary Details	
Remittance Amount	157586600	Beneficiary Name	Jharkhand Campa
Processing Date	04-MAR-25	Beneficiary Account Number	150726441236718

Please note that all payment are processed subject to Bank's terms and conditions.

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 भारत सरकार का वाहन A Government of India Undertaking



NEFT / RTGS CHALLAN for CAMPA Funds

Date : 03-03-2025

Agency Name.	NORTH KARANPURA TRANSCO LIMITED
Application No.	6441236718
MoEF/SG File No.	FP/JH/TRANS/41236/2019
Location.	JHARKHAND
Address.	Sunita Sadan 1st Floor Ashram Marg Bariatu Near Military Firing Range Ranchi
Amount(in Rs)	157586600/-

Amount in Words :Fifteen Crore Seventy-Five Lakh Eighty-Six Thousand Six Hundred Rupees Only

NEFT/RTGS to be made as per following details;

Beneficiary Name:	JHARKHAND CAMPA
IFSC Code:	UBIN0996335
Pay to Account No.	150726441236718 Valid only for this challan amount.
Bank Name & Address:	Union Bank Of India FCS Centre, 21/1, III Floor, Jelitta Towers, Mission Road, Bengaluru-560027

• This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

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 भारत सरकार का वाहन A Government of India Undertaking



NEFT / RTGS CHALLAN for CAMPA Funds

Date : 03-03-2025

Agency Name.	NORTH KARANPURA TRANSCO LIMITED
Application No.	6441236718
MoEF/SG File No.	FP/JH/TRANS/41236/2019
Location.	JHARKHAND
Address:	Sunita Sadan 1st Floor Ashram Marg Bariatu Near Military Firing Range Ranchi
Amount(in Rs)	157586600/-

Amount in Words :Fifteen Crore Seventy-Five Lakh Eighty-Six Thousand Six Hundred Rupees Only

NEFT/RTGS to be made as per following details;

Beneficiary Name:	JHARKHAND CAMPA
IFSC Code:	UBIN0996335
Pay to Account No.	150726441236718 Valid only for this challan amount.
Bank Name & Address:	Union Bank Of India FCS Centre, 21/1, III Floor, Jelitta Towers, Mission Road, Bengaluru-560027

• This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

Note:After making the required payment through challan, if the payment status has not been updated even after 7 working days, then kindly mail a copy of your challan with transaction date and reference id to Email: fcsblr@unionbankofindia.bank , epurse@unionbankofindia.bank, ubin0903710@unionbankofindia.bank



AXIS BANK LIMITED

Date : 26-SEP-25

To

North Karanpura Transco Limited

REMITTANCE ADVICE

UTR /REFERENCE NUMBER : UTIBR52025092600368249

Processed at SOL : 3414 - SHANTIGRAM TOWN SHIP, ADALAJ

We confirm having received your request for outward payment on 26-SEP-25, as per below details.

Payment Mode	RTGS	Beneficiary Bank Details	
Debit Account	916020044459475	Bank name	UNION BANK OF INDIA
Debit account name	North Karanpura Transco Limited	Bank IFS code	UBIN0996335
Remittance Details		Beneficiary Details	
Remittance Amount	137027401	Beneficiary Name	Jharkhand Campa
Processing Date	26-SEP-25	Beneficiary Account Number	150726441236902

Please note that all payment are processed subject to Bank's terms and conditions.

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NEFT / RTGS CHALLAN for CAMPA Funds

Date : 24-09-2025

Agency Name.	NORTH KARANPURA TRANSCO LIMITED
Application No.	6441236902
MoEF/SG File No.	FP/JH/TRANS/41236/2019
Location.	JHARKHAND
Address.	Sunita Sadan 1st Floor Ashram Marg Bariatu Near Military Firing Range Ranchi
Amount(in Rs)	137027401/-

Amount in Words :Thirteen Crore Seventy Lakh Twenty-Seven Thousand Four Hundred and One Rupees Only

NEFT/RTGS to be made as per following details;

Beneficiary Name:	JHARKHAND CAMPA
IFSC Code:	UBIN0996335
Pay to Account No.	150726441236902 Valid only for this challan amount.
Bank Name & Address:	Union Bank Of India FCS Centre, 21/1, III Floor, Jelitta Towers, Mission Road, Bengaluru-560027

- This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

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NEFT / RTGS CHALLAN for CAMPA Funds

Date : 24-09-2025

Agency Name.	NORTH KARANPURA TRANSCO LIMITED
Application No.	6441236902
MoEF/SG File No.	FP/JH/TRANS/41236/2019
Location.	JHARKHAND
Address:	Sunita Sadan 1st Floor Ashram Marg Bariatu Near Military Firing Range Ranchi
Amount(in Rs)	137027401/-

Amount in Words :Thirteen Crore Seventy Lakh Twenty-Seven Thousand Four Hundred and One Rupees Only

NEFT/RTGS to be made as per following details;

Beneficiary Name:	JHARKHAND CAMPA
IFSC Code:	UBIN0996335
Pay to Account No.	150726441236902 Valid only for this challan amount.
Bank Name & Address:	Union Bank Of India FCS Centre, 21/1, III Floor, Jelitta Towers, Mission Road, Bengaluru-560027

- This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

Note:After making the required payment through challan, if the payment status has not been updated even after 7 working days, then kindly mail a copy of your challan with transaction date and reference id to Email: fcsblr@unionbankofindia.bank , epurse@unionbankofindia.bank, ubin0903710@unionbankofindia.bank



Online payment history made by User Agency under CAMPA

Help

Sno.	Proposal Detail	Application_No	Application No (New)	Date of IN-PRINCIPLE	Amount to be Paid/Amount Paid (in Rs.)	Payment Status	Payment Detail	Demand Letter
1	FP/JH/TRANS/41236/2019 Construction of 400 kV D/C North Karanpura to Gaya transmission line (Jharkhand Portion)	TRANS412362019902	6441236902	06 Jun 2023	CA: 0/- PCA: 0/- Safety Zone: 0/- NPV: 0/- Balance amount towards Soil and Moisture 57519200/- Conservat : Balance amount towards Soil and Moisture 19550701/- Conservat : Other Charges3 : 0/- Total : 137027401/-	✓ Paid	Fund Demand Verified by Nodal Officer On : 24 Sep 2025 Bank Name : Union Bank Of India Mode of Payment : NEFT/RTGS (Challan) Challan Generated On : 24 Sep 2025 Transaction Date : 26 Sep 2025	Demand Letter Generated Challan
2	FP/JH/TRANS/41236/2019 Construction of 400 kV D/C North Karanpura to Gaya transmission line (Jharkhand Portion)	TRANS412362019718	6441236718	06 Jun 2023	CA: 0/- PCA: 0/- Safety Zone: 0/- NPV: 0/- Other Charges1 : 0/- Other Charges2 : 0/- Other Charges3 : 0/- Total : 157586600/-	✓ Paid	Fund Demand Verified by Nodal Officer On : 24 Feb 2025 Bank Name : Union Bank Of India Mode of Payment : NEFT/RTGS (Challan) Challan Generated On : 18 Sep 2025 Transaction Date : 04 Mar 2025	Demand Letter Generated Challan
3	FP/JH/TRANS/41236/2019 Construction of 400 kV D/C North Karanpura to Gaya transmission line (Jharkhand Portion)	TRANS412362019826	6441236826	06 Jun 2023	CA: 1/- PCA: 0/- Safety Zone: 0/- NPV: 0/- Other Charges1 : 0/- Other Charges2 : 0/- Other Charges3 : 0/- Total : 1/-	✓ Paid	Fund Demand Verified by Nodal Officer On : 29 May 2024 Bank Name : Union Bank Of India Mode of Payment : NEFT/RTGS (Challan) Challan Generated On : 30 May 2024 Transaction Date : 30 May 2024	Demand Letter Generated Challan
4	FP/JH/TRANS/41236/2019 Construction of 400 kV D/C North Karanpura to Gaya transmission line (Jharkhand Portion)	TRANS412362019504	6441236504	06 Jun 2023	CA: 0/- PCA: 0/- Safety Zone: 0/- NPV: 0/- 0.5% of Project Cost towards Soil & Moisture 8348099/- Conse : Other Charges2 : 0/- Other Charges3 : 0/- Total : 41750499/-	✓ Paid	Fund Demand Verified by Nodal Officer On : 03 Nov 2023 Bank Name : Union Bank Of India Mode of Payment : NEFT/RTGS (Challan) Challan Generated On : 03 Nov 2023 Transaction Date : 06 Nov 2023	Demand Letter Generated Challan






Office of the Principal Chief Conservator of Forests,
Wildlife & Chief Wildlife Warden, Jharkhand,
Van Bhawan, Doranda, Ranchi-834002
Email : pccf-wildlife@gov.in Phone No. 0651-2481744



Office Order No. 22

Date 22/03/2024

Sanction Order of the Site Specific Wildlife Management Plan with reference to the diversion of 197.0115 Ha of Forest Land towards construction of 400 KV D/C North Karnapura to Gaya Transmission Line (Jharkhand Portion) in the state of Jharkhand in favour of M/s North Karnapura Transco Limited under Chatra North, Chatra South & Latehar Forest Division in Chatra & Latehar District of Jharkhand.

The instant Site Specific Wildlife Management Plan (referred to as "the Instant Plan" hereinafter) prepared by Indian Institute of Social Welfare & Business Management (IISWBM), Department of Environment Management, Kolkata has been submitted by M/s North Karnapura Transco Ltd. (referred to as "the User Agency" or "NKTL, Hazaribag" hereinafter) in pursuance of the Condition laid under Item no. A(4) of the "in-principle" (Stage-I) approval order issued by the Ministry of Environment, Forest & Climate Change, Government of India vide its letter no. EP/JH/TRANS/41236/2019-1154 dated 06.06.2023 for diversion of total 197.0115 ha (61.772 ha.- Chatra North Forest Division, 119.8806 ha.- Chatra South Forest Division and 15.3589 ha.-Latehar Forest Division) of forest land in favour of NKTL for construction of 400 KV/DC Transmission Line from North Karnapura to Gaya transmission line (Jharkhand Portion).

The aforesaid condition laid by the Central Government reads as follows:

A(4) "AS recommended by the Regional Empowered Committee, a Wildlife Management Plan and Soil & Moisture Conservation Plan should be prepared by concerned DFO/Project Proponent and approved by the PCCF (Wildlife) & Chief Wildlife Warden, Jharkhand for getting implemented at project cost. The duly approved plan should be submitted in IRO, MoEF&CC, Ranchi before issuance of Final approval. If the finalization of these plans is delayed for any reason not attributable to State/User Agency. Ministry's guideline File No. FC-11/43/2021-FC dated 07th June 2022 can be followed."

In the above stated background, the User Agency, DFO Chatra North, DFO Chatra South and DFO, Latehar Forest Division in pursuance of complying the aforesaid condition laid by the Central Government, have prepared the instant Plan in consultation with each other. Vide his letter no 2093 dated 09.11.2023 the Regional Chief Conservator of Forests, Palamu and letter no 2835 dated 14.12.2023 the Regional Chief Conservator of Forests, Hazaribag has submitted the plan to the office undersigned for its due sanction.

In order to examine the plan prescriptions a communication was issued to the Regional Chief Conservator of Forests, Hazaribag and, Regional Chief Conservator of Forests, Palamu vide this office letter no. 231 dated 14.03.2024, to arrange a Power-Point Presentation of the plan on 19.03.2024 in the Office chamber of the undersigned. The presentation was made by the Project proponent in the presence of RCCF, Hazaribag, DFO, Chatra North, DFO, Chatra South, DFO, Latehar, Sri Santosh Kumar Singh, Head Env, NKTL and Sri Raghvendra Kumar, Head Coult, NKTL participated in the meeting.

The various work components have been assigned to the implementing agencies so as to achieve the maximum efficiency in terms of output and to the best of appreciation of the needs of conservation of forests and wildlife. The cost of the proposed 10 year Site Specific Wildlife Management Plan with respect to the activities to be carried out by DFO, Chatra North, DFO, Chatra South and DFO, Latehar Forest Division has been estimated to be Rs. 1909.89 lakh. The summary of the proposed interventions (component wise) under the Plan with the objective of conservation of forest and wildlife resources is as follows:

Sl. No.	Work Components	Cost Estimates (Rs. In lakh) – To be implemented by Chatra North Forest Division	Cost Estimates (Rs. In lakh) – To be implemented by Chatra South Forest Division	Cost Estimates (Rs. In lakh) – To be implemented by Latehar Forest Division	Total Budget (Rs In Lakh)
1.	Habitat Management & Enrichment- (Food Management, Water Management & Shelter Management)	276.40	318.76	160.00	755.16
2.	Forest Fire Prevention, Control and Management (Fire Fighting squad, along with fire fighting equipments, Theme Plan, Insurance, etc.)	34.25	34.25	43.00	111.50
3.	Research & Wildlife Monitoring	38.00	38.00	49.00	125.00
4.	Anti-depredation and Wildlife Conservation & Protection Activities (Anti-depredation activities, Site Specific HWC Mitigation Plan)	142.50	122.75	139.00	404.25
5.	Eco/Community Development, Awareness Generation and Capacity Building (Development, Capacity building of local people as well forest staff & conservation awareness activities, Climate Resilient Livelihood Forest based and others)	74.00	67.50	69.00	210.50
6.	Management and Evaluation	20.50	8.00	0.00	28.50
	Total	585.65	589.26	460.00	1634.91
7.	Cost escalation consolidated @ 20%	117.13	117.85	0.00	234.98
8.	Contingency LS	15.00	15.00	10.00	40.00
	G. Total	717.78	722.11	470.00	1909.89

The Plan with a total financial outlay of Rs 1909.89 lakh (717.78 Lakhs INR in Chatra North Forest Division, 722.11 Lakh in Chatra South Forest Division and 470.00 Lakhs INR in Latehar Forest Division) for implementation of Site Specific Wildlife Management Plan (SSWLMP) extending over a period of 10 years (Year 2024-25 to 2033-34; tentatively), shall be utilized by the State Forest Department through the DFO, Chatra North, Chatra South and DFO Latehar in accordance with the Plan prescriptions.

Considering the proposals under the plan, sanction is hereby accorded to the instant Plan subject to the following conditions:

- (i) Implementation of the Site Specific Wildlife Mitigation Plan prepared in respect of the proposed project.
- (ii) That various activities in the project shall be executed under the monitoring and guidance of DFO, Chatra North, DFO Chatra South and DFO, Latehar in their respective jurisdiction and under the supervision of RCCF Hazaribag, RCCF, Palamu CF, Territorial Circle Chatra and CF, Territorial Circle Medininagar respectively.
- (iii) That the User Agency shall ensure that its officials/contractors and the work force engaged into transmission line laying and allied works shall not commit or abet any forest/wildlife offence in their area of operation. They will also promptly report any forest/wildlife offence in the area to the nearest forest office/official. Further, they will extend their full cooperation to the forest officials in control/mitigation of any incident, natural or manmade, detrimental to forest and wildlife in their area of operation.
- (iv) The height at the maximum sagging point of the transmission line should be maintained more as prescribed general clearance/height. As proposed by the state forest department, minimum 25 feet height at the maximum sagging point of the transmission line should be maintained in consultation with concerned DFO/DFOs.
- (v) The entire length of the proposed power line between North Karanpura to Gaya should be marked with appropriate bird diverters spaced at 10 m intervals. The bird diverters shall be regularly checked and maintained by the User Agency.
- (vi) The user agency and project personnel will comply with the provisions of Standard SOP/Guidelines issued by WII, Dehradun for linear projects.
- (vii) Any felling/pollarding/pruning of trees for allowing electrical clearance/maintenance will be done with the permission of the DFO, Chatra North, DFO, Chatra South and DFO, Latehar in their respective jurisdictions. Only those trees that are of sufficient height to compromise the requirements of minimal vertical and horizontal clearance from the conductor wires at maximum sag point should be lopped.
- (viii) The gabion plantation of native, palatable species suitable for wild ungulates should be actively promoted by the user agency in collaboration with Jharkhand Forest Department below the power-line in order to avoid invasive species likely to come up due to periodic clearing of vegetation along the power-line.
- (ix) That the total amount of Rs. 1909.89 lakh shall be deposited by the User Agency into CAMPA account only through <https://parivesh.nic.in> under the relevant head/sub-head which shall be utilized by the State Forest Department through the DFO, Chatra North, DFO, Chatra South and DFO, Latehar as delineated under the Plan, strictly in accordance with the prevailing norms under the Jharkhand Forest Department.
- (x) That the User Agency shall implement the mitigation measures/activities mentioned under the Plan. The implementation shall be done under the directions and strict supervisions of DFO, Chatra North, DFO, Chatra South and DFO, Latehar.
- (xi) That the DFO, Chatra North, DFO, Chatra South and DFO, Latehar shall prepare detailed Annual Plans of Operations (APOs) in the beginning of every financial year during the Plan period, as provided in the instant Plan, following all the rules, regulations, Schedule of Rates etc. issued from time to time by the State Government/ Forest Department.

Regional Chief Conservator of Forests, Hazaribagh and Regional Chief Conservator of Forests, Palamu shall supervise & closely monitor the progress of the activities.

- (xii) That the CF, Chatra and CF, Medininagar shall respectively supervise all the activities under the Plan undertaken by Chatra North Forest Division, Chatra South Forest Division and Latehar Forest division respectively as per directions issued by the Forest Department from time to time.
- (xiii) That the DFO, Chatra North, DFO, Chatra South and DFO, Latehar shall carry out the activities under the Plan strictly as per the duly sanctioned APOs.
- (xiv) That the DFO, Chatra North, DFO, Chatra South and DFO, Latehar shall ensure that no violation of duly sanctioned Working Plan of DFO, Chatra North, DFO, Chatra South and DFO, Latehar takes place during implementation of any of the activities involved in this plan over notified and demarcated forest land.
- (xv) That the instant Plan is dynamic and shall be revisited after every 2 years and a revised plan may be formulated as per need of the project impacted area and convenience of the implementing agencies. The revised plan, if any, shall be put up before the Principal Chief Conservator of Forests, Wildlife & Chief Wildlife Warden, Jharkhand for its due approval.
- (xvi) That the User Agency shall submit an Undertaking to the DFO, Chatra North, DFO, Chatra South and DFO, Latehar to the effect that they will deposit extra cost of the plan owing to increase in wage rate, cost of materials etc. in due course of time as well as consequent upon revision of the plan, if any, as and when given effect to by the competent authority.

Sd/-

Principal Chief Conservator of Forests
Wildlife & Chief Wildlife Warden, Jharkhand

Memo No.

Dated:

Copy forwarded to Deputy Director General of Forests (Central), Ministry of Environment, Forests and Climate Change, Integrated Regional Office, Harmu Housing Colony, Ranchi [E-mail: ro.ranchi-mef@gov.in] for information and necessary action.

Sd/-

Principal Chief Conservator of Forests
Wildlife and Chief Wildlife Warden, Jharkhand

Memo No.

Dated:

Copy forwarded to Principal Secretary, Deptt. of Forest, Environment and Climate Change, Jharkhand, Ranchi/ Principal Chief Conservator of Forests, Jharkhand, Ranchi/ PCCF-cum-Executive Director, Wasteland Development Board, Jharkhand, Ranchi for information.

Sd/-

Principal Chief Conservator of Forests
Wildlife & Chief Wildlife Warden, Jharkhand

Memo No.

Dated:

Copy forwarded to Addl. PCCF, CAMPA, Jharkhand, Ranchi with a copy of the Plan for information and necessary action.

Sd/-

Principal Chief Conservator of Forests
Wildlife & Chief Wildlife Warden, Jharkhand

Memo No.

Dated:

Copy forwarded to Regional Chief Conservator of Forests, Hazaribagh/ Regional Chief Conservator of Forests, Palamu/ DFO, Chatra North Forest Division/DFO, Chatra South Forest Division/DFO, Latehar Forest Division/ Conservator of Forests, Chatra/ Conservator of Forests, Medininagar for information and necessary action.

5d/-

Principal Chief Conservator of Forests
Wildlife & Chief Wildlife Warden, Jharkhand

Memo No. 230

Dated: 22/03/2024

Copy forwarded to Sri Raghvendra Kumar, Head (Project), NKTL, Hazaribag for information and necessary action.

Principal Chief Conservator of Forests
Wildlife & Chief Wildlife Warden, Jharkhand



SITE SPECIFIC WILDLIFE MANAGEMENT PLAN

FOR 400 kV (D/C) TRANSMISSION LINE FROM
NORTH KARANPURA THERMAL POWER PLANT
TO GAYA (JHARKHAND PORTION)

Document No: IISWBM/WLCP-NKTL/2021-23/002-Version: 1.1



IISWBM

May 2023

Foreword

A balance between development and conservation of nature (including forest ecosystem) is the need of hour. It is required as our forests, the only home of wildlife, are becoming fragmented by linear infrastructures like transmission lines.

A transmission line along with other adverse impact of forest and wildlife mainly causes habitat loss, habitat fragmentation and disturbance induced behavioural changes impacting arboreal animals/gliders and birds. It also causes impediment to movement and thereby causing injury and mortality impacting large mammals, arboreal animals/gliders and birds. The clearing of native vegetation in transmission line affect permeability of habitat for a wide range of wildlife. In addition, animals other than birds may be injured or killed as a result of collisions with or electrocution by transmission lines. However, the main impacts of transmission lines are undoubtedly on birds. Electrocution of birds, and their collision with transmission lines, is not only a topic of conservation concern but also an issue of serious economic and financial costs. Therefore to balance the developmental goals with conservation necessity, mitigation should be goal oriented and must follow a hierarchy of measures. Mitigation measures must be addressed as an integral part of project planning and implementation to target significant impacts.

The area proposed for diversion in Latchar for 400 KV DC NKTL-Gaya transmission line is rich in floral and faunal diversity being the neighbouring area of Lawalong Wildlife Sanctuary. Latchar is located in one of the India's significant wildlife corridor that connects the Sanjay Gandhi National Park in Singrauli district of Madhya Pradesh to Bhimbandh Wildlife Sanctuary in Munger district of Bihar. Elephant herds are regularly traversing the forests in this area and due to change in landscape the Human-Elephant conflict cases are increasing.

This plan tries to address these issues by focusing on habitat management and improvement activities through soil and moisture conservation activities and bamboo plantation / restocking of existing, minimizing the floral and faunal loss of forest and wildlife with improved forest fire management, awareness generation and capacity building of communities living around the projects area, minimizing the human-animal conflict and losses by anti-depredation activities and monitoring and evaluation mechanism.



Raushan kumar, IFS

Divisional Forest Officer
Latchar Forest Division

SITE SPECIFIC WILDLIFE MANAGEMENT PLAN

**FOR 400 KV (D/C) TRANSMISSION LINE FROM NORTH
KARANPURA THERMAL POWER PLANT (3x660 MW)
TO GAYA (JHARKHNAD PORTION)**

Document No: IISWBM/WLCP-NKTL/2021-23/002-Version: 1.1

adani

**NORTH KARNPURA TRANSCO LIMITED
RANCHI (JHARKHAND)**

Prepared by



IISWBM

**Department of Environment Management
Indian Institute of Social Welfare
& Business Management
(A Constituent Institute of University of Calcutta)
Kolkata - 700 073**

May, 2023

FOREWORD

North Karanpura Transco Limited (NKTL) is a subsidiary company of Adani Transmission Limited (ATL) which has been formed to establish the Transmission System for "Immediate Evacuation for North Karanpura (3X660MW) generation project of NTPC along with creation of 400/220kV Substation at Dhanbad (ERSS-XIX)". Accordingly, NKTL has proposed to construct 400 kV (D/C) transmission line with quad moose conductor from North Karanpura Thermal Power Plant (3x660MW) to Gaya. State Forest Officials while recommending the forest proposal for forest clearance has suggested for formulation of sitespecific Wild Life Management Plan in accordance with guidelines issued by PCCF-cum-Chief Wildlife Warden, Jharkhand for site-specific Wildlife Management Plan for diversion of forest land (2015). Accordingly, NKTL has commissioned the said study to Environment Management Department, IISWBM for the purpose.

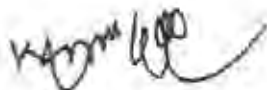
The study presents results of the comprehensive field survey of flora and fauna within the influence zone of proposed TL. The report provides an in-depth analysis ecological setting within the influence zone along with likely ecological impact of proposed TL passing through selected forest stretches. The report also present cost-effective Wildlife Management Plan (WLMP) for minimizing the likely adverse impact during construction and O&M phase on local ecological setting including forest and wildlife of the project area. The estimated budget also have been worked out for implementation of proposed WLMP.

This study would have not been possible without the constant support and guidance of Shri Santosh Kumar Singh, Head-Adani Energy Sustainability Group and Shri R. N. Shukla, Head-Environment & Forest, Corporate Environment Group and other executives of APL, we are indebted to acknowledge their guidance and support.

We are also thankful to Shri Raghavendra Kumar, DGM & Head, NKTL, Chandrasekhar Singh, Assistant Manager & Site In charge, NKTL and other executives of NKTL for their valuable guidance and support provided from time to time in completion of field survey.

The study has been carried out under the technical collaboration with ecological & wildlife experts of University of Calcutta and University of Kalyani. We are indebted to acknowledge the guidance and proactive support extended by the faculty members and research scholars of Department of Marine Science, University of Calcutta & Department of Environmental Science, University of Kalyani in execution of the present study.

Kolkata
May 28, 2023


Prof (Dr) Krishna M Agrawal
Project Director, IISWBM

PROJECT PERSONNEL

PROJECT ADVISOR

Prof Dipankar Das Gupta
Director, IISWBM

PROJECT DIRECTORS

Prof (Dr) Subhas Ch Santra
A Grade NABET Accredited Biodiversity Expert

Prof (Dr) Abhijit Mitra
Aquatic Biodiversity Expert, University of Calcutta

Prof (Dr) Krishna M. Agrawal
Environmental Expert, IISWBM

Dr. Pranjalendu Ray
Principle Scientist (ex), ZSI/NMNH, MoEF&CC

PROJECT TEAM MEMBERS

Dr. Subhash C. Santra, Professor, DoES, Kalyani University
Dr. Abhijit Mitra, Professor, DoMS, University of Calcutta
Dr. Krishna M. Agrawal, Professor & Dean (Ex), IISWBM
Dr. Pranjalendu Ray, Principal Scientist (ex), ZSI/NMNH, MoEF&CC
Dr. Debasish Mondal, Chief Scientist, GEEC
Dr. Sarbani Mitra, Professor, IISWBM
Ms. Moumita Sarkar, Project Officer
Mr. Rahul Chakraborty, Research Fellow
Mr. Sourav Bardhan, Project Fellow
Ms. Asmita Basu, Project Fellow
Ms. Solanki Das, Project Fellow
Mr. Soumen Banerjee, Project Fellow

PROJECT COORDINATOR

Prof (Dr) Krishna M. Agrawal
Head, MBA-PS & Dean(Ex), IISWBM

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Recd 22.9.23

Ragivendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

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 Rajivendra Kuntal
 Head-Projects (Site) TL
 NWTL, Naxambagh

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Raghendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

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RAJIBENDU SUTAR
 Head, Projects (S&D) TL
 NW FL - Ranchi

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Paal
 Raghvendra Kumar
 Head-Projects (Site) TL
 NKTIL - Hazaribagh

EXECUTIVE SUMMARY

1.0 INTRODUCTION & BASELINE STUDY

North Karanpura Transco Limited (NKTL) is a subsidiary company of Adani Transmission Limited (ATL) which has been formed to establish the Transmission System for "Immediate Evacuation for North Karanpura (3X660MW) generation project of NTPC along with creation of 400/220kV Substation at Dhanbad (ERSS-XIX)". Accordingly, NKTL has proposed to construct 400 kV (D/C) transmission line with quad moose conductor from North Karanpura Thermal Power Plant (3x660MW) to Gaya. In Principal approval for diversion of 197.0115 ha. forest area was granted by IRO, MOEFCC, Ranchi vide letter dated 06.06.2023.

Respective Divisional Forest Officer (DFO) while recommending the forest proposal for forest clearance has suggested for formulation of site-specific Integrated Wildlife Management Plan for proposed 400 kV (D/C) transmission line with quad moose conductor from North Karanpura Thermal Power Plant to Gaya (Jharkhand Portion) is required to be formulated to prevent and minimize the likely ecological impact, if any during construction as well as operation phase.

The objective of the present study includes:

- To prepare inventory of wildlife (flora and fauna) found along the proposed route of 400 kV D/C transmission line from North Karanpura to Gaya (Jharkhand Portion).
- To undertake ecological study within the Buffer zone of proposed 400 kV D/C transmission line.
- To identify threatened and endangered species of flora and fauna if any and prepare conservation and management plan for the same.
- To prepare site specific Integrated Wildlife Management Plan to minimize the negative impact on wildlife likely to be found within the Buffer zone of proposed transmission line from North Karanpura to Gaya (Jharkhand Portion), if any.

The scope of the study includes the undertaking of a reconnaissance survey. Based on the reconnaissance survey a framework has been evolved for undertaking time bound detailed field survey within the Buffer zone of the proposed 400 kV D/C transmission line (i.e., 10.0 km both the side of RoW i.e., 46m) and preparation of Integrated Wildlife Management Plan including budget estimate for undertaking mitigation measures by project authority as well as DFOs of concerned Forest Divisions.

The Salient features of proposed North Karanpura to Gaya 400 KV (D/C) transmission line is presented in following table:



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Rajivendra Kumar
Joint Project Officer (Site) TL
NKTL Karanpura

Name of Proposed Transmission Line	:	400 kV D/C (Quad Moose) North Karanpura – Gaya Transmission Line (Jharkhand Portion)
District	:	Latehar (Jharkhand), Chatra (Jharkhand),
Total No. Angle Points	:	Jharkhand Portion 73 Nos (From common point
Total Route Length	:	Jharkhand Portion= 69.74 km. (From common
Terminal Points	Gantry North	E : 298128
	Karanpura :	N : 2639035
	Gantry Gaya:	E : 292646
		N : 2725070
Major Crossings along the route:		
Total H.T. Line	:	Total = 3 Nos 220 kV (1Nos.) and 400 kV (2nos.)
Total Railway Line	:	01 Nos.
National Highway (NH)	:	02 Nos
State Highway (SH)	:	Nil
River Crossing	Major River :	Nil
	Minor River:	Nil
Forest /Sanctuary involved & Status of Forest Diversion Proposal	:	42.828 Kms i.e., 197.0115 ha (PF & Jungle Jhari) In Principal approval for diversion of 197.0115 ha. forest area was granted by IRO, MOEFCC, Ranchi vide letter dated 06.06.2023
Town, Cities & villages along the route	:	The route alignment is avoiding towns / inhabitants
Minerals in the route corridor	:	Nil
Type of Crops, Fruits, Forest Land, Hill are along the route	a) Crops	Rice, Aarahar, Maize, Sugarcane, Wheat etc.
	b) Soil	Normal Dry, Wet, Wet Paddy, Wet, PS, FS, DFR & Hard Rock. Soil investigation report shall be furnished on later date
	c) land	Plain (70%)
	d) Hill	HILL (30%)
Land involvement	:	Combination of Sparse Open Scrub, Govt. Land,
Climate	Seasons	Summer= March to June,
		Rain = July to September, Winter = October to February



Rash
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

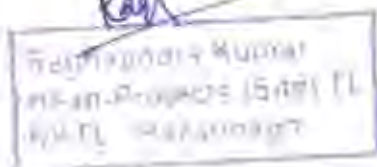
	a) Maximum Temperature	46°C
	b) Minimum Temperature	19°C
Specific features	This alternative route-1 Central Coalfields limited (CCL) and Ministry of Coal (MOC) has issued NOC for route-1 minimum coal blockage <u>Hence, Route-1 is the only option for the project.</u>	
Project Cost	157 Cr	

Following major factors were taken into account while deciding the final line route of the projects as per provisions of the acts and rules -

- ✓ Major habitation and major settlement area avoided.
- ✓ Minimum route length.
- ✓ No Protected Areas i.e., Wildlife Sanctuary / National Park/ Biosphere Reserve/ ESZ area etc. involved.
- ✓ Minimal involvement of forest area.
- ✓ Higher density tree patches avoided.
- ✓ Minimum Vegetation / tree cutting in the route of line.
- ✓ Archeological Structures, defense sites, airport area etc. are avoided.
- ✓ Rich gardens, plantations, notified industrial area, etc. avoided,
- ✓ No involvement of temples/ Cultural Habitats/ Schools & colleges.
- ✓ Road connectivity to project sites to avoid construction of temp roads.
- ✓ No involvement of Industrial corridor.
- ✓ Minimum no. of River Crossings, Railway Crossings, Highway Crossings, Power Line Crossings are considered.
- ✓ Economic viability of the route.

The major construction activity envisages in the proposed 400 kV transmission line are as follows:

- Construction of Tower Foundation (An average of 14.89 M x 14.89 M tower base and activities involves excavation of soil and concreting)
- Erection of transmission towers (involves joining of tower members/lattice structure)



- Stringing of electrical conductor wires between adjacent towers.
- Activities during operation and maintenance of the transmission line during its working life.

The state-of-the art method has been used for ecological impact assessment study. The present study was exploratory in nature based on primary as well as secondary data. The following step wise approach & methodology was followed in order to achieve conformity with the scope of work for baseline data collection.

- **Step 1: Reconnaissance Survey**- A reconnaissance survey was undertaken to understand the complexity of terrain, habitats available, approach for various locations enroute to transmission line corridor and potential areas for species enumeration.
- **Step 2: Secondary Data Collection** - Available secondary data through published research papers, books and periodicals and PhD thesis from the area was reviewed and enlisted to confirm the presence of species. Secondary data was also collected on the historical surveys in the area. The Working & Management plan of the respective forest division and protected area, if any, was also reviewed. Consultation with the locals and forest officials was also made.
- **Step 3: Primary Data Collection** - Primary surveys were undertaken to understand the actual baseline and analyse the impacts of the proposed project on ecological baseline.
- **Step 4: Biodiversity Impact Assessment** - Assessment of impact of the various construction and operation activities on the ecological baseline.
- **Step 5: Wildlife Management & Conservation Plan** - Preparation of Wildlife Management & Conservation plan for mitigation of major impacts of construction and operation activities

The list of flora and fauna in the project area was collected from the working plan of Chatra South FD and Latehar FD. A detailed survey will be done with experts (BSI and ZSI) to identify threatened and endangered species of flora and fauna if any and prepare a conservation and management plan for the same (cost to be borne by User Agency). The Study Area comprises of Project area (i.e., Project corridor / ROW area) and buffer area (i.e., 10 km from both side of corridor area) of North Karanpura to Gaya (Jharkhand Portion) 400 KV (D/C) transmission line.

The climate of the project area is characterized by humid to sub-humid climate. The region has a variety of climatic conditions with higher landforms in the south and plains in the north. The summers are cool and moderate in the southern region. The area experiences temperatures between 16 and 18°C in the winter and up to 41°C in the summer. The highest southern regions receive up to 2000 mm of rainfall annually. However, northern part remains in rain shadow

area and receives less than 1200 mm rainfall.

The detailed LULC analysis has been undertaken for the study area considering 10 km area both the sides of NKG (Jharkhand Portion) 400KV D/C Transmission Line of NKTL. The LULC data for the project region has been acquired from ESRI land cover data having spatial resolution of 10m x 10m. The data was further processed and analyzed by utilizing the ArcGIS software. The analysis indicates that within the study area, nearly 35.26% is forest area and similarly cropland area covers 34.92% and shrubland constitutes 24.8%. However, water bodies in the study area account for only 0.35% and built-up area comprises of nearly 4.51%. The segment wise analysis of LULC of study area indicates that maximum forest cover (i.e., 48.96%) falls under segment 6 (i.e., 50-60 km) followed by 46.3% under segment 3 (i.e., 20-30km).

The analysis of drainage pattern of project area reveals that the principal rivers are Lilajan, Barki, Chako, Damodar and Garhi. The general slope is North to South. The general trend of the drainage is from SE-NW. The structural features, particularly the foliation and joints exert profound impact upon the drainage and control the drainage pattern of the region.

The soil type of project region includes Entisols, Inceptisols and Alfisols. Alfisols were the dominant soils covering 52.2 % followed by Entisols (33.9 %) and Inceptisols (13.0%). The analysis indicates that area's main agricultural products include paddy, wheat, maize, gramme, legumes, and vegetables. However, due to the mountainous and rugged topography, there is very little land that can be utilized for agriculture. Only 12.21% area of agricultural use are net irrigated and major source of irrigations are well and tube wells.

The list of flora and fauna in the project area was collected from the working plan of Chatra South Forest Division, Chatra North Forest Division and Latehar Forest Division. Further the list of site-specific flora actually present in the project region was also enlisted on the basis of survey of project site.

The study area along the corridor of 400 kV NKG (within Jharkhand portion) transmission line showed a few protected forest and Jungle Jhari (Degraded Scrub Land) intermingled with village settlements and crop field. However, there are few waterbodies, streams and rainfed rivers in the vicinity of the project area. Due to the unique setting of undulated landform, faunal diversity of the landscape is fairly good.

In general, the forest area of the project region belongs to two major categories viz., Sal Forest and mixed forest. The estimation of Importance Value Index (IVI) of various tree species found within the RoW of proposed NKG (Jharkhand Portion) transmission line indicate that maximum IVI was found for *Shorea robusta* (202.32) followed by *Casia fistula* (189.02, *Madhuca latefolia* (136.21) and *Anogeissus latefolia* (84.03).

In addition, there are many plantation patches where plants like Eucalyptus, Akashmoni, Karan],



Rash
Rajeshwari Kumar
Head, Project (Sib) TL
NITL, Huzaribagh

Amlaki, Tamarind, Jamun, Teak etc. were planted. There are a couple of invasive alien plant species often found in the forest viz. Lantana, Chromolaena, Hyptis, Imperata, Argemone etc. were also found in forest patches. The proposed transmission line is not passing through any Protected Areas i.e., Wildlife Sanctuary, National Park, etc. and Eco-sensitive zone.

Further, details of movement of mega wildlife, man animal conflict and depredations caused by the wild animal in the study area have been mentioned in the report as per the data received from Chatra South, Chatra North & Latehar Forest divisions.

The analysis of villages falling under the study area i.e., 10 km both the side of ROW of proposed transmission line reveals that 55 villages fall under Project area and 343 villages under buffer zone. The villages within the study area primarily fall under Simariya, Lawalong, Chatra and Hunterganj Blocks of Chatra District and Barlayatu Block of Latehar District under Jharkhand State. Out of total villages falling under study area maximum villages are under Hunterganj Block i.e., 175 (44.08%) followed by Chatra Block i.e., 101 (25.44%). The analysis of demographic profile of villages falling under the study reveals that total number of households in the villages under the study area are 61,782 with total population of 3,79,740. 32.78% are scheduled caste and 5.36% are scheduled tribe of total population in the villages under the study area.

2.0 ECOLOGICAL AND ENVIRONMENTAL IMPACT

The proposed project is likely to have both positive and negative impact on the environment and ecological setup of the project region. The likely ecological & environmental impacts with specific reference to the various activities related with construction and maintenance of proposed 400 kV Transmission Line from North Karanpura to Gaya (Jharkhand Portion) is presented in subsequent sections.

Project Benefit: The Project will facilitate the evacuation of power from the 3x660 MW (1980 MW) Superthermal power project of NTPC, thereby increasing productivity in the industrial sector and improving power availability in the area.

The beneficiaries (Long Term Transmission Customer) under the TSA (Transmission Service Agreement) for the NKTL projects are as under, which comprising of Jharkhand, Bihar, Odisha, and West Bengal:

- West Bengal State Electricity Distribution Co. Ltd. (West Bengal)
- GRIDCO Ltd. (Odisha)
- North Bihar Power Distribution Company Ltd. (Bihar)
- South Bihar Power Distribution Company Ltd. (Bihar)
- Jharkhand Bijli Vitran Nigam Ltd. (Jharkhand)

The evacuation of power will help the power generation and distribution companies. Entire region

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 Raghvendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

and beneficiary states will get benefited from the availability of reliable energy. Various sectors of economy like manufacturing industry, banking, manpower, engineering etc. will get benefited due to improved power supply.

The project will provide direct and indirect employment during construction & operation phase and shall improve the socio-economic status of the region and result in overall economic development.

Out of total area i.e., 320.804 ha falling within ROW of proposed 400 kV D/C North Karanpura to Gaya (Jharkhand Portion) transmission line, 197.0115ha is forest area and the remaining 123.7925 ha is non-forest area. The analysis of division wise forest area falling under the proposed transmission line reveals that 15.3589 ha area falls under Latehar Forest Division while 119,8806 ha of forest area falls under Chatra South division. The remaining 61,772 ha area falls under Chatra North Forest Division.

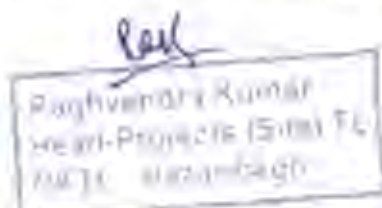
The analysis of component wise forest area utilization within ROW for construction of proposed 400 kV D/C North Karanpura to Gaya (Jharkhand Portion) transmission line reveals that only 3.4612 ha forest area will be required for setting up tower foundations whereas 96.763 ha of ROW area would be required for stringing and remaining ROW area i.e. 96.7873 ha is required for maintaining minimum clearance between conductors and forest canopy for safety. Out of total forest area i.e. 197.0115 ha., 149.1959 is Protected Forest (PF) and 47,8156 ha is Jungle Jhari (JJ). In Latehar forest division, 8.5899 ha. land belongs to Protected Forest (PF) and 6.769 ha. to Jungle Jhari (JJ), in Chatra South 88.677 ha. land belongs to (PF) and 31,2036 ha. is Jungle Jhari (JJ) and in Chatra North 51.929 ha. land belongs to (PF) and 9.843 ha. is Jungle Jhari (JJ) forest area.

The Normalized Difference Vegetation Index (NDVI) of the study area was analysed on GIS platform using Landsat-8 data of May 24, 2023. The analysis revealed the status of vegetation cover of the study area i.e. 48.53% area having low to moderate vegetation cover where as "Very Dense/Healthy Vegetation Cover" accounts for 11.21% of the study area. The remaining portion (40.25%) is covered by built up areas and water bodies.

The ecological impacts of the proposed North Karanpura to Gaya (Jharkhand Portion) 400 kV D/C transmission line corridor passing through selected forest stretches has been categorized into the following categories:

- Impacts on forest & wildlife during Construction Phase
- Impacts on forest & wildlife during Operation Phase

Unlike other infrastructure projects the impacts of proposed 400 kV transmission line on biodiversity are much lower in scale. Most of the impacts are confined to activities such as tower foundation, tower erection and stringing. The ground disturbances, if any, are likely to be



regenerated on the ground. The operation phase will have limited impacts w.r.t. vegetation clearance below the lineis to maintain the desired ground clearance as per the established electrical safety norms.

Vegetation clearance along the transmission tower locations and corridor (ROW) area for the various construction activities may lead to habitat loss, habitat disturbance to faunal species. It may also lead to loss of natural vegetation resulting to reduced vegetal cover, shrinkage in natural forest cover, loss of nesting and foraging for avifaunal species, arboreal amphibians, reptiles and movement pattern of mammal species in the study area.

The excavation, leveling and removal of vegetation may also result in soil erosion which will be washed and drained with the occurrence of rains will runoff to the natural streams and change the stream characteristics, impacting the aquatic habitat associated amphibians and reptile and mammalian species.

The analysis of trees falling within ROW of North Karanpura to Gaya (Jharkhand Portion) Transmission Line indicate that the total number of trees falling in the corridor of 46 meters is **20879** no's out of which **1264** numbers of tree are impacting tower base area and **12327** numbers of trees are impacted in the corridor of transmission line, total **13591** trees (tower base area and corridor) which will be cut during construction of transmission line, trimming of **6117** numbers of trees will be done which are lying in corridor of transmission line during stringing work and rest **1171** numbers of tree will remain unharmed and shall continue standing in corridor as it is.

The impact will be limited to the activity areas, transmission tower locations and corridor (ROW) activity areas as described above and will not cause a significant change in the population of these species and therefore the impact magnitude has been deemed as Medium. The construction period suggested is around 23 months hence, the impact durationsuggested as "Short term" and likely to be reduced in subsequent years due to high re-generationrate.

Removal of vegetation and construction activities can have a direct and indirect impact on the local ecology. The impact is limited to the construction phase of the Project, following which the vegetation can recover, however, recovery as back to original stage will require significant duration of undisturbed state. The significance of the residual impacts is Minor for habitats and species.

Following prime impacts are envisaged during the Operation Phase:

Paul
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

Impacts during the operation	
Phase	Context
Impacts due to electrocution and collision of avifaunal species with conductor.	Mortality by Electrocution: Electrocution may happen if the avifaunal species sitting on the conductor and touching two-phase.
	Mortality by collision: Mortality by collision may happen if the avifauna flying near the conductor did not spot the conductor and collides with it in full force, leading to physical injury (Like broken wings etc.) resulting in death.
Disturbance to vegetation during maintenance of required ground clearance.	Preventive and Corrective Maintenance of the transmission line and for maintenance of the mandatory vertical clearance between vegetation and the lowest point of conductor sag. This will involve lopping and pruning of existing tree species leading to loss of nesting and perching sites.
Electrocution of Arboreal mammals.	The arboreal mammals in the study area may face changes in the movement within traditional corridors and mortality due to electrocution while moving from one canopy to another canopy with transmission line as the barrier in between.

The proposed North Karanpura to Gaya (Jharkhand) 400 kV D/C transmission line will not pass through any protected areas such as National Parks or Wildlife Sanctuary and Eco Sensitive Zone. There are some Schedule I species, IUCN listed CR and VU species reported in Latehar, Chatra North and South Forest Division based on the forest working plan in the 10 Km study area. The residual impacts for the operational phase impacts are deemed as Low as the implementation of mitigation measures suggested will lower the impact magnitude from moderate to low.

Page
Raghendra Kumar
Hyatt Products (Site) TL
NMTL Hazaribagh



3.0 STRATEGIES FOR MITIGATION OF IMPACT ON WILDLIFE

Where wildlife and biodiversity values of importance to conservation are associated with a project site, the formulation of Integrated Wildlife Management Plan (IWMP) provides a useful means to focus a project's mitigation and management strategy. The development of a IWMP for transmission line project documents the process, actions, responsibilities, and budget allocation. It also gives the opportunities to investigate the effectiveness of the mitigation measures suggested and provides as chance to revisit them and make timely changes to update/upgrade the mitigation actions for better management of forest & wildlife.

The wildlife management & conservation plan has been devised on the following aspects.

- Ecological Sensitivities along the transmission line corridor.
- Species of conservational significance along the transmission line corridor.
- Impacts during the construction and operation phase.
- Proposed mitigation measures.
- Parameters to be monitored.
- Measurement and frequency.
- Institutional responsibility.
- Implementation schedule

This chapter presents the objectives of the management and strategies to mitigate and minimize adverse impact likely to be observed within the study area. The objective of the present study was to find solutions for mitigating impact on wildlife in the project area. During the construction work the disturbance of the habitat will be more and so the impact will be greater. Regular contact with the Forest Department will be maintained to monitor wildlife movement when the work starts. The mitigation work will start simultaneously with as the construction work starts on priority based in the forest area diverted. Based on identified impact the following mitigation measure will be carried out:

- i. Proper signage at strategic locations with suggestions to follow in order to have regulated construction & maintenance activities in ROW falling under the elephant movement/corridor route will be strictly followed.
- ii. To check the signage of important species of animals with short information will be erected on strategic location of forest area along the ROW.
- iii. Monitoring for animal deaths due to electrocution and effectiveness of implemented measures.
- iv. Safe passage by providing minimum ground clearance of 30 feet for wild animals and special elephant crossing to cross.
- v. Exchange of information with NKTL and forest department regarding presence of elephant in the area.



Paul
Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

- vi. Wildlife and wildlife habitat will be protected in accordance with wildlife law and guideline issued by Chief Wildlife Warden.
- vii. Artificial nests will be installed on trees near pond/ water bodies and in villages for roosting and nesting of birds, if required.
- viii. Plantation of native trees species.
- ix. Installation of Anti-climbing devices for protection of arboreal species & chain link fencing at base of tower falling in the vicinity of elephant movement zone for protection from electrocution.
- x. Soil binders like Bamboo will be planted to protect soil erosion particularly in the stream, water bodies where the chance of erosion is more.
- xi. Preference will be given to local people in employment during construction period.
- xii. The Project proponent will take responsibility for awareness generation and livelihood options among people of project village.

On the basis of above assumption, Wildlife Management Plan has been prepared keeping in mind following plans:

- i. Habitat Management & Enrichment
 - a. Food Management
 - b. Water Management
 - c. Shelter Management
- ii. Forest Fire Prevention, Control and Management
- iii. Research and Wildlife Monitoring
- iv. Anti-Depredation and Wildlife Conservation & Protection Activities
- v. Eco/Community Development, Awareness Generation and Capacity Building.
- vi. Management and Evaluation.

4.0 INTEGRATED WILDLIFE MANAGEMENT PLAN FOR PROJECT AREA

"Mitigation Measures" refer to the actions that can be implemented to minimize the magnitude of the project related impacts on ecology in general and forest & wildlife of the project area. Mitigation can carry on along three possible courses of actions, either by changing actions (1) at source, (2) on path (3) or at the receiving end.

Based on the present study it is very clear that the prevailing physical environmental conditions of the project location and associated project activities predicted to impact upon some ecological attributes (flora & fauna) of the project area which are at local, shorter period mainly during construction phase and magnitude of low to moderate levels in many cases. Overall impact statement identified impacts in construction and operation phase as:



Rajendra Kumar
 Rajendra Kumar
 Head-Projects (S&D) TL
 NHAI, Hyderabad

Mitigation measures proposed to be adopted to protect wildlife during the construction phase are presented below.

- Raghu
Raghvendra Kumar
Head-Projects (Site) TL
*TL - Hazaribagh

- No night stay at the construction site should be planned, proper planning of day work (within the daylight hours) should be done.
- Movement within the wildlife area should be entirely regulated, each work force party/gang should be trained in do's and don'ts and how to deal in a situation of wildlife encounter before entering the wildlife area.
- Hunting, trapping, and poaching by the employed work force should be completely banned and work force/contractors should be made aware about no poaching tolerance strategy.
- The excavated pits for foundation towers shall be properly hard barricaded and fenced so as to prevent accidental falling of mammals in the vicinity of the construction sites.
- Vehicle speed while travelling to the activity area should be regulated and minimized as required.
- Proper housekeeping of the construction areas should be followed during and after construction phase is completed.
- Monitoring shall be done to oversee the mitigation measure implementation during the construction phase.
- Before the start of work in the selected protected forest stretches awareness, a campaign will be taken up to create maximum awareness among the construction workers regarding safeguard of forest and wildlife.

Mitigation measures proposed to be adopted for protection of wildlife during the operation phase are presented below:

- Routine and corrective maintenance should be undertaken on regular basis.
- Pre nest search before commencing any pruning and lopping to be undertaken.
- Suggesting artificial nest boxes along the transmission line route to mitigate the loss of nesting sites along the transmission line route.
- In addition to the above, artificial nesting platform for raptor species to be built along the transmission line at suitable location, if required.
- Structures to climb transmission towers should have restriction guards (to avoid access to for arboreal species (Maccaques, Langurs, Loris, Giant Squirrels etc.)
- Rapid carcass search along the transmission line corridor for possible victims of collision & electrocution should be undertaken once in 6 months.

Mitigation measures proposed to be adopted by User Agency under the guidance of concerned DFO to protect wildlife during the construction phase are presented below;

- Habitat disturbances to be kept at minimum by using existing trails for transportation of man, material and machinery.
- Any vegetation clearance required should be limited to the minimum area required for such passages.
- Tree enumeration for clearance has been already undertaken. During the vegetation removal, a trained ecologist will be consulted in order to seek guidance to avoid, restore and replant species of conservation significance.



Rash
Raghendra Kumar
Head-Projects (S&H) TL
NRCD, Hazratnagar

- The specific and important tree species must be identified and marked separately and protected during the construction of the Transmission Line.
- The trees on the remaining part of the Transmission Line corridor will be mostly lopped and pruned which are required for stringing of conductor. In case of towers falling in hilltop locations where enough ground clearance is available, tree will not be felled. This will minimize the impact on nesting sites of birds as well as habitat of arboreal species.
- To minimize the disturbance to wildlife, no new approach road will be constructed in the forest area. The existing village tracks/paths will be utilized for carrying of tower materials and also manual excavation of tower foundation will be done.
- Ecofriendly engineering practices in the construction works and due care be taken properly so as to avoid injury to wildlife.
- All pollution-related aspects and waste management will be duly taken care during the implementation of the project.
- Construction activity, man and material movement should be limited to the daytime and early morning, late evening and night activity should be completely avoided to allow the unrestricted wildlife movement.
- No night stay at the construction site should be planned, proper planning of day work (within the daylight hours) should be done.
- Movement within the wildlife area should be entirely regulated, each work force party/gang should be trained in dos and don'ts and how to deal in a situation of wildlife encounter before entering the wildlife area.
- Tree felling should be in compliance of all the statutory requirements, tree felling in the nesting season of endemic avifaunal species should carefully examine the active nest on trees before felling, relocation of active nest should be undertaken with the help of wildlife expert under the guidance of State Forest Department.
- Hunting, trapping and poaching by the employed work force should be completely banned and no poaching tolerance strategy should be covered under contractual obligations.
- The excavated pits for foundation towers shall be properly barricaded and fenced so as to prevent accidental falling of mammals in the vicinity of the construction sites.
- Vehicle speed while travelling to the activity area should be regulated and minimized as required.
- The vegetation clearance along the RoW of the Transmission Line will create a canopy break for the arboreal mammals (Tree dwelling) construction of *canopy bridges* at strategic locations (where such canopy breaks are very evident) under the guidance of SFD.
- Proper housekeeping of the construction areas should be followed during and after construction phase is completed.

- Before start of work in the selected protected forest stretches *awareness campaign* will be taken up by NKTL in association with Forest Dept. to create maximum awareness among the construction workers regarding safeguard of forest and wildlife.

Mitigation measures proposed to be adopted by User Agency under the guidance of concerned FPD for protection of wildlife during the operation phase are presented below:

- Any routine and corrective maintenance schedule planned should be undertaken only after pre-informing the forest department.
- Pre nest search before commencing any pruning and lopping to be undertaken.
- *Artificial nest boxes* along the Transmission Line route to mitigate the loss of nesting sites along the Transmission Line route.
- Periodic review of condition of *canopy bridges*, if any and undertake required maintenance.
- Installation of *bird diverters* at every 10 meters on the conductor and *perch rejecters* on transmission tower along the Transmission Line corridor should be undertaken along the wildlife stretch.
- In addition to the above, *artificial nesting platform* for raptor species to be built along the Transmission Line at a distance of 200 m;
- Structures to climb transmission towers should have restriction guards (Anti-climbing devices to avoid access to for arboreal species (Maccaques, Langurs, Loris, Giant Squirrels etc.)
- Rapid carcass search along the Transmission Line corridor for possible victims of collision and electrocution should be undertaken once in 2 months.

Where wildlife and biodiversity values of importance to conservation are associated with a project site or its area of influence, the formulation of a Wildlife Management Plan (WLMP) provides a useful means to focus a project's mitigation and management strategy. The development of a WLMP for Transmission Line project is a requirement for regulatory clearances as it documents the process, actions, responsibilities, and budget allocation. It also gives the opportunities to investigate the effectiveness of the mitigation measures suggested and provides as chance to revisit them and make timely changes to update/upgrade the mitigation actions for better management of forest & wildlife.

The wildlife management plan has been devised on the following aspects;

- Ecological Sensitivities along the Transmission Line corridor;
- Species of conservational significance along the Transmission Line corridor;
- Impacts during the construction and operation phase;
- Proposed mitigation measures;
- Parameters to be monitored;
- Measurement and frequency;
- Institutional responsibility;
- Implementation schedule



R.K.
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

Role of the User Agency:

User agencies, apart from providing the fund for wildlife management plan (*to be strictly deposited in CAMPA account without any deviation*) will also execute interventions and mitigation measures as laid down in this plan. All the interventions and mitigation measures will be strictly as per the specification agreed by concerned DFO and User Agency will work under the strict guidance and supervision of concerned DFO because the needs and requirements of the mitigation measures may vary due to local variations. User Agency will strictly follow all the guideline given in WII's recommendations in *Eco-Friendly Measures to mitigate the Impacts of Linear Infrastructures* regarding Transmission lines.

The cost of implementation for Wildlife Management Plan for the proposed North Karanpura to Gaya (Jharkhand Portion) 400 kV D/C transmission line is prepared considering different project specific activities. The overall cost prepared for implementation of Wildlife Management Plan (WLMP) is approximately **1909.89 Lakhs INR**.

The project specific activities by project proponent include installation of Bird Diverters, Markers along the upper conductor of transmission line in forest stretches and Anti-climbing devices for transmission line towers.

5.0 INTEGRATED WILDLIFE MANAGEMENT PLAN FOR BUFFER AREA

This chapter presents the interventions to be done by the State Forest Department within the buffer area of the 400 kv North Karanpura- Gaya transmission line. The financial outlay and plan to be implemented has been distributed over 10 years for proper implementation. The suitable provision for interim review has been made.

The grasses and palatable shrubs are very sparsely distributed and so unable to fulfill the requirement of herbivores. Hence the area should be managed in such a way that plenty of food should be available round the year for herbivores. It will be done by ensuring habitat protection and its improvement by developing grassland and other browse species like *Zyzyphus*, *Bija*, *Sissoo*, *Bauhinia*, *Karanj*, *Bamboos* etc, fruit trees such as *Bargad*, *Pipal*, *Wild fig*, *Amla*, *Bel*, *Tut* etc. at suitable places. Similarly, a number of salt licks should be provided at different places in the forest area.

Water is essential not only for animals but also for plants, microbes, and all ecological processes. Both in-situ and ex-situ conservation of water should be done by various means. It will be ensured that catchments remain covered with vegetation at all times by protection and plantation, so that erosion and run off will be kept at the minimum. Works like creation of contour trenches, gully plugging etc. will be carried out wherever necessary from time to time through annual plans. Desiltation of main reservoirs even in the villages will also be done periodically, so that water will remain available even in summer months.



Part
Raghuendra Kumar
Head-Projects (Site I)
NKTG - Hararibagh

Different kinds of covers like winter cover, summer cover, refuse cover, breeding cover, fawning cover, resting cover, ambush cover and nesting cover are required for different animals for different purpose. It can be ensured by strict protection of habitat, that includes dens, caves, rocks, talas, ravines, vegetal cover etc. and further, by improvement of habitat by planting in blanks with suitable plant species listed in site specific survey separately listed for the concerned three divisions, for rehabilitation of degraded forest areas as well as habitat change due to construction of transmission line etc. The occurrence of fire incidence greatly hampers the availability of nesting and reproductive cover for birds. So, incidence of fire should be checked efficiently.

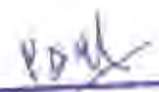
The overall objective of environmental and social monitoring is to ensure that mitigation measures are implemented. Environmental monitoring will be carried out to ensure that all construction activities comply and adhere to environmental provisions and standard specifications. The project authorities will maintain regular contact with all the DFOs concerned. The contractor will have responsibility to ensure that the proposed mitigation measures are properly implemented during the construction phase.

The cost of implementation for Integrated Wildlife Management Plan for the proposed North Karanpura to Gaya (Jharkhand Portion) 400 kV D/C transmission line is prepared considering different project specific activities & management actions through concerned Forest Department. The overall cost proposed for implementation of the Integrated Wildlife Management Plan (IWMP) is approximately **1909.89 Lakhs INR**.

The detailed schedule of cost of intervention for habitat management and ecodevelopment activities has been worked out over the 10-year period. The analysis reveals that maximum fund of **755.16 Lakhs INR** out of the total **1909.89 Lakhs INR** has been allocated for **Habitat Management and Enrichment** activities in the buffer area of the project.

The proposed plan focuses on the six key areas which are as follows:

1. Habitat Management & Enrichment
 - a) Food Management
 - b) Water Management
 - c) Shelter Management
2. Forest Fire Prevention, Control and Management
3. Research and Wildlife Monitoring
4. Anti-Depredation and Wildlife Conservation & Protection Activities
5. Eco/Community Development, Awareness Generation and Capacity Building.
6. Management and Evaluation


Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

Chatra South Forest Division

S. No.	Component	Total Budget (in Lacs)
1	Habitat Management and Enrichment activities	318.76
2	Forest Fire Prevention, Control and Management activities	34.25
3	Research & Wildlife Monitoring	38.00
4	Anti-Depredation and Wildlife Conservation & Protection activities	122.75
5	Eco/Community Development, Awareness generation and capacity building activities	67.50
6	Management and Evaluation	8.00
7	Escalation @ 20% of (Sum of 1 to 6)	117.85
8	Contingency	15.00
	Total	722.11

Chatra North Forest Division

S. No.	Component	Total Budget (in Lacs)
1	Habitat Management and Enrichment activities	276.40
2	Forest Fire Prevention, Control and Management activities	34.25
3	Research & Wildlife Monitoring	38.00
4	Anti-Depredation and Wildlife Conservation & Protection activities	142.50
5	Eco/Community Development, Awareness generation and capacity building activities	74.00
6	Management and Evaluation	20.50
7	Escalation @ 20% of (Sum of 1 to 6)	117.15
8	Contingency	15.00
	Total	717.78

Latehar Forest Division

S. No.	Component	Total Budget (in Lacs)
1	Habitat Management and Enrichment activities	160.00
2	Forest Fire Prevention, Control and Management activities	43.00
3	Research & Wildlife Monitoring	49.00
4	Anti-Depredation and Wildlife Conservation & Protection activities	139.00
5	Eco/Community Development, Awareness generation and capacity building activities	69.00
6	Management and Evaluation	0.00
7	Escalation @ 20% of (Sum of 1 to 6)	0.00
8	Contingency	10.00
	Total	470.00

Signature
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

- Regular monitoring and evaluation of the proposed activities with the active participation of user agency under the supervision of respective DFOs must be done.
- This plan shall be valid for a period of 10 years and based on its success or otherwise if needed; a revised plan can be prepared. This plan may be revisited (after 3 years or as and when need required) with the approval of PCCF, Wildlife and the user agency will contribute towards the revised cost of the management plan till the project period.
- If there would be a need for wildlife management plan after expiry of the present plan period of 10 years, the user agency will have to submit such plan at least 01 year before the expiry of the present plan.
- Cost escalation of 20% per year in wages for the implementation period of 10 years has been considered in the proposed plan. However, the project proponent has to bear the differential cost in case of enhancement of wage rate at the time of implementation of this plan.

User Agency Raghvendra Kumar Head-Projects (Site) TL NKTL - Hazaribagh	DFO, Chatra South FD Mukesh Kumar IFS Divisional Forest Officer Chatra South Forest Division	CF, Chatra Conservator of Forests Territorial Circle, Chatra	RCCF, Hazaribag Regional Chief Conservator of Forests Hazaribag
DFO, Chatra North FD Rahul Mehta I.F.S. Divisional Forest Officer Chatra North Forest Division	DFO, Latehar FD Reushan Kumar IFS Divisional Forest Officer Latehar Forest Division, Latehar	CF, Medininagar Conservator of Forests Territorial Circle, Medininagar	RCCF, Medininagar Regional Chief Conservator of Forests Palamu, Medininagar

5.0 MAPS & ANNEXURE

This chapter presents maps, Annexures related to secondary and other related information.

1.0 INTRODUCTION & BASELINE STUDY

1.1 BACKGROUND

North Karanpura Transco Limited (NKTL) is a subsidiary company of Adani Transmission Limited (ATL) which has been formed to establish the Transmission System for "Immediate Evacuation for North Karanpura (3X660 MW) generation project of NTPC along with creation of 400/220kV Substation at Dhanbad (ERSS-XIX)". Accordingly, NKTL has proposed to construct 400 kv (D/C) transmission line with quad moose conductor from North Karanpura Thermal Power Plant (3x660MW) to Gaya (Figure 1.1.1).

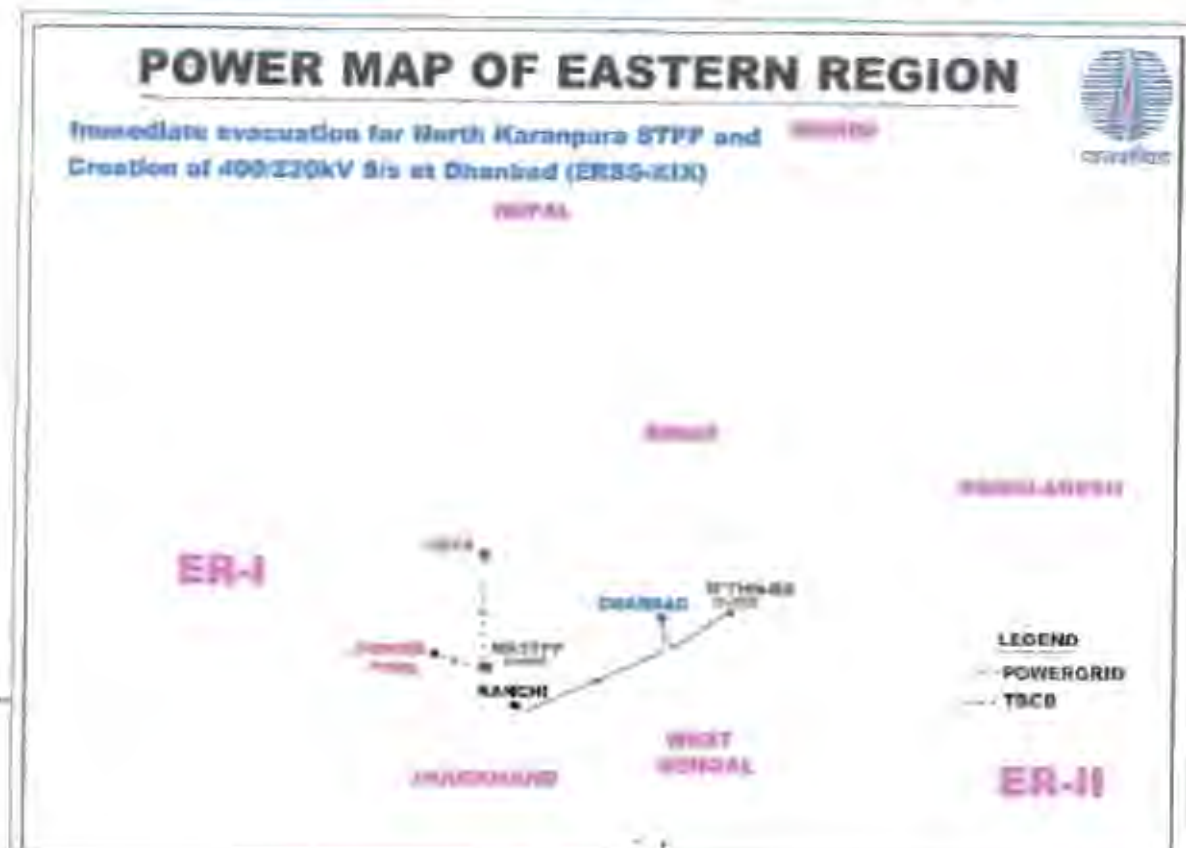
Respective Divisional Forest Officer (DFO) while recommending the forest proposal for forest clearance has suggested for formulation of Site-Specific Integrated Wildlife Management Plan for proposed 400 k (D/C) transmission line with quad moose conductor from North Karanpura Thermal Power Plant to Gaya (Jharkhand Portion) is required to be formulated.

The setting up and operation of the 400 kV (D/C) transmission lines from North Karanpura to Gaya (Jharkhand Portion) may result in changes of ecological setup of the project area. A thorough understanding of issues related to ecological as well as environmental factors, are absolutely important for formulating an appropriate site-specific Integrated Wildlife Management Plan (WLCMP).

In accordance with its objective of being enviro-socially responsible corporate entity with thrust on sustainable development, NKTL aims to focus on implementing Integrated Wildlife Management Plan for protection of wildlife along its proposed 400 kV D/C transmission lines from North Karanpura to Gaya (Jharkhand Portion) falling under forest area. To accomplish this objective, it is imperative to carry out ecological study that can facilitate in formulating a comprehensive short as well as long-term Integrated Wildlife Management Plan.

Ragh
 Raghvendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

FIGURE 1.1.1: LOCATION OF PROPOSED TRANSMISSION SYSTEM FOR IMMEDIATE EVACUATION FOR NORTH KARANPURA (3X660MW) GENERATION PROJECT OF NTPC ALONG WITH CREATION OF 400/220KV SUBSTATION AT DHANBAD (ERSS-XIX)



1.1.1 Objectives of the Study

The objectives of the present study include:-

- To prepare inventory of wildlife (flora and fauna) found along the proposed route of 400 kV D/C transmission line from North Karanpura to Gaya (Jharkhand Portion);
- To undertake ecological study within the buffer zone of proposed 400 kV D/C transmission line;
- To undertake a detailed survey with experts (BSI/ZSI) identify threatened and endangered species of flora and fauna if any and prepare conservation and management plan for the same;
- To prepare site specific Wildlife Conservation & Management Plan to minimize the negative impact on wildlife likely to be found within the study area of proposed transmission line from North Karanpura to Gaya (Jharkhand Portion), if any.



Raghvendra Kumar
Head Projects (Site) TL
NKTL - Hazaribagh

➤ 1.1.2 Scope of the Study

The scope of the study includes the undertaking of a reconnaissance survey. On the basis of the reconnaissance survey a framework has been evolved for undertaking time bound detailed field survey within the buffer zone of the proposed 400 kV D/C transmission line (i.e. 10 km both the side of RoW i.e. 46m) and preparation of site specific wild life conservation & management plan. The study area map showing the Project area and Buffer zone has been presented in Figure 1.1.2. The detail scope of work for proposed study is as follows:

- 1) The study needs to cover and collect the Primary data from the field and Secondary data. Study shall be conducted in pre-monsoon season by the team experts.
- 2) The detailed assessment for the study area (project and buffer area) i.e. 10.0 km both the side of RoW of the proposed 400 kV D/C transmission line and study will be carried by Ecologist/ Forest/ Environment Professional.
- 3) Identification and prepare an inventory for flora and fauna in the study area for species diversity, density, frequency relative abundance, cover will be defined based on field survey within 10.0 km both the side of RoW of the proposed 400 kV D/C transmission line, Species Hierarchy such as family, Genus, species, relative abundance of wild animals & birds will be estimated and also focus on the rare, critical, threaten & endangered species, within the study area.
- 4) If the study area has endangered flora and fauna, or an ecologically sensitive area, then a comprehensive Conservation & Management Plan shall be prepared. The list of flora and fauna separately for the project and buffer area and a statement clearly specifying whether the study area forms a part of the migratory or wildlife corridor of any endangered fauna with conservation plan.
- 5) Demographic and occupational profile of the villages and habitations within the buffer area of 10 Km radius.
- 6) Mapping of the Land Use and Forest, Vegetation types within the buffer area i.e., 10.0 km both the side of RoW of the proposed 400 kV D/C transmission line using GIS and remote sensing.
- 7) Ecological status of the study area such as habitat type and its quality, species, diversity, rarity, fragmentation, ecological and study shall provide the nature and distribution of vegetation in with in the study area.
- 8) Details of flora and fauna for project and buffer area will be furnished based on field survey clearly indicating the schedule of the fauna present, Conservation plan to be prepared in consultation with Forest Department along with delineation of necessary funds allocation for implementing the same.
- 9) The report would specify the experts visit in the study area and the methodology adopted in arriving at facts and figure. The budget estimations for project site and project impact zone to be implemented by Project proponent and DFO respectively.



Raghu
Raghvendra Kumar
Head Projects (Site) TL
NKTL - Hazaribagh

- 10) The period of the mitigation plan would be for initial 10 years with suitable provisions and mitigative measures.
- 11) Degradation anticipation due to project implementation in the study area would be explained in quantified and qualitative terms.
- 12) Study area maps would be prepared in 1:500,000 scale and include: land use plan maps, location maps showing PA and corridors, location maps of other leases and forest diversions.
- 13) The report would be framed with accordance to chapter wise format provided in the new guideline for Wildlife Mitigation Plan by Jharkhand State Government.
- 14) Consultant shall provide necessary technical support to the project proponent during presentation or discussion or meeting with Government Official for further preparation of flora & fauna conservation with budget.

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 Raghvendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

FIGURE 1.1.2: STUDY AREA MAP OF NKG (JH) 400KV D/C TRANSMISSION LINE



1.1.3 Structure of Report

The site-specific Integrated Wildlife Management Plan for proposed 400 kv (D/C) transmission line with quad moose conductor from North Karanpura Thermal Power Plant to Gaya (Jharkhand Portion) has been structured into six Chapters as hereunder:

Executive Summary

Chapter 1 – Introduction & Baseline Study: This chapter describes background of project and its components; objectives & scope and approach & methodology adopted for preparation of site-specific Integrated Wildlife Management Plan. This chapter also present the status of flora & fauna as well as ecological setting with within the buffer area proposed 400 kv (D/C) transmission line from North Karanpura Thermal Power Plant to Gaya (Jharkhand Portion).

Chapter 2 – Ecological & Environmental Impact: This chapter presents likely ecological and environmental impact of proposed 400 kv (D/C) transmission line from North Karanpura Thermal Power Plant to Gaya (Jharkhand Portion).

Chapter 3 – Strategies for Wildlife Conservation & Management: This chapter present the objectives of Strategies to be followed to address the issues of Wildlife Conservation & Management within the project area along with buffer zone of 400 kv (D/C) transmission line from North Karanpura Thermal Power Plant to Gaya (Jharkhand Portion). This chapter also presents the strategies to mitigate and minimize potential adverse impact likely to be found during construction and maintenance activities of proposed NKG(JH) Transmission Line.

Chapter 4 – Integrated Wildlife Management Plan for Project Area: This chapter present the proposed Integrated Wildlife Management Plan within the project area of 400 kV (D/C) transmission line from North Karanpura Thermal Power Plant to Gaya (Jharkhand Portion) by the project authority in consultation with Forest Department.

Chapter 5 – Integrated Wildlife Management Plan for Buffer Area: This chapter present the proposed Integrated Wildlife Management Plan along with budget to be followed within the buffer area of 400 kV (D/C) transmission line from North Karanpura Thermal Power Plant to Gaya (Jharkhand Portion) prepared by DFOs of Concerned Division.

Chapter 6 –Maps & Annexures: This chapter presents maps, Annexures related to secondary and other related information.

Raghu
 Raghuendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

1.2 PROJECT DETAILS

The Government of India, Ministry of Power, vide Gazette Notification dated July 08, 2014, has notified REC Transmission Project Company Ltd. to be the Bid Process Coordinator (BPC) for the purpose of selection of Bidder as Transmission Service Provider (TSP) to establish Transmission System for "Immediate Evacuation for North Karanpura (3X660MW) generation project of NTPC along with creation of 400/220kV Substation at Dhanbad (ERSS- XIX)" through tariff based competitive bidding process. Scope of the proposed Project includes:

Sl. No.	Scheme / Transmission Works	Completion Target
IMMEDIATE EVACUATION FOR NORTH KARANPURA (3X660MW) GENERATION PROJECT OF NTPC		
1	North Karanpura – Gaya 400kV D/C line with quad moose conductor	23 Months
2	North Karanpura – Chandwa (Jharkhand) Pooling Station 400kV D/c line with quad moose conductor	14 Months
Creation of 400/220kV Substation at Dhanbad (ERSS-XIX)		
3	Establishment of 400/220 kV, 2x500 MVA sub-station at Dhanbad 400 kV • ICTs: 400/220 kV, 2x500 MVA • ICTs bays: 2 no. • Line bays: 4 no. • 400 kV bus reactor bays: 2 no. • Bus reactor: 2x125 MVAR • Space for future bays: 4 no • Space for future 400/220 kV, 500 MVA ICT along with associated bay 220 kV • ICTs bays: 2 no. • Line bays: 4 no. • Space for future bays: 4 no	18 Months
4	LILO of both circuits of Ranchi – Maithon-RB 400kV D/c line at Dhanbad (Twin Moose)	18 Months

1.2.1 Technical Specification

The technical requirements of this project has been brought out under the section "Technical specification" in the Request for Proposal (RFP) by BPC which has been evolved from the CEA technical standards and CTU practices. NKTL is mandated to adhere to these requirements during design, engineering, and execution.

1.2.2 Location of the Project

The project is falling in Chatra and Latehar Districts under Jharkhand State.

1.2.3 Route Selection Approach

In order to execute such transmission system, precise planning, costing, scheduling etc. were required. Optimum deployment of resources also was of prime target in implementing this transmission system. It is essential that at the planning stage itself various alternative routes and technical solutions for transmission lines be examined in detail.

For undertaking such studies, one of the major requirements is obtaining adequate information regarding physical constrains, environmental factors etc. along the route so that optimum solutions are identified. Subsequently, during implementation of the project, it is required to obtain elaborate details about terrain, soil conditions, constraints etc. of the route for proper resource planning, costing etc. as well as reduction in implementation time.

Presently, conventional methods of survey like walk over survey, preliminary survey and detailed survey are carried out at various stages from conceptualization of the project to implementation, which are time consuming tasks. There are new means available which is used to conduct route survey using Google, DGPS based survey etc.

Following are the major factors taken into account while deciding the line route of the projects as per provisions of the acts and rules –

- a. Major habitation and Settlement area avoided.
- b. Wildlife Sanctuary's, Biosphere's, Dense Forest avoided.
- c. Minimum Vegetation / tree cutting in the route of line.
- d. Minimum no. of River Crossings, Railway Crossings, Highway Crossings, Power Line Crossings are considered.
- e. Lowest minimum forest area demand in the proposed route
- f. Archeological Structures, defense sites, airport area etc. are avoided.
- g. Accessibility of approach road to the project site.
- h. Rich gardens, plantations, notified industrial area, etc. to be avoided.
- i. Economic viability of the route



Rajendra Kumar
Rajendra Kumar
Head-Projects (Site) TL
NKTL Hazaribagh

Preliminary & Route Alignment Survey

The preliminary survey included the following steps:

- Map study
- Walkover survey

Route survey was carried out for following benefits:

To select optimal route from the alternatives for ease of construction followed by O&M with economy.

- Maintenance & additional construction costs can be brought to the minimum.
- Material Estimation and procurement can be done fairly on a realistic basis. Limited Reserve/Protected/Private Forest Area.
- Proper planning can be done for networks keeping provision for future routes etc.
- Approvals from Railways, Civil Aviation, Forest authorities etc. can be obtained faster.
- Preparation of Master Network and fixing construction/erection targets can be done on realistic basis, which will help in the judicious planning of materials flow, cash flow and manpower requirements.
- Appreciable time can be saved during construction & maintenance of roads, if selection of Rivers, route along hill sections and power line etc., are properly made.

Map Study

After drawing various routes of alignment network within the topo maps, a comparative study was made on the basis of the following data:

- Route length.
- Nos. and type of important road points in each indicating alignment of each road as measured on the map.
- Nature and number of major crossings.
- Mapping the industrial installations, structures, and important places for identification of Roads.
- Approach to the line in general for construction & maintenance.
- Reaches through protected or Reserved Forests
- Continuously long stretches in paddy fields.
- Close parallelism with Railway lines.
- Restricted areas such as civil and military airfields are avoided.
- Aircraft landing approaches are avoided.



Rash
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

Walkover Survey

Walkover Survey was carried out going over the area associated with the routes and collecting features observed other than those existing on the map. In addition, the indications on following features are also checked:

- Communication lines
- Accessibility and smoother approach.
- Logistics of the route.
- Economic viability of the route.
- Existing and Present course of River
- Power lines (existing)
- Expanding villages and towns
- Rich gardens and plantations
- Reserved forests and high tree areas
- National Parks & Wild life sanctuaries
- Archeological monuments
- Aerodromes, radar centers etc.
- Steep sloping terrain, Areas prone to landslides, soil instability etc.
- Prohibited areas declared under statutory regulations

Selection of Route

Three (3) alternate route alignments were carried out by help of satellite images available in google map. Physical walk over survey was conducted on all the three routes and GPS coordinates were collected at requisite locations along with soil strata. Based on the information so collected, the best route was selected after evaluation of factors like, minimum forest coverage, angle points, river crossing, power line crossing, habitation etc.

The selected route alignment is presented in Figure 1.2.1. The Infrastructural Details along the Routes are presented in Table 1.2.1. The village wise detail of land falling within right of way (i.e., 46 m) of proposed North Karanpura to Gaya 400 KV (D/C) transmission line (JH Portion) is presented in Table 1.2.2.

Paul
 Raghuendra Kumar
 Head-Projects (Site) TL
 NKTL Hazaribagh



TABLE 1.2.1: SAILENT FEATURES OF SELECTED ROUTE ALIGNMENT FOR PROPOSED 400 KV (D/C) TRANSMISSION LINE FROM NORTH KARANPURA TO GAYA

(D/C) TRANSMISSION LINE FROM NORTH KARANPURA TO GAYA

Name of Proposed Transmission Line	:	400 kV D/C (Quad Moose) North Karanpura – Gaya Transmission Line (Jharkhand Portion)	
District	:	Latehar (Jharkhand), Chatra (Jharkhand),	
Total No. Angle Points	:	Jharkhand Portion 73 Nos (From common point AP/19 to AP/92)	
Total Route Length	:	Jharkhand Portion= 69.74 km. (From common point AP/19 to AP/92)	
Terminal Points		Gantry North Karanpura :	E : 298128 N : 2639035
		Gantry Gaya:	E : 292646 N : 2725070
Major Crossings along the route :			
Total H.T. Line	:	Total = 3 Nos 220 kV (1Nos.) and 400 kV (2nos.)	
Total Railway Line	:	01 Nos.	
National Highway (NH)	:	02 Nos	
State Highway (SH)	:	Nil	
River Crossing	:	Major River :	Nil
	:	Minor River:	Nil
Forest /Sanctuary involved & Status of Forest Diversion Proposal	:	42.828 Kms i.e., 197.0115 ha (PF & Jungle Jhari) In Principal approval for diversion of 197.0115 ha. forest area was granted by IRO, MOEFCC, Ranchi vide letter dated 06.06.2023	
Town, Cities & villages along the route	:	The route alignment is avoiding towns / Inhabitants	
Minerals in the route corridor	:	Nil	
Type of Crops, Fruits, Forest Land, Hill are along the route	:	a) Crops	Rice, Arahar, Maize, Sugarcane, Wheat etc.
	:	b) Soil	Normal Dry, Wet, Wet Paddy, Wet, PS, FS, DFR & Hard Rock. Soil Investigation report shall be furnished on later date
	:	c) land	Plain (70%)
	:	d) Hill	HILL (30%)
Land involvement	:	Combination of Sparse Open Scrub, Govt. Land, Forest Land, barren and agriculture land	

Climate	Seasons	Summer= March to June, Rain = July to September, Winter = October to February
	a) Maximum Temperature	46°C
	b) Minimum Temperature	19°C
Specific features	This alternative route-1 Central Coalfields limited (CCL) and Ministry of Coal (MOC) has issued NOC for route-1 minimum coal blockage Hence, Route-1 is the only option for the project	

FIGURE 1.2.1: SELECTED ROUTE ALIGNMENT FOR PROPOSED 400 KV (D/C) TRANSMISSION LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)



The SOI Map showing final route alignment for proposed 400 kV (D/C) Transmission line from North Karanpura to Gaya (Jharkhand Portion) enclosed as **Annexure – 6.A.1**

TABLE 1.2.2: VILLAGE-WISE DETAIL OF FOREST AND NON-FOREST LAND FALLING UNDER RoW FOR PROPOSED 400 KV (D/C) TRANSMISSION LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)

S.No	Village	Forest Land (ha.)	Non-Forest Land(ha.)
LATEHAR FOREST DIVISION			
1	Phulbasia Alias Amarwadih	3.653	4.1919
2	Charra	1.692	5.9558
3	Rahea	2.19	4.804
4	Barwadih	1.341	3.3285
5	Besra	5.4739	3.8828
6	Kusamha	0.264	2.2946
7	Bhattachatra	0.144	3.0478
8	Makra	0	4.5982
9	Sibla	0.601	9.8376
	Total	15.3589	41.9412
CHATRA SOUTH FOREST DIVISION			
10	Kasiyatu	11.093	4.4217
11	Kasari	2.476	1.2767
12	Nawada	0	4.6482
13	Kendu	4.231	8.0932
14	Dundua	2.211	3.1556
15	Bagra	1.627	8.4325
16	Belgara	0.529	0.001
17	Kuthan	8.626	1.5651
18	Baksi	6.752	1.169
19	Lamta	1.556	7.72
20	Jogiadih	6.846	0.015
21	Bhagnadih	5.777	0.104
22	Manatu	1.47	1.586
23	Barhgaon	0.765	2.24
24	Pherenda	0	1.4851
25	Bhang	4.661	4.007
26	Korcha	1.462	0.004
27	Gulhutu	2.04	0.004
28	Parbat Alias Barahmana	9.79	2.922
29	Ambadih	1.099	0
30	Geri	3.5526	3.31
31	Ghurnadih	1.161	0.099
32	Nartama	1.012	0.642
33	Karma	2.806	1.467


 Raghuendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

S.No	Village	Forest Land (ha.)	Non-Forest Land(ha.)
34	Suruj	4.596	0.982
35	Larkua	5.873	0.013
36	Sanghri	11.057	1.437
37	Darha	9.605	0.071
38	Sikid	7.207	0.317
	Total	119.8806	61.1881
CHATRA NORTH FOREST DIVISION			
39	Postia	12.659	5.6501
40	Bandatar	2.69	0.0059
41	Demdem	4.15	0.6512
42	Dhobey	0	0.5106
43	Paini Kalan	6.508	6.1835
44	Paini Khurd	0.306	0.6317
45	Ketaribar	1.415	0.1424
46	Jhagartari	4.401	0.209
47	Baniadih	2.555	0.5874
48	Chitua	5.443	0.0382
49	Raharbar	3.086	0.0456
50	Halwaria	3.685	2.8656
51	Bajinathpur	0.171	0
52	Kasdabar	0.344	2.5143
53	Gaighat	1.946	0.578
54	Bedauli	7.793	0.0396
55	Kolwa	4.62	0.0101
	Total	61.772	20.6632
	Grand Total	197.0115	123.7925

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Raghendra Kumar
Head-Projects (NKTL)
NKTL Hazaribagh



1.2.4 Justification for Using Forest Land

North Karanpura to Gaya (Jharkhand Portion) 400 kV D/C Transmission line with bee line distance between the two points is about 69.74 kms. All the efforts were made to find a most feasible route which may involves minimum / least forest land through various alternative routes.

Central Coalfields limited (CCL) and Ministry of Coal (MOC) has issued NOC for construction of the project through route-1 considering the minimum coal blockage. Hence, Route-1 is the only option for the project (Table 1.2.3 and Figure 1.2.2).

For selection of optimum routes following points are taken into consideration:

- Minimum route length
- The transmission line is away from the major settlement areas
- No wildlife sanctuary / Biosphere/ Protected Areas / Archeological sites.
- Least forest involvement
- No involvement of Defense & Airport authority of India sites
- Higher density tree patches avoided
- No involvement of temples/ Cultural Habitats/ Schools & colleges.
- Road connectivity to project sites to avoid construction of temporary access roads
- No involvement of Industrial corridor

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Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

TABLE 1.2.3: COMPARATIVE STATEMENT OF ALTERNATIVE ROUTES

S. No.	DESCRIPTION	Route-I	Route-II	Route-III
1	Route Particulars			
	(i) Bee Line (KM)	62.327 KM	62.327 KM	62.327 KM
	(ii) Length (KM)	69.74KM	70.28 KM	78.96 KM
	(iii) Angle Points	73 Nos	82 Nos	83 Nos
	(iv) Terrain	Plain Terrain- 70% Hilly / Undulation terrain- 30%	Plain Terrain- 70% Hilly / Undulation terrain- 30%	Plain Terrain- 70% Hilly / Undulation terrain- 30%
2	Environmental Impact	Minimum	Moderate	Moderately High
3	Houses within R.O.W.	No house falls within ROW corridor.	Few houses fall within ROW corridor.	Few houses fall within ROW corridor.
4	Forest Involvement			
	Details of Forest involved	Most of the forest involved are of Protected Forest & some parts of Revenue Forest. No reserved forest, Archaeological/ Defence/ Aviation sites, wildlife Sanctuaries, national parks, Eco sensitive zone, Buffer Zone, Biosphere is involved in this alignment.	Most of the forests involved are of Protected Forest & Revenue Forest. No reserved forest, Archaeological / Industrial Defence/ Aviation sites, wildlife Sanctuaries, national parks, Eco sensitive zone, Buffer Zone, Biosphere is involved in this alignment.	More forest area involved compared to route 1 & 2 most for the forests are of Protected Forest & Revenue Forest. No Reserved Forest, Archaeological / Industrial Defence/ Aviation sites, wildlife Sanctuaries, national parks, Eco sensitive zone, Buffer Zone, Biosphere is involved in this alignment.
	State Involved	Jharkhand	Jharkhand	Jharkhand
	Length of forest area	42.828 Km	44.45 Km	47.78 Km
	Reserved Forest	Nil	Nil	Nil
	Protected Forest	149.1959Ha	151.4/44 Ha	164.6222 Ha
	GM Jungle Jhari	47.8156 Ha	52.9956Ha	56.9658 Ha
	Total Forest area	197.0115 Ha	204.47Ha	219.788Ha
	Flora	Sparse flora through most of the alignment commonly found species like Palash, Sakua, Kendu, Ghamhar, Siddha, Mahua, Asan Etc., found	Dense and diverse flora in the alignment species like Palash, Sakua, Kendu, Ghamhar, Siddha, Mahua, Asan Etc., found	Very Dense and diverse flora in the alignment species like Palash, Sakua, Kendu, Ghamhar, Siddha, Mahua, Asan Etc., found
	Fauna	Chital, Nilgai, Sambar, Sloth Bear, Wild Boar	Chital, Nilgai, Sambar, Sloth Bear, Wild Boar	Chital, Nilgai, Sambar, Sloth Bear, Wild Boar

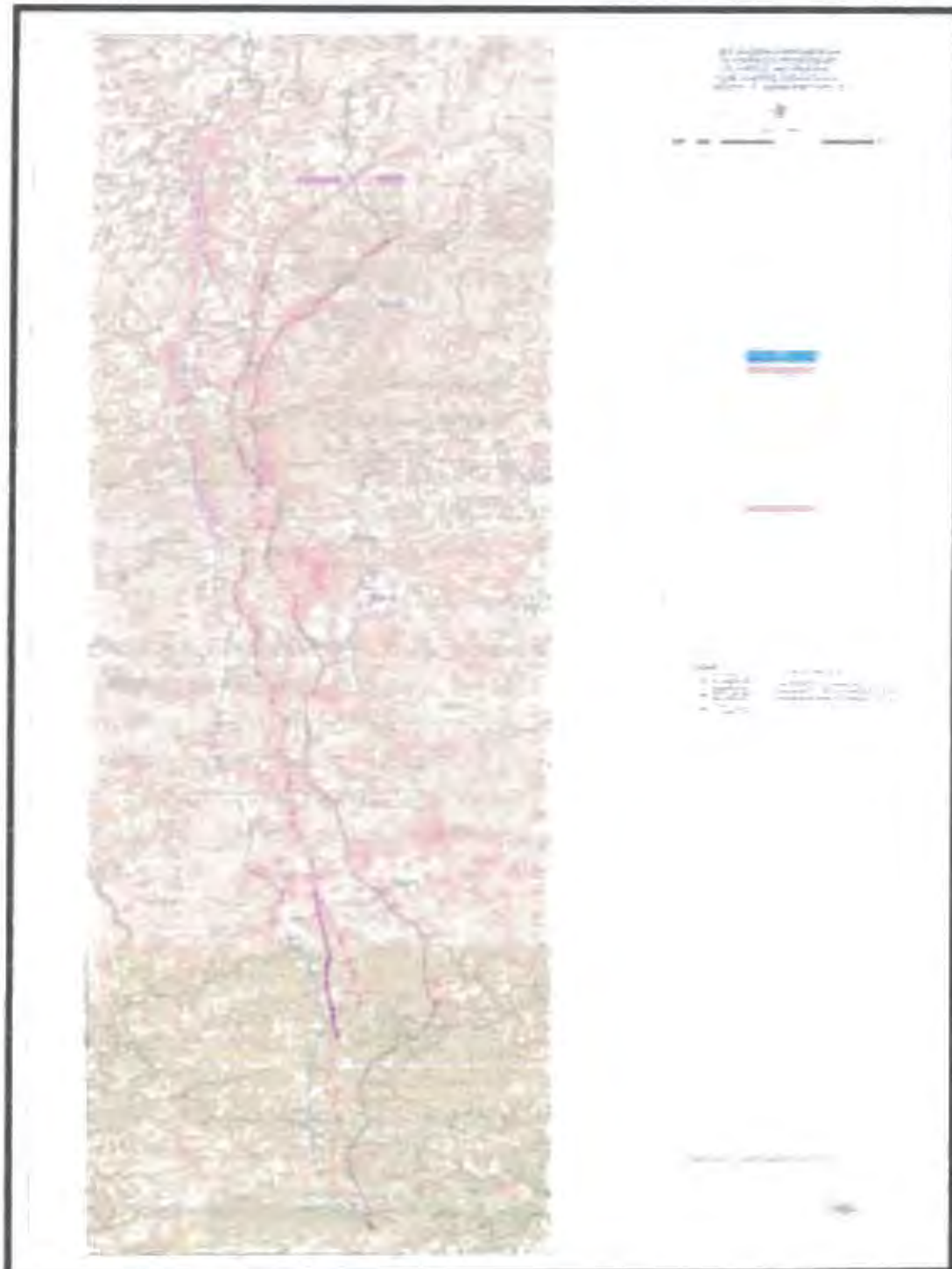


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Raghavendra Kumar
Head-Projects (S&P) TL
NKTIL Hazaribagh

Sl. No.	DESCRIPTION	Route-I	Route-II	Route-III
		Rabbit, Fox, common monkey, Squirrel, etc.,	Rabbit, Fox, common monkey, Squirrel, etc.	Rabbit, Fox, common monkey, Squirrel, etc.
5	Railway Crossing	1 No	1 Nos	1 No
6	Highway Crossing	2 Nos	2 Nos	2 Nos
7	Power Line Crossing	3 Nos	3 Nos	3 Nos
8	Industrial Corridor	Nil	Nil	Nil
9	Site Connectivity	Good	Moderately Good	Not Good
10	Corridor	46m wide As per MOEF&CC guideline F.NO 7-25/2012 -FC, the Width of right way for transmission lines on forest land shall be 46m for 400kv/DC Transmission Voltage. After Stringing area remaining ROW maintained for safety purpose.	46m wide As per MOEF&CC guideline F.NO 7-25/2012 -FC, the Width of right way for transmission lines on forest land shall be 46m for 400kv/DC Transmission Voltage. After Stringing area remaining ROW maintained for safety purpose.	46m wide As per MOEF&CC guideline F.NO 7-25/2012 -FC, the Width of right way for transmission lines on forest land shall be 46m for 400kv/DC Transmission Voltage. After Stringing area remaining ROW maintained for safety purpose.
11	Recommendations	This route length are comparable minimum crossings, well connected by road network which is convenient for construction /O&M. this route has no wildlife sanctuaries Biosphere, ESZs, Defence & Aviation zones, Industrial corridors. This route has less vegetation, away from settlements areas and least forest land involved Least no of trees will be impacted. Hence this route is more feasible economical, environment friendly and bearing recommended.	This route is ruled out due to ecological reasons as forest land involved is more compared to Route I, the proposed corridor is passing through some of the settlements areas and no proper approach roads to project sites alternative route is uneconomical & unfeasible.	This route is ruled out due to longest route length compared to Route I & II Impact on ecology is expected to be high due to higher forest area, Involvement of Industrial corridor and involvement most of the area is not feasible in terms of constructability and approach roads.


Raghvendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

FIGURE 1.2.2: IDENTIFICATION OF ALTERNATIVE ROUTES FOR NORTH KARANPURA GAYA (JHARKHAND PORTION) 400 KV (D/C) TRANSMISSION LINE



1.2.5 Legal Framework

It is proposed to execute the above entire transmission system as per provisions contained in the Indian Electricity Act 2003 and the rules made there under and the Electricity (Supply) Act 1910 and 1948, so far as applicable.

The following regulatory and Government approval will be taken:

- Transmission License from Central Regulatory Electricity Commission (CERC)
- Approval of under section 68 of Indian Electricity Act 2003.
- Approval of under section 164 of Indian Electricity Act 2003.
- Tariff Adoption from CERC.

1.2.6 Detail of Construction Activities

The major construction activity envisages in the proposed 400 kV transmission line are as follows:

- Construction of Tower Foundation (An average of 14.89 M x 14.89 M tower base and activities involves excavation of soil and concreting)
- Erection of transmission towers (Involves joining of tower members/lattice structure)
- Stringing of electrical conductor wires between adjacent towers.

The above activities will be carried out by engaging suitable Contractor. For tower foundation works, local gangs/manpower are usually engaged as petty Contractor and temporary makeshift camps are set nearby the construction site till completion of work. For hill areas construction of new approach road generally not encouraged & the existing village tract or jungle tract are used for head loading of tower materials. Tower erection and stringing of conductor is generally carried out by specialized gangs and temporary construction camps are also required to be set up for this purpose.

Tower Foundation

Foundation of a transmission tower is the basic structure to support the tower in its position. It plays an important role in safety and satisfactory performance of the structure as it transmits mechanical loads of the electrical transmission system to earth. The foundations in various types of soils have to be designed to suit the soil conditions of particular type. In addition to foundations of normal towers, there are situations where considering techno-economical aspect for special towers required or river crossing which may be located either on the bank of the river or in the main stream or both, pile foundation may be provided. The various activities involved in the foundation work are illustrated in Figure 1.2.3.


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NKTIL - Hazaribagh

FIGURE 1.2.3: ACTIVITIES INVOLVED IN CONSTRUCTION OF TOWER FOUNDATION OF 400 KV (D/C) TRANSMISSION LINE

Transmission Tower Foundation

Raft Concrete



Transmission Tower Foundation

Stub Footing Concrete



Stub Concrete



Transmission Tower Foundation

Stub setting & Template Assembly



Tower Erection

There are four main methods of erection of steel transmission towers which are as below;

- Build-up method or Piecemeal method
- Section method
- Ground assembly method
- Helicopter method

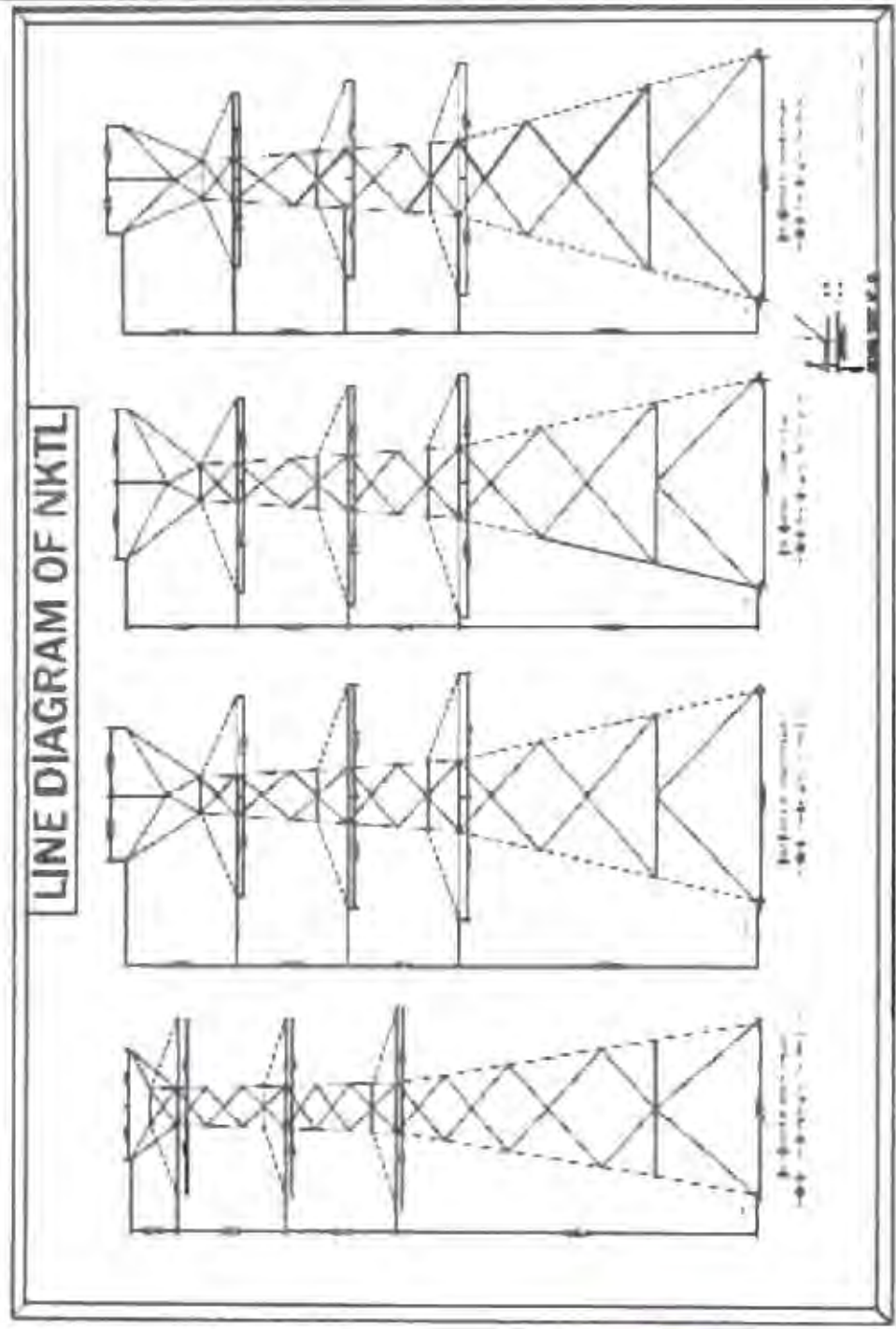
The basic design of towers proposed to be erected for 400 kV (D/C) transmission line is presented in Figure 1.2.4.



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Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

FIGURE 1.2.4: DESIGN OF TOWERS OF 400 KV (D/C) TRANSMISSION LINE



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Head-Projects (Site) TL
NKTL - Hazaribagh

Build Up Method of Tower Erection

- This method is most commonly used in India for the erection of 400 kV transmission line towers. This method consists of erecting the towers, member by member (Figure 1.2.5). The tower members are kept ground serially according to erection sequence to avoid search or time loss.
- The erection progresses from the bottom upwards. The four main corner leg members of
- the first section of the tower is first erected and bolted with the stub.

FIGURE 1.2.5: TYPICAL TOWER ERECTION PROCESS FOR PROPOSED NKG (JH) OF 400 KV (D/C) TRANSMISSION LINE



Tower Stringing

- Stringing of Transmission line a process of joining and fixing of the electrical conductor wires from tower to tower and various other assemblies for transmission of electricity.
- Stringing overhead conductors in transmission is a very specialized type of construction requiring years of experience as well as equipment and tools that have been designed, tried and proven to do the work.

The prime steps of stringing includes (Figure 1.2.6):

- Proper guying
- Insulator Hoisting
- Paying out of pilot wire & conductor
- Rough sagging of conductor
- Clipping & spacing
- Finishing activities
- Jumpering
- Final checking

FIGURE 1.2.6: TOWER STRINGING PROCESS OF 400 KV (D/C) TRANSMISSION LINE



1.2.7 Environmental Impact Assessment

Forest Clearance

As per the practice, preliminary route selection is done based on such documents as the Forest Atlas and the survey of India maps using "bee" line method followed by field clarification through walk over survey. All possible steps are taken to avoid the route alignment through forest. In case where it becomes unavoidable due to the geography of terrain, the alignment is made in such a way that the route through the forest is the barest minimum.

For selection of optimum routes following points are taken into consideration:

- The route of the transmission line does not involve any human rehabilitation.
- Any monument of culture or historical importance is not getting affected.
- The route does not create any threat to the survival of any community with special reference to tribal.
- It does not affect any Public Utility Services like Playground, School, other Establishment, etc.
- It does not pass through any Sanctuaries, National Park etc. if any alternative route is feasible.
- It does not infringe with areas of natural resources.
- Away from major towns to account for future urban expansion

In case where it becomes unavoidable due to the geography of terrain, the alignment is made in such a way that the bare minimum line route through forest is selected.

Name of Transmission line	Forest – involvement (Approx. length in km)
400 kV D/C Transmission Line from North Karanpura to Gaya (Jharkhand Portion)	42.828

Environmental Issues

(i) Escape of Polluting Material

The equipment installed on lines are static in nature and do not generate any fumes or waste materials.

(ii) Explosion/Fire hazards

During the survey and site selection for transmission lines, it has been ensured that these are kept away from oil/gas pipelines and other sites with potential for creating explosions or fires. Fires due to flashover from lines can be a more serious problem in deciduous forest.



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Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

Topsoil disturbed during the development of sites will be used to restore the surface of the platform. Infertile and rocky material will be reused as fill for tower foundations.

Due to transmission line, minor impacts associated with corona generated audible noise, but is expected to be less. The increased noise level at the edge of the right-of-way may be discernible or audible during wet-weather conditions, although line noise would most often be masked by naturally occurring sounds at locations beyond the right-of-way and would not be significant.

The total project cost including taxes and duties works out to INR 167 crores.

Following approvals and clearances need to be obtained from the various authorities at the different stages of the project. Close follow up will be exercised for the timely approval of the below items:

10/10/2019
Raghuveera Kumar
Hoad-Projects (Site) TL
NKTL - Hazaribagh

CHAPTER – 1.0

INTRODUCTION TO THE AREA, BASELINE STUDY OF BUFFER AREA & METHODOLOGY ADOPTED FOR THE PREPERATION OF SITE-SPECIFIC INTEGRATED WILDLIFE MANAGEMENT PLAN

1.A.1 LOCATION OF THE PROJECT

The project is falling in Latehar and Chatra districts under Jharkhand state. The proposed Transmission line originates from Tandwa in Chatra district travels through Latehar district of Jharkhand state and terminate at Bara in Gaya district of Bihar state. The total length of the proposed Transmission line is **97.69 Km** out of which **70 Km** transmission line length falling inside the Latehar and Chatra districts of Jharkhand state.

1.A.2 IMPACTED AREA AROUND THE PROJECT SITE

The proposed Transmission line impacted around 5 Blocks, 4 Range & 3 Divisions of Forest in Chatra and Latehar districts.

Details of impacted area with reference to Forest block, beat, forest range etc. are shown in Table 1.A.2.1

TABLE 1.A.2.1: DETAILS OF IMPACTED AREA FALLING AROUND PROPOSED 400 KV (D/C) TRANSMISSION LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)

Sr. No.	Forest Division	Forest Block	Forest Beat	Forest Range	Forest Area in Ha.	Non-Forest Area in Ha.
1	Latehar	Bariyatu	Balumath	Balumath	15.3589	41.9412
2	Chatra South	Simariya	Bagra	Simariya	30.793	31.594
		Lawalaung			20.931	9.008
		Chatra	Chatra Sadar	Chatra	68.1566	20.5861
3	Chatra North	Hunterganj	Jori	Hunterganj	19.499	6.3072
			Dantar		42.273	14.3566
Total					197.0115	123.7925

1.A.3 EXTENT OF PROJECT AREA AND LAND SCHEDULE

The Forest area proposed to be diverted is mostly undulating (60%). The total area required for diversion is **197.0115 Ha.** comes under the jurisdiction of Latehar, Chatra South & Chatra North Forest Division in Latehar and Chatra districts.

Out of **197.0115 Ha.** forest land **149.1959 Ha.** land falling inside Notified Forest Area & **47.8156 Ha.** land falling inside GM/JI Area and **123.7925 Ha.** land falling inside non-Forest area.

Division wise detailed Land schedule shown in Table 1.A.3.1—



TABLE 1.A.3.1: LAND SCHEDULE FOR PROPOSED 400 KV (D/C) TRANSMISSION LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)

S.No	Village	Forest Land (ha.)	Non-Forest Land(ha.)
LATEHAR FOREST DIVISION			
1	Phulbasia Alias Amarwadih	3.653	4.1919
2	Charra	1.692	5.9558
3	Rahea	2.19	4.804
4	Barwadih	1.341	3.3285
5	Besra	5.4739	3.8828
6	Kusamha	0.264	2.2946
7	Bhattachatra	0.144	3.0478
8	Makra	0	4.5982
9	Sibla	0.601	9.8376
	Total	15.3589	41.9412
CHATRA SOUTH FOREST DIVISION			
10	Kasiyatu	11.093	4.4217
11	Kasari	2.476	1.2767
12	Nawada	0	4.6482
13	Kendu	4.231	8.0932
14	Dundua	2.211	3.1556
15	Bagra	1.627	8.4325
16	Belgara	0.529	0.001
17	Kuthan	8.626	1.5651
18	Baksl	6.752	1.169
19	Lamta	1.556	7.72
20	Jogiadih	6.846	0.015
21	Bhagnadih	5.777	0.104
22	Manatu	1.47	1.586
23	Barhgaon	0.765	2.24
24	Pherenda	0	1.4851
25	Bhang	4.661	4.007
26	Korcha	1.462	0.004
27	Gulhutu	2.04	0.004
28	Parbat Alias Barahmana	9.79	2.922
29	Ambadih	1.099	0
30	Geri	3.5526	3.31
31	Ghurnadih	1.161	0.099
32	Nartama	1.012	0.642
33	Karma	2.806	1.467



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 Sd/- *[Signature]*
 Joint Secretary (Forest)
 Ministry of Environment, Forest and Climate Change
 Government of India, New Delhi

The land use pattern is variable in the project region falling under Latehar and Chatra districts. The land use pattern of the area falling under Latehar district has been depicted in Figure 1.A.4.1. The study indicates that geographical features play a major role in extracting information about land use pattern of a specific area. Out of total geographical area of the district i.e 3613 Sq. km, nearly 18 % area comes under net sown area, 7% under forests and the rest area falls under barren, cultivable waste, pasture, and other agricultural use.

On the other hand, the land use pattern of the project region falling under Chatra district has been depicted in Figure 1.A.4.2. A major portion of the Chatra district is covered by forest (60.4% of TGA) and has scattered settlement pattern. The forest has a variety of medicinal plants, kendu leaves, bamboo, sal, teak and other timber species. The district has considerable flat land, which

provides suitable site for agricultural use. The hilly areas are mostly under forest with patches of cultivation on scarp areas.

FIGURE 1.A.4.1: LAND USE/LAND COVER MAP OF LATEHAR DISTRICT

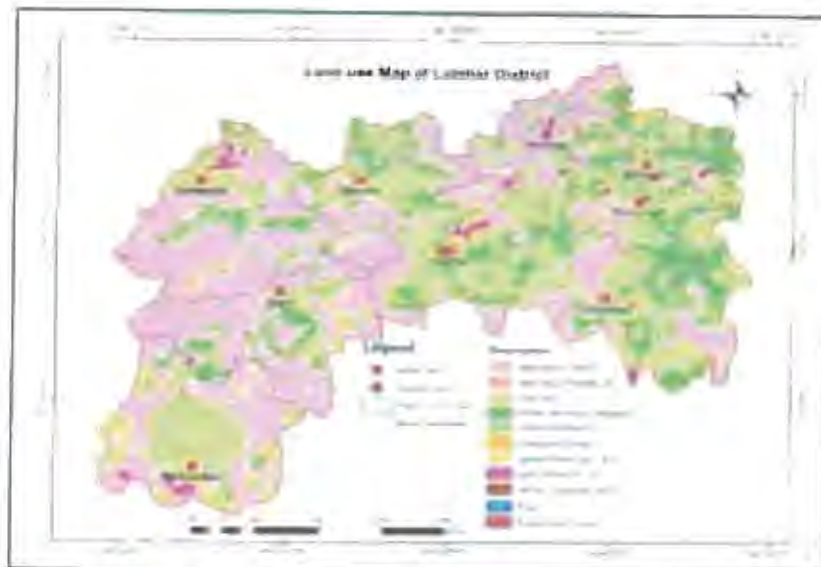


FIGURE 1.A.4.2: LAND USE/LAND COVER MAP OF CHATRA DISTRICT



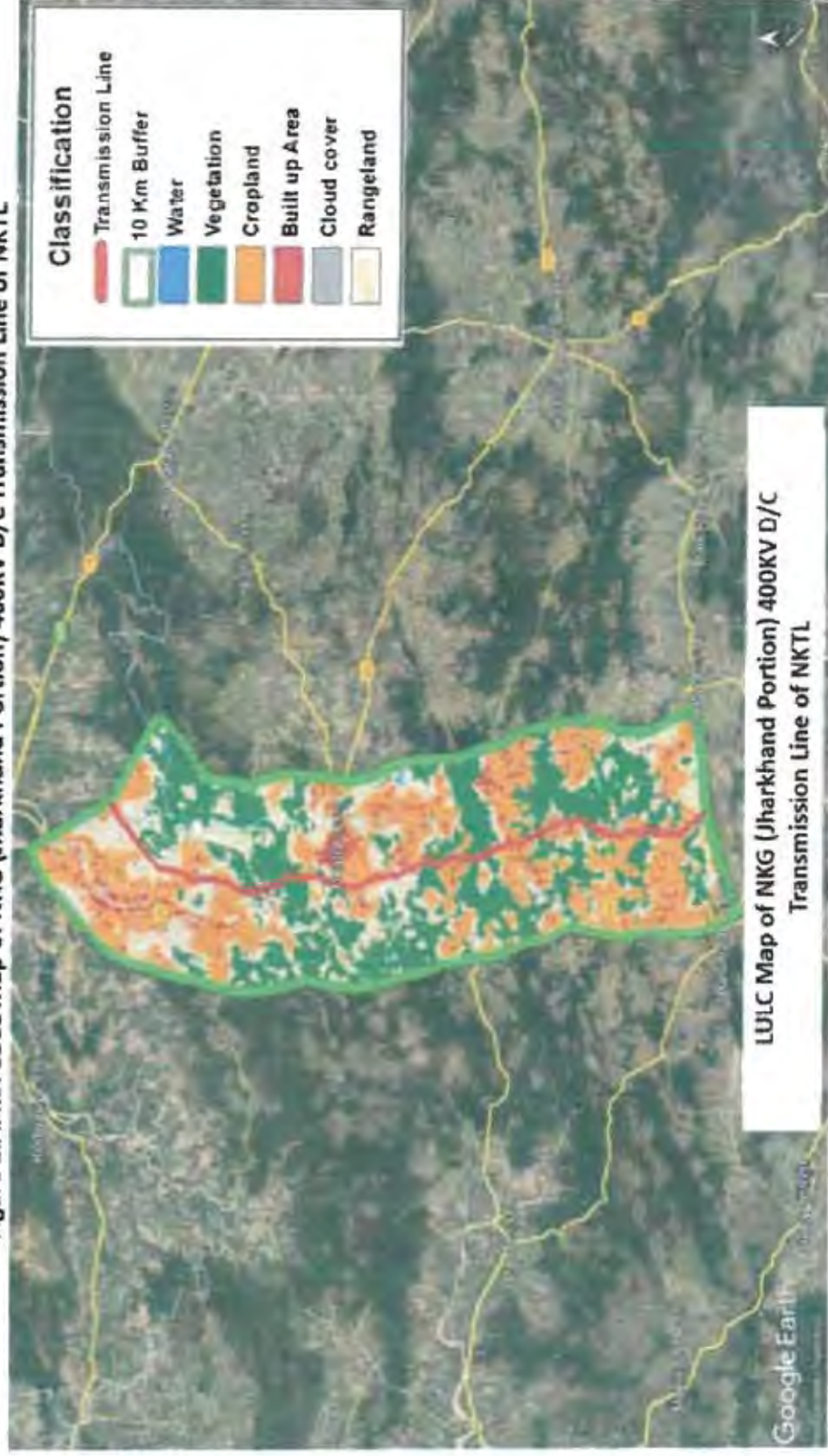
The detailed LULC analysis has been undertaken for the study area considering 10 km area both the sides of NKG (Jharkhand Portion) 400KV D/C Transmission Line of NKTL. The LULC data for the project region has been acquired from ESRI land cover data having spatial resolution of 10m x 10m. The data was further processed and analysed by utilizing the ArcGIS software.

TABLE 1.A.4.1: STATUS OF LULC OF THE PROJECT REGION

Sl. No.	Land use/land cover	Area (km ²)	Percentage (%)
1	Water bodies	5.07	0.35
2	Forest/Tree cover	514.67	35.26
3	Cropland	509.66	34.92
4	Built up Area	65.79	4.51
5	Shrubland	361.93	24.80
6	Cloud cover	2.30	0.16

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Figure 1.A.4.3: LULC Map of NKG (Jharkhand Portion) 400KV D/C Transmission Line of NKTL

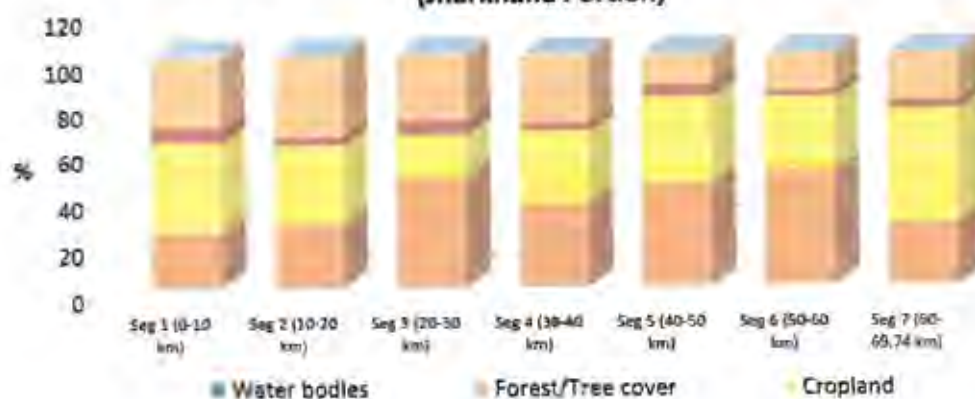


LULC Map & details of Land use pattern within the study area of NKG (Jharkhand Portion) 400KV D/C Transmission Line enclosed as Annexure 6.A.2.

Rajendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

The segment wise LULC have been also undertaken to identify the stretch which is having maximum forest cover and also to identify ecological sensitive receptors which need to be considered and given the priority for conservation and management of wildlife likely to be found in these receptors. The segment wise LULC is presented in Figure 1.A.4.4. The segment wise analysis of LULC of study area indicates that maximum forest cover (i.e., 48.96%) falls under segment 6 (i.e., 50-60 km) followed by 46.3% under segment 3 (i.e., 20-30km). The detailed segment wise LULC maps along with area analysis is appended in **Annexure 6.A.2**

Figure 1.A.4.4: Segment Wise Analysis of LULC Within the Study Area of Proposed 400 kV (D/C) Transmission Line from NKSTPP to Gaya (Jharkhand Portion)



1.A.5 LOCATION OF PROJECT WITH REFERENCE TO LATITUDE AND LONGITUDE

Details of project locations with Latitude and Longitude coordinates shoen in Table 1.A.5.1 —

TABLE 1.A.5.1: LATITUDE AND LONGITUDE OF PROJECT LOCATIONS

SL No	Angle Point	Deviation Angle	GPS - Coordinate		Village	District
			Latitude	Longitude		
1	AP 19/0	29° 19' 8"RT	23°50'58.55"	84°54'15.03"	Amarwadih	Latehar
2	AP 20/0	32° 49' 43"RT	23°50'58.61"	84°54'12.71"	Amarwadih	
3	AP 21/0	20° 21' 31"RT	23°51'1.53"	84°54'7.98"	Amarwadih	
4	AP 22/0	5°59'24"LT	23°51'42.72"	84°53'36.85"	Charra	
5	AP 23/0	41°49'12"RT	23°52'24.52"	84°52'56.66"	Charra	
6	AP 24/0	10° 5' 12"RT	23°53'26.83"	84°52'57.27"	Rahea	



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Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

46	AP-59	40° 1' 27"LT	24°12'4.51"	84°49'59.83"	Karma
47	AP 60/0	30° 49' 38"RT	24°12'52.52"	84°49'59.25"	Suruj
48	AP 61/0	12° 43' 30"LT	24°13'38.22"	84°50'25.56"	Larkua
49	AP 62/0	32° 12' 33"RT	24°14'38.76"	84°50'17.7"	Sangri
50	AP 63/0	31° 22' 39"RT	24°14'54.95"	84°50'24.73"	Sanghri
51	AP 64/0	8° 58' 21"LT	24°14'58.4"	84°50'29.74"	Darha
52	AP 65/0	55° 51' 51"LT	24°15'3.12"	84°50'34.73"	Darha
53	AP 66/0	33° 23' 33"LT	24°15'12.74"	84°50'32.54"	Darha
54	AP 67/0	4° 33' 10"LT	24°15'17.74"	84°50'27.06"	Darha
55	AP 68/0	16° 37' 38"RT	24°15'23.02"	84°50'20.27"	Darha
56	AP 69/0	31° 59' 41"LT	24°15'30.47"	84°50'14.98"	Darha
57	AP 70/0	37° 3' 17"RT	24°15'34.49"	84°50'5.55"	Darha
58	AP 71/0	18° 3' 55"RT	24°15'47.8"	84°49'57.83"	Sikid
59	AP 72/0	15° 38' 29"LT	24°15'58.89"	84°49'55.71"	Sikid
60	AP 73/0	8° 18' 57"RT	24°16'7.45"	84°49'51.23"	Sikid
61	AP 74/0	14° 45' 37"LT	24°16'14.66"	84°49'48.79"	Sikid
62	AP 75/0	11° 24' 14"RT	24°16'22"	84°49'43.78"	Sikid
63	AP 75A	3° 54' 32"RT	24°16'28.43"	84°49'41.14"	Sikid
64	AP 76A/0	10° 13' 54"RT	24°16'36.82"	84°49'38.39"	Sikid
65	AP 76B/0	1° 32' 43"RT	24°16'54.92"	84°49'36.14"	Postia



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Raghvendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

66	AP 77/0	9° 42' 35"LT	24°17'4.21"	84°49'35.26"	Postia
67	AP 77A/0	2° 41' 10"LT	24°17'11.92"	84°49'33.06"	Postia
68	AP 78/0	20° 52' 42"RT	24°17'27.62"	84°49'27.71"	Postia
69	AP 79/0	14° 11' 51"RT	24°17'40.07"	84°49'28.55"	Postia
70	AP 80/0	16° 58' 36"LT	24°18'12.74"	84°49'39.95"	Postia
71	AP 80A/0	53° 4' 54"RT	24°18'21.24"	84°49'40.02"	Postia
72	AP 80 B/0	28° 7' 12"LT	24°18'23.92"	84°49'43.96"	Postia
73	AP 81/0	10° 5' 54"RT	24°18'30.53"	84°49'47.38"	Postia
74	AP 82/0	21° 59' 54"LT	24°18'53.92"	84°50'5.56"	Demdem
75	AP 83/0	14° 15' 19"LT	24°19'1.89"	84°50'7.64"	Demdem
76	AP 84/0	16° 35' 02"RT	24°19'19.31"	84°50'7.38"	Demdem
77	AP 85/0	11° 12' 5"LT	24°19'45.09"	84°50'15.33"	Demdem
78	AP 86/0	26° 53' 52"LT	24°20'20.43"	84°50'18.43"	Paini Kalan
79	AP 87/0	41°37'15"RT	24°20'36.23"	84°50'11.36"	Paini Kalan
80	AP 88/0	4°48'25"RT	24°21'27.73"	84°50'31.06"	Jhagartari
81	AP 89/0	13° 47' 42"LT	24°21'46.19"	84°50'40.08"	Jhagartari
82	AP 90/0	37°21'48"RT	24°23'0.54"	84°50'54.87"	Bijinathpur
83	AP 91/0	4° 17' 45"RT	24°24'3.47"	84°52'10.37"	Gaighat
84	AP 92/0	1° 13' 40"LT	24°24'39.75"	84°53'1.08"	Bedauli



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Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

1.A.6 STATUS OF FOREST DIVERSION PROPOSAL

Proposal No: FP/JH/TRANS/41236/2019

Stage 1 In-principal approval granted by IRO Office Ranchi by letter no. FP/JH/TRANS /41236/2019/1154 dated: 6th June 2023 for the Diversion of 197.0115 Ha. (Chatra North – 61.772 ha., Chatra South- 119.8806 ha. & Latehar – 15.3589 ha.) forest land in favour of North Karanpura Transco Limited for construction of 400 KV D/C Transmission Line from North Karanpura (Tandwa) to Gaya under Chatra North, Chatra South & Latehar Forest Division in Chatra and Latehar Districts of Jharkhand.

1.A.7 STATUS OF FOREST ENVIRONMENTAL CLEARANCE

NA

1.B.1 VILLAGES AND HABITATIONS WITHIN THE PROJECT & IMPACT AREA

The villages falling under the study area i.e., 10 km both the side of ROW of proposed transmission line have been identified (Figure 1.B.1.1). The zone wise analysis of villages falling under study area reveals that 55 villages fall under project area and 343 villages under buffer zone. The list of villages falling within study area is appended in Annexure 6.F

The villages within the study area primarily fall under Simeriya, Lawaloung, Chatra and Hunterganj Blocks of Chatra District and Bariyatu Block of Latehar District under Jharkhand State. The Block wise distribution of villages falling under the study area is presented in Table 1.B.1.1. Out of total villages falling under study area maximum villages are under Huntergunj Block i.e. 175 (43.97%) followed by Chatra Block i.e. 102 (25.63%).

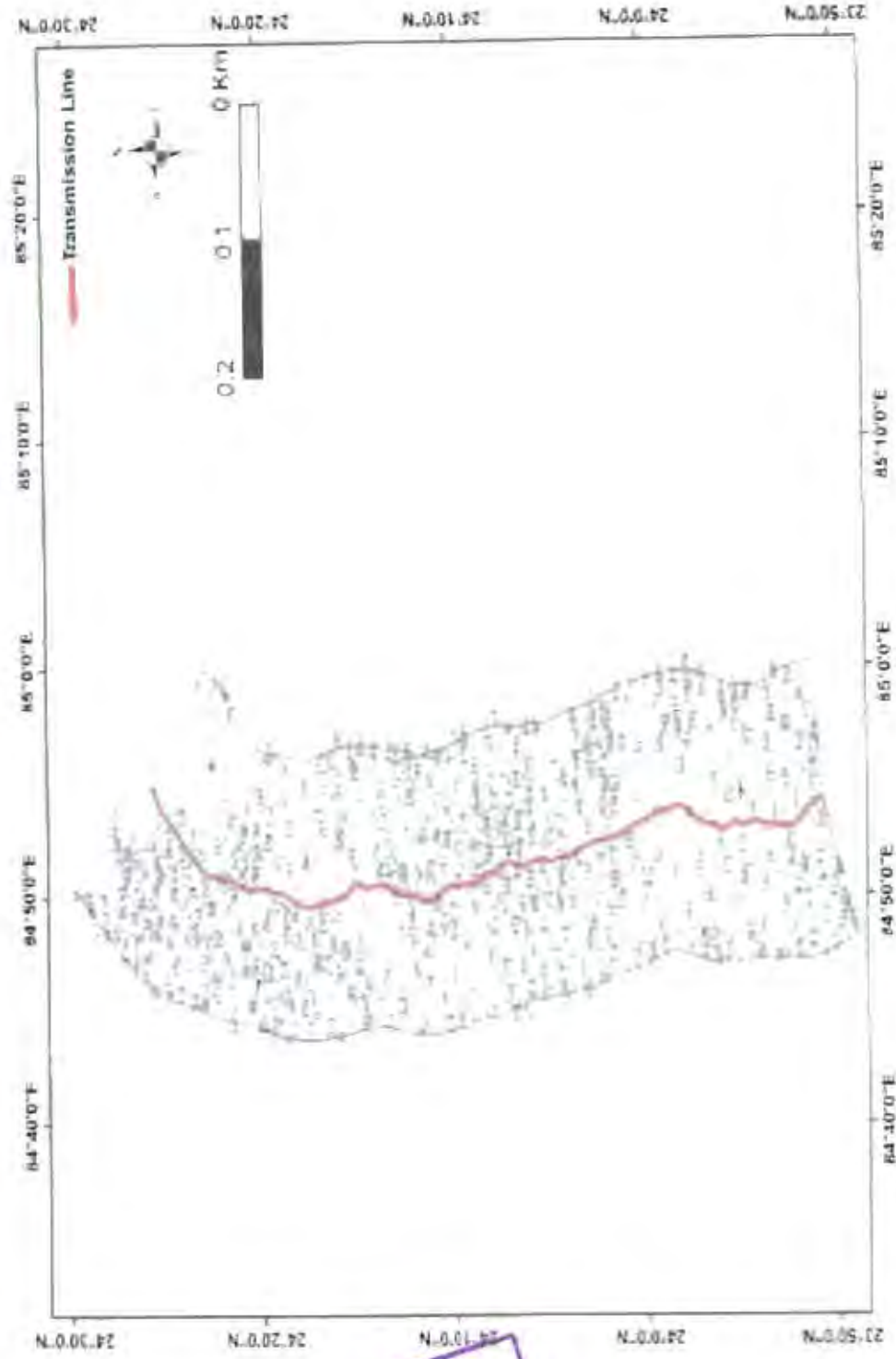
TABLE 1.B.1.1: BLOCK WISE DISTRIBUTION OF VILLAGES FALLING WITHIN THE STUDY AREA

Sl. No.	District	Block	Project Area	Buffer Zone (Upto 10 Km)	Total
1	Latehar	Bariyatu	9	21	30 (7.54%)
Sub-Total			9	21	30
2	Chatra	Chatra	17	85	102 (25.63%)
3		Huntergunj	16	159	175 (43.97%)
4		Lawalung	4	31	35 (8.79%)
5		Simaria	9	47	56 (14.07%)
Sub-Total			46	322	368
Grand Total			55	343	398



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NHTL Hazaribagh

FIGURE 1.B.1.1: VILLAGES FALLING WITHIN THE STUDY AREA OF 400 KV NKG (JHARKHAND PORTION) TRANSMISSION LINE OF NKTL



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Raghvendra Kumar
Head-Projects (Site) TL
NKTL, Hazaribagh

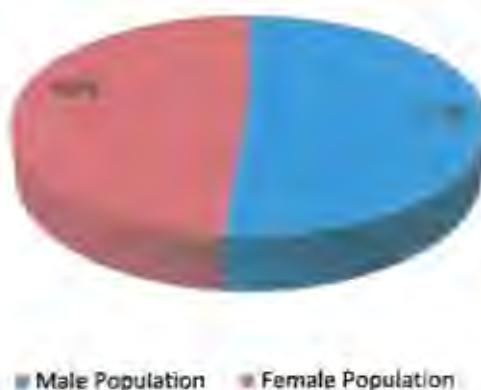
1.8.2 DEMOGRAPHIC AND OCCUPATIONAL PROFILE OF THE VILLAGES

The analysis of demographic profile of villages falling under the study reveals that total number of households in the villages under the study area are 61,782 with total population of 3,79,740.

1.8.2.1 Gender Wise Distribution of Population

Overall gender wise distribution of population in villages under the study is presented in Figure 1.8.2.1. It shows that 51.46% of the population are male and remaining 48.54% are female. The analysis further shows that the sex ratio is 943 females per 1000 male in the villages under the study area.

Figure 1.8.2.1; Overall Gender Wise Distribution of Population in the Villages under the Study Area



Analysis of status of child population (0-6 years) in the villages under the study area reveals that 20.53% are children (0-6 years) of total population. Overall gender wise distribution of child population in the villages under study area is presented in Figure 1.8.2.2. It shows that in the villages under study area, out of male population, 20.14% are male children, whereas out of female population, 20.94% are female children. The analysis further shows that the sex ratio among child population is 980 females per 1000 male children in the villages under study area.

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 Regional Manager (S&T)
 MALE, Hazratnagar

Gender	Percentage
Male Population	50%
Female Population	50%

Distribution of scheduled tribe population in the villages under the study area reveals that 5.36% are scheduled tribe of total population in CSR zone of the villages under the study area. The analysis further shows that 5.25% are male ST of the total male population and 5.49% are female ST of the total female population of CSR zone of the villages under the study area.

A bar chart comparing the percentage of the total population for two groups, SC (Scheduled Caste) and ST (Scheduled Tribe), across three categories: Total, Male, and Female. The Y-axis represents the percentage of the total population, ranging from 0 to 35. The X-axis lists the categories: Total, Male, and Female. For each category, there are two bars: a blue bar for SC and a red bar for ST. The values for SC are 32.78 (Total), 32.53 (Male), and 33.06 (Female). The values for ST are 5.36 (Total), 5.25 (Male), and 5.49 (Female).

Category	SC (%)	ST (%)
Total	32.78	5.36
Male	32.53	5.25
Female	33.06	5.49

1.B.2.3 Literacy Rate

The villages under the study area, 35.48% of the population are literates. Status of gender wise literacy in the villages under the study area is presented in Figure 1.B.2.4. It reveals that 44.89% are male literates of the total male population against 25.51% female literates of the total female population of the villages under the study area. Overall status of literacy in the villages under the study area is presented in Figure 1.B.2.5.

Figure 1.B.2.4: Status of Literacy in the Villages under the Study Area

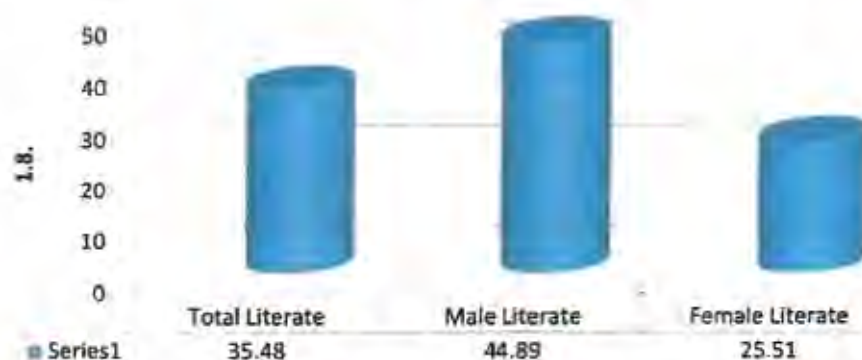
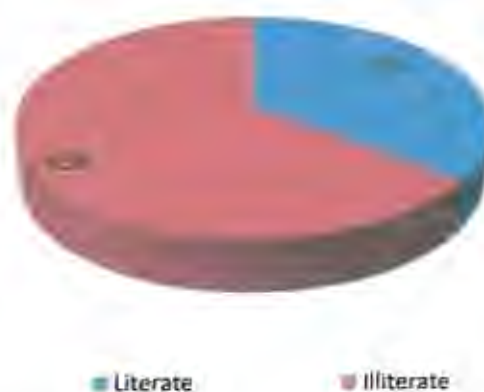


Figure 1.B.2.5: Overall Status of Literacy in the Villages under the Study Area



1.B.2.4 Occupational Pattern

Out of total working population, 62.92% are main workers and remaining 37.08% are marginal workers in the villages under the study area. Figure 1.B.2.6 shows that 23.78% are main workers of the total population, 14.02% are marginal workers and remaining 62.20% are non-workers of the total population. Overall status of workers in the villages under the study area is presented in Figure 1.B.2.7. It reveals that 37.80% are working population and remaining 62.20% of the total population are non-workers in the villages under the study area.

Figure 1.B.2.6: Worker Profile in the Villages under the Study Area

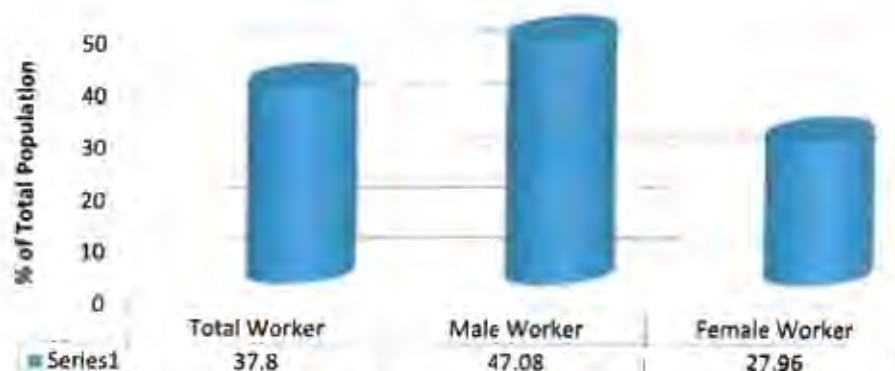


Figure 1.B.2.7: Overall Working Status in the Villages under the Study Area



Status of gender wise worker profile in the villages under the study area is presented in Figure 1.B.2.8. It reveals that 47.08% are male workers of the total male population against 27.96% female workers of the total female population of the villages under the study area.

Figure 1.B.2.8: Status of Workers in the Villages under the Study Area



Status of gender wise non-worker profile in the villages under the study area is presented in Figure 1.B.2.9. It reveals that 52.92% are male non-workers of the total male population against 72.04% female non-workers of the total female population of the villages under the study area.

Figure 1.B.2.9: Status of Non-Workers in the Villages under the Study Area



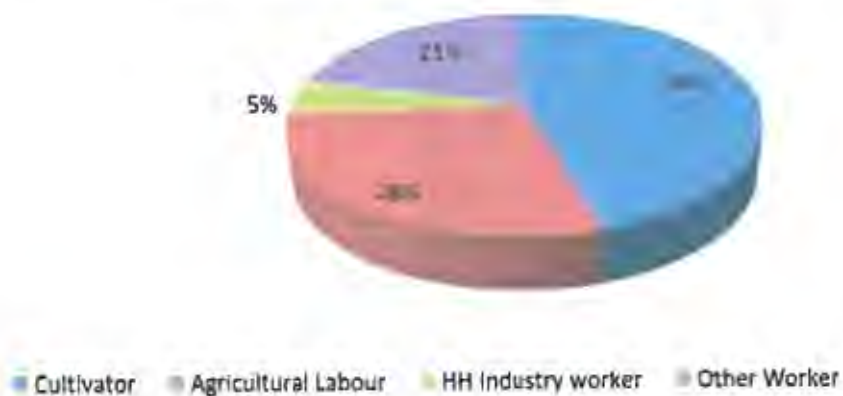
Status of worker profile in the villages under the study area is presented in Figure 1.B.2.10. It reveals that 62.92% are main workers of the total worker against 37.08% marginal workers of the total working population of the villages under the study area.

Figure 1.B.2.10; Status of Worker Profile in the Villages under the Study Area



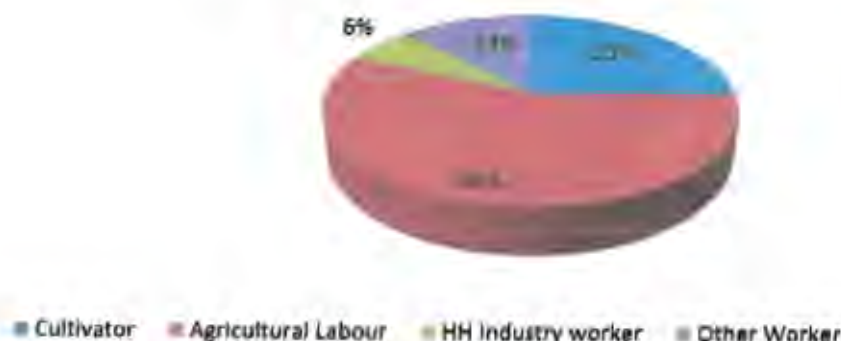
Out of total main workers in the villages under the study area, majority (45.58%) are cultivators followed by agricultural labour (28.45%), 5.10% are engaged in household industries and remaining 20.87% of the total main workers are other workers (Figure 1.B.2.11).

1.B.2.11 : Detail of main workers of villages falling under the study area



Out of total marginal workers in the villages under the study area, majority (56.59%) are agricultural labour followed by cultivators (24.69%) (Figure 1.B.2.12).

1.B.2.12 Detail of marginal workers of villages falling under the study are



1.B.3 CROPPING PATTERN ADOPTED BY THE VILLAGERS

The details of cropping pattern for the Latehar district for the period 2015-2016 has been presented in Table 1.B.3.1. The analysis indicates that the area's main agricultural products include paddy, wheat, maize, gramme, legumes, and vegetables. However, due to the mountainous and rugged topography, there is very little land that can be utilized for agriculture.

TABLE 1.B.3.1: CROPPING PATTERN OF LATEHAR DISTRICT

Sl. no.	Crop	Kharif	Rabi
1	Cereals	Rice, Maize	Wheat
2	Pulses	Arhar, Urad, Moong	Gram, Linseed
3	Oilseed	Groundnut, Niger	Mustard, Sunflower
4	Vegetables	Bhindi, Chilli	Potato, Onion, Brinjal, Tomato

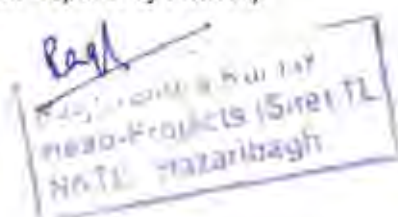
(Source: DIP reports of PMKSY)

For the Chatra district, the major crops grown in the district are rice, wheat, and pulses. Only 12.21 percent of the area of agricultural use is net irrigated and major sources of irrigation are well and tube wells. The details of cropping pattern for the Chatra district for the period 2015-2016 has been presented in Table 1.B.3.2.

TABLE 1.B.3.2: CROPPING PATTERN OF CHATRA DISTRICT

Sl. no.	Crop	Kharif	Rabi
1	Cereals	Paddy, Maize	Wheat
2	Pulses	Arhar, Urad,	Gram, Lentil, Pea
3	Oilseed	Groundnut, Sesum	Mustard, Linseed
4	Vegetables	Bhindi, Capsicum, Tomato	Potato, Onion, Brinjal

(Source: DIP reports of PMKSY)



1.8.4 FOREST BASED LIVELIHOOD/NTFP

The villagers are mostly dependent on wood fuel. In the study area people are not actively engaged in forest product collection. It is an important livelihood source for many tribal communities. Forest is an important source of firewood and other minor forest produce like timber, herbs, fruits, gums, sal seed, sal leaves etc. It contributes almost 20 percent of the total income of the villagers in the project. Sal seeds and sal leaves together gives 10 percent of the forest income. Jamun and Kendu leaf contribute almost 8 percent of the income.

It is estimated 60% of the total production of NTFPs are consumed locally. Various types of NTFP viz., Kendu leaf, Mahua flower & seeds, Sal seed and leaves, fruits, flowers, roots, bark, gums, fiber, medicines etc. of various species are collected from the forest of project area. Except kendu leaf, which is collected by the corporation through contractors, all other NTFP are collected by the locals in an unorganized way. Training and support are being given to villagers by the forest divisions.

Collection of NTFP from the forest in an unorganized way has a negative impact, as it leads to habitat degradation and disturbance causing shortage of food and cover for wild animals. There are many incidences wherein the collection of Mahua flower has led to outbreak of forest fires. Even for the collection of Kendu leaves, fire is lit in order to encourage new flush of kendu leaves, which is not in the interest of conservation. Regarding the collection of other NTFP, local people need to be educated properly to avoid all kinds of disturbance and degradation.

1.8.5 CATTLE POPULATION AND DEPENDENCY ON FOREST

It has been estimated from the sampling area of project site that the average number of livestock population of about 60,124, including cows, buffaloes, pigs, goats and poultry are found in the project site. The average percentage of cattle population per village is shown in figure 6. The figure shows that the goat population is maximum 49% followed by buffaloes. 24 %, cow 15%, poultry 6% and pig is also 6%. Stall feeding is not popular or being implemented. So, people use forests as grazing ground, causing shortage of food and cover for wild herbivores. On account of this direct competition for pasture, the wild herbivores like Blue Bull, Deer etc. are forced to come to open places like agricultural fields. Excessive grazing also causes soil compactness which in turn causes soil erosion, runoff, siltation of water bodies, shortage of water, loss of vegetation etc.

Ray
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh



1.B.5.1 Percent of Livestock per village



• Cattle • Buffalo • Cow • Goat • Pig

Such habitat degradation due to domestic livestock grazing disturbs the wild fauna and it also spreads contagious diseases to adversely affect the health and population of the whole pyramid of ecosystem. Pastures areas need to develop and stall feeding implemented for cattle, so they are not dependent upon the forest.

1.C.1 DESCRIPTION OF TOPOGRAPHY

1.C.1.1 Climate

The project regions fall under 2 districts i.e., Latehar and Chatra. The district of Latehar is characterized by humid to sub-humid climate. During summer the hot spell prevails from March to middle of June, Rainy season starts from middle of June to middle & end of October. Winter starts from the middle of November and continues till the end of February. Latehar district has a variety of climatic conditions with higher landforms in the south and plains in the north. The summers are cool and moderate in the southern region. On the contrary, the Chatra district experiences warm and temperate climate. In winter, there is much less rainfall in Chatra than in summer.

1.C.1.2 Temperature

Latehar district experiences temperatures between 16 and 18^o C in the winter and up to 41^o C in the summer. In Chatra district May is the warmest month of the year. The temperature in May averages 32.3 °C. January has the lowest average temperature of the year i.e., 16.5 °C. The average temperature of the district is 24.7 °C. There is a difference of 321 mm of precipitation between the driest and wettest months.



Paul
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

1.C.1.3 Rainfall

The highest southern regions of the Latehar district receive up to 2000 mm of rainfall annually. However, northern part of the Latehar district remains in rain shadow area and receives less than 1200 mm rainfall. The average rain fall data of Latehar district for the year 2020 has been presented in Table 1.C.1.1.

TABLE 1.C.1.1: AVERAGE RAINFALL PATTERN OF LATEHAR DISTRICT FOR 2020

Sl. No.	Block	Average Rainfall (mm)
1	Balumath	1176.8
2	Bariatu	1176.8
3	Barwadih	1086.1
4	Chandwa	1432.31
5	Garu	1194
6	Herhang	1176.8
7	Latehar	2051.4
8	Mahuadanr	1112.8
9	Manika	1932

(Source- CGWB Report: Aquifer Maps and Ground Water Management Plan, Latehar District, Jharkhand State)

The year wise detail of rainfall pattern for the Chatra district for the period 2013-2017 has been presented in Table 1.C.1.2.

TABLE 1.C.1.2: YEAR WISE RAINFALL PATTERN OF CHATRA DISTRICT FOR 2013-2017

Year	2013	2014	2015	2016	2017	
Sl. No.	Month	Avg(mm)	Avg(mm)	Avg(mm)	Avg(mm)	
1	Jan	12.3	17.4	0	10.3	8.7
2	Feb	0.4	28.2	0.7	0	0
3	Mar	18.2	27.5	7.4	15.3	8.3
4	Apr	0	0	14.7	0	0
5	May	30.4	96.3	3.5	24.4	14.1
6	Jun	60.4	115.2	143.6	45.7	71
7	Jul	110.8	222.9	309.2	255.6	348.1
8	Aug	263.2	232.7	217.5	514.7	209.3
9	Sep	74.9	185.9	42.7	291.2	76.9
10	Oct	200.1	31.1	0.7	35.4	32
11	Nov	0	0	0.7	0	0
12	Dec	0	0	0	0	0

1.C.1.4 Characteristics of Soil

During the state's 1:250,000 scale soil resource mapping, the soils present in various landforms were identified (Halder et al. 1996). The soil map of the Latehar district has been presented in (Figure 1.C.1.1) which reveals that in the Latehar district, three different soil orders—Entisols, Inceptisols, and Alfisols- are present. Alfisols accounted for (63.7%) of TGA, with Entisols (28.2%) and followed by Inceptisols (7.2%)

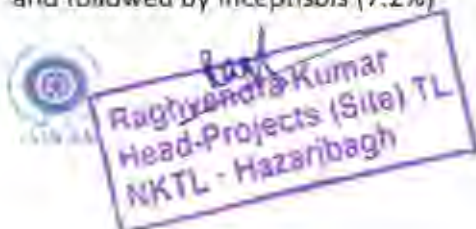
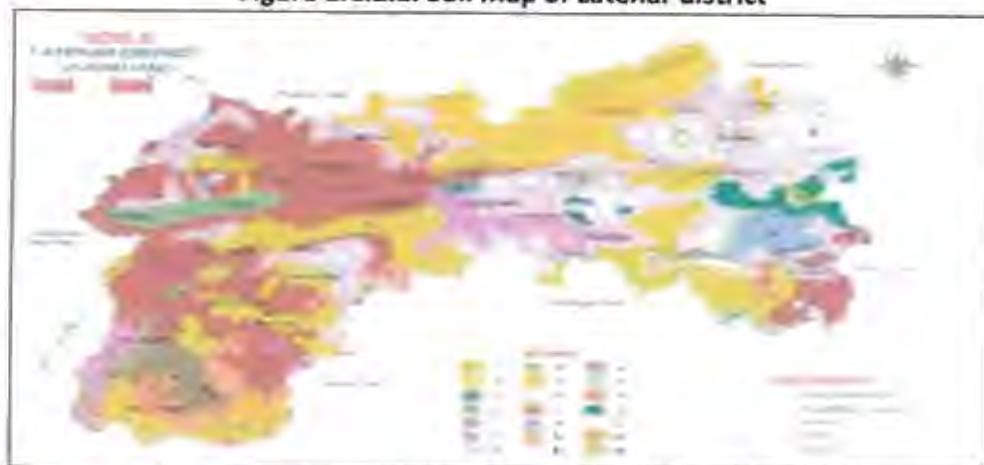


Figure 1.C.1.1: Soil Map of Latehar district



(Source: National Bureau of Soil Survey and Land Use Planning (ICAR))

The soil type of project region constituting the Chatra district has been depicted in Figure 1.C.1.2. Three soil orders were identified in the district namely Entisols, Inceptisols and Alfisols. Alfisols were the dominant soils covering 52.2 percent of TGA followed by Entisols (33.9 %) and Inceptisols (13.0).

FIGURE 1.C.1.2: SOIL MAP OF CHATRA DISTRICT



1.C.2 DRAINAGE PATTERN

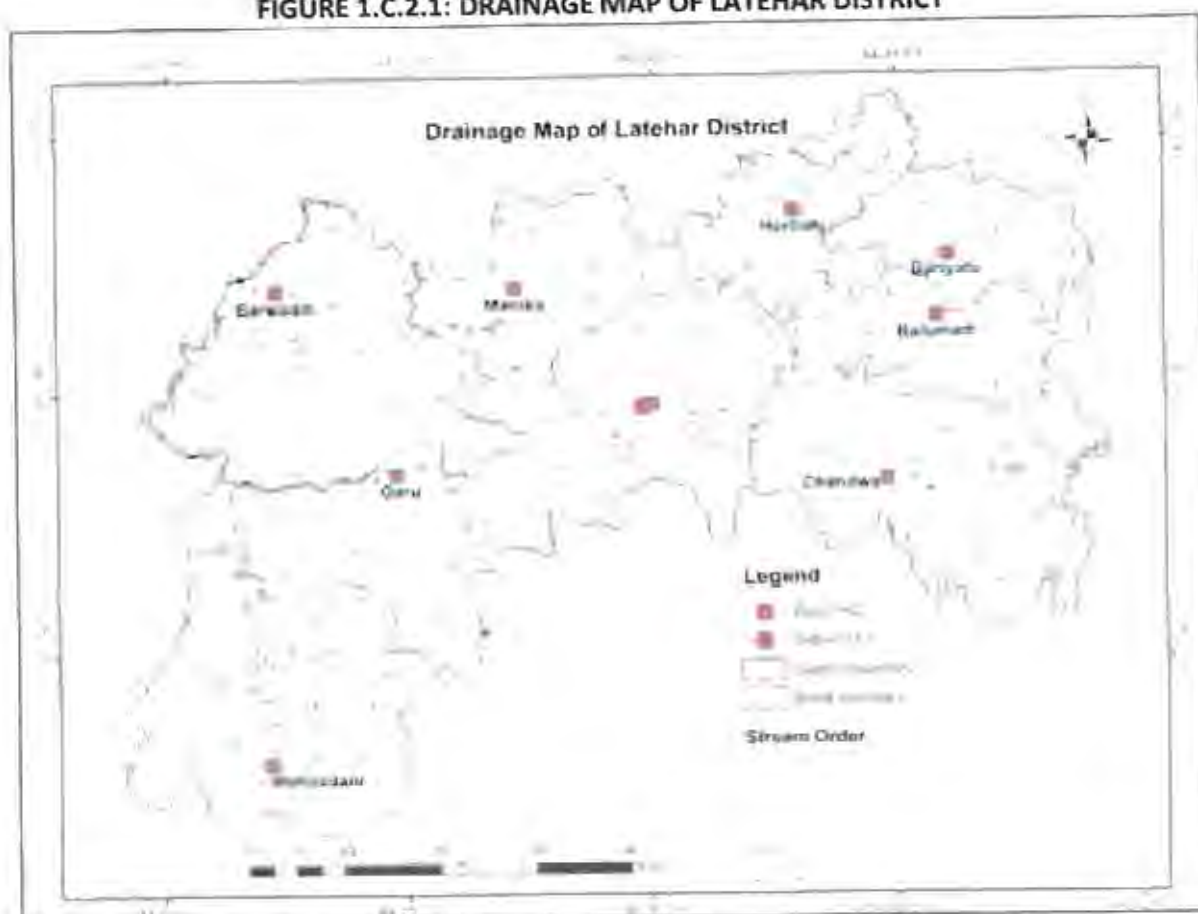
The drainage map of the Latehar district has been presented in Figure 1.C.2.1. The study reveals that the drainage system of this region is mostly comprised of the North Koel River and its tributaries, including the Burha River, Kudai Nala, Kohbarwa Nala, Charo Nala, Aksi River, and Charhu Nala. Several seasonal streams and nallas, in addition to these tributaries, eventually merge with the North Koel.



Raj
Rajendra Kumar
HBD-Projects (Site) TL
NKTL Hazratnagar

On the other hand, the drainage pattern of Chatra district is different. The principal rivers of the Chatra district are Lilajan, Barki, Chako, Damodar and Garhi. The general slope of the district is North to South. The general trend of the drainage is from SE-NW. The structural features particularly the foliation and joints exert profound impact upon the drainage and control the drainage pattern of the district. The drainage pattern of Chatra district has been presented in Figure 1.C.2.2.

FIGURE 1.C.2.1: DRAINAGE MAP OF LATEHAR DISTRICT



Rag
 Raghvendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

FIGURE 1.C.2.2: DRAINAGE MAP OF CHATRA DISTRICT



1.C.3 PRESENCE OF WATER BODIES

Detail of various water bodies which are located in the vicinity of project area is presented in Table 1.C.3.1--

TABLE 1.C.3.1: DETAILS OF WATER BODIES FALLING WITHIN STUDY AREA

S. No.	Name	X-coordinate (°E)	Y-coordinate (°N)	Distance from transmission line (in Km)
1	Lilajan river	84°47'38.96"E	24°19'54.48"N	4.6
2	Water body near Kenrimoh	84°54'42.24"E	24°22'19.84"N	6.49
3	Water body near Birlututdag	84°58'42.60"E	24°22'41.22"N	9.2

The Map showing water bodies falling under study area is enclosed as **Annexure – 6.I**

1.D DETAILS OF LINEAR INFRASTRUCTURE DEVELOPED IN THE PROJECT IMPACT ZONE

There is no such linear infrastructures i.e., Roads, Rail lines, Water ways, Canals and other developmental structures developed in the impact zone (23 mtr corridor from both side) of proposed 400 KV D/C North Karanpura-Gaya Transmission Line project.



Raghu
Raghuendra Kumar
Head, Project Impact TL
NXTL - Hazaribagh

1.E DESCRIPTION OF FLORA & FAUNA

The state-of-the-art methods have been used to assess the ecological setting within the study area (Project area and buffer area i.e., 10 km both the side) of North Karanpura to Gaya (Jharkhand Portion) 400 kV (D/C) transmission line at Jharkhand.

The list of floral & faunal species found in Latehar, Chatra South & Chatra North Division as provided by respective DFO's is enclosed as **Annexure 6.E.1, Annexure 6.E.2 & Annexure 6.E.3** respectively.

Further the list of site-specific flora actually present in the project area was also enlisted on the basis of survey of project site.

1.E.1 Forest Flora

In general, the forest area of the project area belongs to two major categories viz., Sal forest and miscellaneous or mixed forest, however many ecologists classified this into eight categories as listed below except plantation area. These are as follows:

- Dry Peninsular Sal Forest
- Dry mixed Deciduous Forest
- Moist Peninsular Low-Level Sal Forest
- Moist Peninsular Valley Sal Forest
- Dry Deciduous Scrub Patches
- Boswellia Forest Patch
- Butea Forest Patch
- Dry Bamboo Barrack

Site Specific Flora (i.e., Project area/ROW area)

A survey was conducted in the project area to prepare inventory of flora as observed during site specific survey. Phyto-sociological aspects of the study were carried out by sampling through quadrates method in the project site. The site-specific survey was conducted along the proposed transmission line route covering all the forest stretches which falls in the project area.

The inventory of dominant trees & shrubs of the forest areas (protected forest, mixed degraded jungles) are given in the Table 1.5.1. In addition, there are many plantation patches where plants like Eucalyptus, Akashmoni, Karanj, Amlaki, Tamarind, Jamun, Teak etc. were planted. There are couple of invasive alien plant species often found in the forest viz. *Lantana*, *Chromolaena*, *Hyptis*, *Imperata*, *Argemone* etc. were also found in forest patches.

The species enumeration for the total area was performed for the winter season. From the species enumeration data obtained for the selected season, it is clear that the species density usually during the monsoon is much higher in all the zones as compared to the winter/summer. Also, the highest number of species was found in the Chatra South Forest Division. This proves that the environmental conditions and physio-chemical parameters of the soil in study area are favourable for the growth of plants. Thus, multiple species thrive in this area. In the summer, the species count is decreased drastically in all the zones indicating that most of the species that thrived during the monsoon has died out.



Page
Ragendra Kumar
Head-Projects (SHA) TL
NMTL - Hazaribagh

TABLE 1.E.1: INVENTORY OF FLORA OF FOREST AREAS ALONG THE ROUTE OF 400 KV D/C NKG(J) TRANSMISSION LINE (PROJECT AREA)

Sl. No.	Scientific Name	Local Name	Family	Occurrence (Low/Moderate/High)
Trees				
1	<i>Shorea robusta</i>	Sal	Dipterocarpaceae	Very High
2	<i>Madhua indica</i>	Mahua	Sapotaceae	Moderate
3	<i>Terminalia tomentosa</i>	Asan	Combretaceae	Moderate
4	<i>Adina cordiflora</i>	Haldu	Rubiaceae	Low
5	<i>Diospyros melanoxylon</i>	Kenud	Ebeneaceae	Low
6	<i>Pterocarpus marsupium</i>	Muchikund	Sterculiaceae	Low
7	<i>Semecarpus anacardium</i>	Bhela	Anacardiaceae	Low
8	<i>Mangifera indica</i>	Aam	Anacardiaceae	Moderate
9	<i>Anogeissus latifolia</i>	Dhawda	Lythraceae	Moderate
10	<i>Lagerstroemia parviflora</i>	Jarul	Lythraceae	Low
11	<i>Butea monosperma</i>	Palas	Papilionaceae	High
12	<i>Myrtagyna parviflora</i>	Kalikadam	Rubiaceae	Low
13	<i>Phyllanthus emblica</i>	Amla	Euphorbiaceae	Low
14	<i>Aegle marmelos</i>	Bael	Rutaceae	Moderate
15	<i>Terminalia bellerica</i>	Bahera	Combretaceae	Moderate
16	<i>Boswellia serrata</i>	Salai	Bursaraceae	Low
17	<i>Syzigium cumini</i>	Jamun	Myrtaceae	Low
18	<i>Acacia catechu</i>	Khair	Mimosaceae	Low
19	<i>Pongamia pinnata</i>	Karanja	Papilionaceae	Low
20	<i>Dendrocalamus strictus</i>	Bamboo	Poaceae	Moderate
21	<i>Artocarpus integrifolia</i>	Jackfruit	Moraceae	Low
22	<i>Albizia lebbek</i>	Siris	Mimosaceae	Low
23	<i>Ficus benghalensis</i>	Banyan	Moraceae	Low
24	<i>Ficus religiosa</i>	Peepal	Moraceae	Low
25	<i>Schleichera oleosa</i>	Kusum	Sapotaceae	Low
26	<i>Azadirachta indica</i>	Neem	Meliaceae	Low
27	<i>Cassia fistula</i>	Amaltas	Caesalpiniaceae	Low
28	<i>Dalbergia sissoo</i>	Sissoo	Papilionaceae	Low
29	<i>Delonix regia</i>	Gulmohar	Caesalpiniaceae	Low
30	<i>Alstonia scholaris</i>	Chhatim	Verbenaceae	Low
31	<i>Tamarindus indica</i>	Tamarind	Papilionaceae	Low
32	<i>Cassia siamea</i>	Chakunda	Caesalpiniaceae	Low
33	<i>Gmelina arborea</i>	Gamar	Verbenaceae	Low
34	<i>Tectona grandis</i>	Teak	Verbenaceae	Low
35	<i>Bauhinia acuminata</i>	Kanchan	Caesalpiniaceae	Low



RAJENDRA KUMAR
HOD-PROJECTS
NKT, HALDIGHAT

S. No.	Scientific Name	Local Name	Family	Dominance (Low/Moderate/High)
36	<i>Holarrhena antidysenterica</i>	Kurcha	Apocynaceae	High
37	<i>Zizyphus oenoplia</i>	Bher	Rhamnaceae	Low
38	<i>Sterculia urens</i>	Kateera	Sterculiaceae	Low
39	<i>Mallotus philippensis</i>	Kamala	Euphorbiaceae	Moderate
Shrubs				
1	<i>Lantana camara</i>	Putush	Verbenaceae	Moderate
2	<i>Woodfordia fruticosa</i>	-	Lythraceae	Low
3	<i>Croton oblongifolius</i>	-	Euphorbiaceae	Low
4	<i>Indigofera pulchella</i>	-	Leguminaceae	Low
5	<i>Vitex negundo</i>	Nisenda	Lamiaceae	Low
6	<i>Annona squamosa</i>	Sitaphal	Annonaceae	Low
7	<i>Chromolaena odorata</i>	Siam	Asteraceae	Low
8	<i>Capparis sp. mosia</i>	-	Capparaceae	Low
9	<i>Clerodendrum infortunatum</i>	-	Lamiaceae	Low
Herbs				
1	<i>Sida acuminata</i>	-	Malvaceae	Low
2	<i>Xanthium strumarium</i>	-	Asteraceae	Low
3	<i>Parthenium hysterophorus</i>	-	Asteraceae	Low
4	<i>Blumea lacera</i>	-	Asteraceae	Low
5	<i>Elephantopus sp.</i>	-	Asteraceae	Low
6	<i>Gallinsoga parviflora</i>	-	Asteraceae	Low
7	<i>Panicum colonum</i>	-	Poaceae	Low
8	<i>Paspalum digitatum</i>	-	Poaceae	Low
9	<i>Pennisetum digitatum</i>	-	Poaceae	Low
10	<i>Imperata cylindrica</i>	-	Poaceae	Low
11	<i>Andropogon aciculatus</i>	-	Poaceae	Low
12	<i>Cassia tora</i>	-	Caesalpiniaceae	Low
13	<i>Hyptis suaveolens</i>	-	Labiatae	Low
14	<i>Leonurus sibiricus</i>	-	Labiatae	Low
15	<i>Leucas aspera</i>	-	Labiatae	Low
16	<i>Celosia cristata</i>	-	Labiatae	Low
17	<i>Achyrothes aspera</i>	-	Amaranthaceae	Low
18	<i>Combretum decandrum</i>	-	Combretaceae	Low
Aquatic Plants or Marsh Plants				
1	<i>Nymphaea rubra</i>	-	Nymphaeaceae	Low
2	<i>Elchharnea crasipes</i>	-	Pontederiaceae	Low
3	<i>Polygonum hydropiper</i>	-	Polygonaceae	Low
4	<i>Cyperus rotundus</i>	-	Cyperaceae	Low



Page
Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

**FIGURE 1.E.1: DIFFERENT FLORAL SPECIES FOUND IN THE RoW OF PROPOSED NORTH KARANPURA
- GAYA (JHARKHAND PORTION) 400 KV (D/C) LINE**



1. *Madhuca indica* (Mahua), 2. *Acacia catechu* (Khaer), 3. *Anogeissus latifolia* (Dhawda), 4. *Shorea robusta* (Sal),
5. *Terminalia tomentosa* (Asan), 6. *Terminalia bellirica* (Bahera), 7. *Butea monosperma* (Palas)

By
Raghendra Kumar
Head-Projects (Site) TL
TKTL - Hazaribagh

1.E.2 Forest Fauna

The forest of Chatra South, Chatra North and Latehar is rich in faunal diversity. The checklist of Working Plan of Chatra South Forest Division (2013-14 to 2023-24) reports 25 species of Mammals, 26 Reptiles, 12 amphibians, 20 species of insects and 94 species of birds.

The study area along the corridor of 400 kV NKG(J) transmission line showed a few protected forests and Jungle Jhari (Degraded Scrub Land) intermingled with village settlements and crop field. However, there are few waterbodies, streams and rainfed rivers in the vicinity of the project area. Due to the unique setting of undulated landform, faunal diversity of the landscape is fairly good. However, the proposed transmission line does not pass through any Protected Areas i.e., Wildlife sanctuary, National Park etc and Eco-sensitive zone. Among the vertebrates, documented information is available only for Mammalian, Reptiles and Avifauna. However, other vertebrates like Amphibians (frogs, toads) are also found. Recent studies on reptiles in Jharkhand revealed 25 species of snakes, 8 species of lizards and 1 species of Indian Flapshell Turtle (*Lissemys punctata*) in the Chatra & Latehar districts (Raziuddin, 2015). Report on the snake fauna reports presence of 19 species of snakes found in the project region (Prakash and Raziuddin, 2009).

Agd
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

**TABLE 1.E.2: INVENTORY OF FAUNAL DIVERSITY IN CHATRA SOUTH, CHATRA NORTH & LATEHAR FOREST DIVISION
AS PER FOREST WORKING PLAN/OTHER SECONDARY INFORMATION**

Sl. No.	Scientific Name	Common Name	Status as per Wildlife (Protection) Act, 1972	Status as per IUCN List
Amphibian Diversity				
1	<i>Duttaphrynus stomaticus</i>	Indus Valley Toad	Sch-I, Part-II	Least Concern
2	<i>Duttaphrynus melanostictus</i>	Asian Common Toad	Sch-I, Part-II	Least Concern
3	<i>Microhyla ornata</i>	Ornamented Pygmy Frog	Sch-I, Part-II	Threatened
4	<i>Kalonia pulchra</i>	Asian Painted Frog	Sch-I, Part-II	Threatened
5	<i>Uperodon systoma</i>	Marbled Balloon Frog	Sch-I, Part-II	Threatened
6	<i>Uperodon variegatus</i>	White Bellied Pug-Snout Frog	Sch-I, Part-II	Threatened
7	<i>Uperodon taprobanicus</i>	Srilankani Bull Frog	Sch-I, Part-II	Threatened
8	<i>Polypedates maculatus</i>	Chunam Tree Frog	Sch-I, Part-II	Threatened
9	<i>Euphyctis cyanophytis</i>	Common Skittering Frog	Sch-I, Part-II	Threatened
10	<i>Sphaerothera breviceps</i>	Indian Burrowing Frog	Sch-I, Part-II	Threatened
11	<i>Hoplobatrachus tigerinus</i>	Indian Valley Frog	Sch-I, Part-II	Threatened
12	<i>Hoplobatrachus crassus</i>	Jerdonis Bull Frog	Sch-I, Part-II	Least Concern
Reptilian Diversity				
1	<i>Phyton naolurus</i>	Indian Python	Sch-I, Part-II	Vulnerable
2	<i>Calotes versicolor</i>	Changeable Lizard	Sch-I, Part-II	Vulnerable
3	<i>Psammophilus dorsalis</i>	Rock Dragon	Sch-I, Part-II	Vulnerable
4	<i>Psammophilus blanfordianus</i>	Blanford's Rock Agama	Sch-I, Part-II	Vulnerable
5	<i>Riopa punctata</i>	Common Dotted Garden Skink	Sch-I, Part-II	Vulnerable
6	<i>Eutropis macularia</i>	Bronze Nabuya	Sch-I, Part-II	Vulnerable
7	<i>Lepidodactylus lugubris</i>	Mourning Gecko	Sch-I, Part-II	Vulnerable
8	<i>Hemidactylus flaviviridis</i>	Northern House Gecko	Sch-I, Part-II	Vulnerable



Signature: Raghvendra Kumar
 Designation: Project Director
 Office: Hazaribagh

Sl. No.	Scientific Name	Common Name	Status as per Wildlife (Protection) Act, 1972	Status as per IUCN List
9	<i>Hemidactylus prenatius</i>	Asian House Gecko	Sch-I, Part-II	Vulnerable
10	<i>Varanus salvator</i>	Common Water Monitor	Sch-I, Part-II	Vulnerable
11	<i>Varanus bengalensis</i>	Bengal Monitor	Sch-I, Part-II	Vulnerable
12	<i>Psammophis condanaroma</i>	Condanaroma Sand Snake	Sch-I, Part-II	Vulnerable
13	<i>Atractaspis schistosomus</i>	Split Keelback	Sch-I, Part-II	Vulnerable
14	<i>Rhabdophis plumbicollis</i>	Green Keelback	Sch-I, Part-II	Vulnerable
15	<i>Fowla piseator</i>	Chequer Keelback	Sch-I, Part-II	Vulnerable
16	<i>Baiga trigonata</i>	Common Cat Snake	Sch-I, Part-II	Vulnerable
17	<i>Baiga westermanni</i>	Indian Egg Eater	Sch-I, Part-II	Vulnerable
18	<i>Ptyas mucosa</i>	Oriental Rat Snake	Sch-I, Part-II	Vulnerable
19	<i>Oligodon ornatus</i>	Banded Kukri	Sch-I, Part-II	Vulnerable
20	<i>Lycodon striatus</i>	Barred Wolf Snake	Sch-I, Part-II	Vulnerable
21	<i>Dendrelaps triatus</i>	Common Bronzeback Tree Snake	Sch-I, Part-II	Vulnerable
22	<i>Bungarus fasciatus</i>	Banded Krait	Sch-I, Part-II	Vulnerable
23	<i>Bungarus caeruleus</i>	Common Krait	Sch-I, Part-II	Vulnerable
24	<i>Naja kaouthia</i>	Monocellate Cobra	Sch-I, Part-II	Vulnerable
25	<i>Trimereurus erythrurus</i>	Spot Tailed Pit Viper	Sch-I, Part-II	Vulnerable
26	<i>Lissemys punctata</i>	Indian Flapshell Turtle	Sch-I, Part-II	Vulnerable
Avian Diversity				
1	<i>Centropus bengalensis</i>	Lesser Coucal	Sch-IV	Rare
2	<i>Clamator jacobineus</i>	Pied Cuckoo	Sch-IV	Rare
3	<i>Cacomantis sanerattii</i>	Banded Bay Cuckoo	Sch-IV	Rare
4	<i>Endynamis scolopacea</i>	Asian Koel	Sch-IV	Rare
5	<i>Cuculus canorus</i>	Common Cuckoo	Sch-IV	Rare

Dr. S. K. Mishra
Project Director
Biodiversity Conservation
FL - Hazaribagh

Sl. No.	Scientific Name	Common Name	Status as per Wildlife (Protection) Act, 1972	Status as per IUCN List
6	<i>Dendrocopos macei</i>	Fulvous-breasted Woodpecker	Sch-IV	Rare
7	<i>Picus canus</i>	Grey-headed Woodpecker	Sch-IV	Rare
8	<i>Dinopium benghalense</i>	Black-rumped Flameback	Sch-IV	Rare
9	<i>Chrysocolaptes festius</i>	White Naped Woodpecker	Sch-IV	Rare
10	<i>Psilopogon haemacephalus</i>	Coppersmith Barbet	Sch-IV	Rare
11	<i>Psilopogon asiaticus</i>	Blue-throated Barbet	Sch-IV	Rare
12	<i>Psittacula krameri</i>	Rose Ringed Parakeet	Sch-IV	Rare
13	<i>Glucidium radiatum</i>	Jungle Owlet	Sch-II, Part-III	Threatened
14	<i>Athene brama</i>	Spotted Owlet	Sch-II, Part-III	Rare
15	<i>Harpactes fasciatus</i>	Malabar Trogon	Sch-IV	Rare
16	<i>Merops leschenaultia</i>	Chestnut-headed Bee Eater	Sch-IV	Rare
17	<i>Merops orientalis</i>	Green Bee Eater	Sch-IV	Rare
18	<i>Coracias benghalensis</i>	Indian Roller	Sch-IV	Rare
19	<i>Halcyon coromanda</i>	Ruddy Kingfisher	Sch-IV	Rare
20	<i>Halcyon pileate</i>	Black-capped Kingfisher	Sch-IV	Rare
21	<i>Alcedo meninting</i>	Blue-eared Kingfisher	Sch-IV	Rare
22	<i>Ceryle rudis</i>	Pied Kingfisher	Sch-IV	Rare
23	<i>Streptopelia chinensis</i>	Spotted Dove	Sch-IV	Rare
24	<i>Streptopelia senegalensis</i>	Laughing Dove	Sch-IV	Rare
25	<i>Columba livia</i>	Rock Pigeon	Sch-IV	Rare
26	<i>Clinonia nigra</i>	Black Stork	Sch-IV	Rare
27	<i>Mycteria leucocephala</i>	Painted Stork	Sch-IV	Least Concern
28	<i>Anastromus oscitatus</i>	Asian Openbill	Sch-IV	Least Concern
29	<i>Fulica atra</i>	Eurasian Coot	Sch-IV	Least Concern

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Hazaribagh
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Sl. No.	Scientific Name	Common Name	Schedule of Wildlife (Protection) Act, 1972	Status in the IUCN List
30	<i>Gallicrex cinerea</i>	Watercock	Sch-IV	Least Concern
31	<i>Pterocles indicus</i>	Sand Goose	Sch-IV	Least Concern
32	<i>Upupa epops</i>	Common Hoopoe	Sch-IV	Least Concern
33	<i>Ocyrceros bisostris</i>	Indian Grey Hornbill	Sch-I, Part-III	Threatened
34	<i>Anthraceroceros coronatus</i>	Malabar Pied Hornbill	Sch-I, Part-III	Threatened
35	<i>Pavo cristatus</i>	Indian Peafowl	Sch-I, Part-III	Threatened
36	<i>Francolinus pondicerianus</i>	Grey Francolin	Sch-IV	Least Concern
37	<i>Gallus gallus</i>	Red Jungle Fowl	Sch-IV	Least Concern
38	<i>Tringa nebularia</i>	Common Greenshank	Sch-IV	Least Concern
39	<i>Tringa ochropus</i>	Green Sandpiper	Sch-IV	Least Concern
40	<i>Actitis hypoleucos</i>	Common Sandpiper	Sch-IV	Least Concern
41	<i>Sterna aurantia</i>	River Tern	Sch-IV	Least Concern
42	<i>Chroicocephalus ridibundus</i>	Black Headed Gull	Sch-IV	Least Concern
43	<i>Metopidius indicus</i>	Bronze-winged Jacanna	Sch-IV	Least Concern
44	<i>Cursorius coromandellicus</i>	Indian Cousser	Sch-IV	Least Concern
45	<i>Vanellus cinereus</i>	Gray-headed Lapwing	Sch-IV	Least Concern
46	<i>Tachybatus ruficollis</i>	Little Grebe	Sch-IV	Least Concern
47	<i>Platalea leucorodia</i>	Eurasian Spoonbill	Sch-I, Part-III	Threatened
48	<i>Pelecanus onocrotalus</i>	Great White Pelican	Sch-IV	Least Concern
49	<i>Egretta garzetta</i>	Little Egret	Sch-IV	Least Concern
50	<i>Ardea alba</i>	Great Egret	Sch-IV	Least Concern
51	<i>Ardea intermedia</i>	Intermediate Egret	Sch-IV	Least Concern
52	<i>Ardeola grayii</i>	Indian Pond Heron	Sch-IV	Least Concern
53	<i>Bubulcus ibis</i>	Cattle Egret	Sch-IV	Least Concern

Sl. No.	Scientific Name	Common Name	Status as per Wildlife (Protection) Act, 1972	Status as per IUCN List
78	<i>Sturnia malabarica</i>	Chestnut-tailed starling	Sch-IV	Vulnerable
79	<i>Gracula religiosa</i>	Common Jungle Myna	Sch-IV	Vulnerable
80	<i>Acridotheres tristis</i>	Common Myna	Sch-IV	Vulnerable
81	<i>Phylloscopus trachiloides</i>	Greenish Warbler	Sch-IV	Vulnerable
82	<i>Pericrocotus erythropygus</i>	White-bellied Minivet	Sch-IV	Vulnerable
83	<i>Dierurus leucophaeus</i>	Ashy Drongo	Sch-IV	Vulnerable
84	<i>Lonchura malacca</i>	Tricolour Munia	Sch-IV	Vulnerable
85	<i>Troglodytes paradisi</i>	Indian Paradise Flycatcher	Sch-IV	Vulnerable
86	<i>Pericrocotus speciosus</i>	Scarlet Minivet	Sch-IV	Vulnerable
87	<i>Motacilla cinerea</i>	Grey Wagtail	Sch-IV	Vulnerable
88	<i>Anthus rufus</i>	Paddy-field Pipit	Sch-IV	Vulnerable
89	<i>Oriolus kundoo</i>	Indian Golden Oriole	Sch-IV	Vulnerable
90	<i>Ploceus philippinus</i>	Baya Weaver	Sch-IV	Vulnerable
91	<i>Rhipidura aureola</i>	White-browed Fantail	Sch-IV	Vulnerable
92	<i>Sialia rayta</i>	Sand Lark	Sch-IV	Vulnerable
93	<i>Turdoides striata</i>	Jungle Babbler	Sch-IV	Vulnerable
94	<i>Dendrocygna vagabunda</i>	Rufous Treepie	Sch-IV	Vulnerable
Mammalian Diversity				
1	<i>Elephas maximus</i>	Asian Elephant	Sch-I, Part-I	Critical
2	<i>Lepus nigricollis</i>	Indian Hare	Sch-I, Part-I	Critical
3	<i>Macaca mulata</i>	Rhesus Macaque	Sch-I, Part-I	Critical
4	<i>Petaurista philippensis</i>	Common Giant Squirrel	Sch-I, Part-I	Critical
5	<i>Funambulus pennantii</i>	Five-striped Palm Squirrel	Sch-I, Part-I	Critical
6	<i>Rattus rattus</i>	Black Rat	Sch-II, Part-III	Threatened

Sl. No.	Scientific Name	Common Name	Status as per Wildlife (Protection) Act, 1972	Status as per IUCN List
7	<i>Bandicota indica</i>	Greater Bandikoot Rat	Sch-II, Part-III	Threatened
8	<i>Bandicota bengalensis</i>	Lesser Bandikoot Rat	Sch-II, Part-III	Threatened
9	<i>Mus booduga</i>	Common Indian Field Mouse	Sch-II, Part-III	Threatened
10	<i>Axis axis</i>	Chital	Sch-II, Part-III	Threatened
11	<i>Rusa unicolor</i>	Sambar	Sch-II, Part-III	Threatened
12	<i>Muntiacus vaginalis</i>	Northern Red Muntjac	Sch-II, Part-III	Threatened
13	<i>Tetracerus quadricornis</i>	Four-horned Antelope	Sch-II, Part-III	Threatened
14	<i>Boselaphus tragocamelus</i>	Nilgai	Sch-II, Part-III	Threatened
15	<i>Sus scrofa</i>	Wild Boar	Sch-II, Part-III	Threatened
16	<i>Cynopterus sphinx</i>	Greater Short-nosed Fruit Bat	Sch-II, Part-III	Threatened
17	<i>Paradoxurus hermaphroditus</i>	Asian Palm Civet	Sch-II, Part-III	Threatened
18	<i>Hyaena hyaena</i>	Stripped Hyaena	Sch-II, Part-III	Threatened
19	<i>Urva edwardsii</i>	Indian Gray Mongoose	Sch-II, Part-III	Threatened
20	<i>Prionaiurus bengalensis</i>	Mainland Leopard Cat	Sch-II, Part-III	Threatened
21	<i>Felis chaus</i>	Jungle Cat	Sch-I, Part-I	Critical
22	<i>Panthera pardus</i>	Leopard	Sch-I, Part-I	Critical
23	<i>Vulpes bengalensis</i>	Indian Fox	Sch-I, Part-I	Critical
24	<i>Manis crassicaudata</i>	Indian Pangolin	Sch-I, Part-I	Critical
25	<i>Lutrogale perspicillata</i>	Smooth Coated Otter	Sch-I, Part-I	Critical
Butterflies, Insects & Spiders				
1	<i>Pelopidas mathias</i>	Small Branded Swift	Sch-I, Part-IV	Threatened
2	<i>Taractrotera malivus</i>	Common Grass Dart	Sch-I, Part-IV	Threatened
3	<i>Caladenia Indrani</i>	Tricolour Pied Flat	Sch-I, Part-IV	Threatened
4	<i>Charaxes Bernardus</i>	Tawny Rajah	Sch-I, Part-IV	Threatened

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Rajendra Kumar
Head Projects (Site)
NKTL - H - Hazarebagh



Sl. No.	Scientific Name	Common Name	Status as per Wildlife (Protection) Act, 1972	Status as per IUCN (H)
5	<i>Athyra perius</i>	Common Sergeant	Sch-I, Part-IV	Threatened
6	<i>Moduna Procris</i>	Commander	Sch-I, Part-IV	Threatened
7	<i>Junonia atlites</i>	Gray Pansy	Sch-I, Part-IV	Threatened
8	<i>Junonia lemonias</i>	Lemon Pansy	Sch-I, Part-IV	Threatened
9	<i>Danaus genutia</i>	Common Tiger	Sch-I, Part-IV	Threatened
10	<i>Danaus chrysippus</i>	Plain Tiger Butterfly	Sch-I, Part-IV	Threatened
11	<i>Delias eucharis</i>	Common Jezebel	Sch-I, Part-IV	Threatened
12	<i>Asota caricae</i>	Tropical Tiger Moth	Sch-I, Part-IV	Threatened
13	<i>Creatonotos transiens</i>	Clouded Tiger Moth	Sch-I, Part-IV	Threatened
14	<i>Apis cerana</i>	Asian Honey Bee	Sch-I, Part-IV	Threatened
15	<i>Apis dorsata</i>	Giant Honey Bee	Sch-I, Part-IV	Threatened
16	<i>Rhynchophorus ferrugineus</i>	Red Palm	Sch-I, Part-IV	Threatened
17	<i>Pantala flavescens</i>	Wandering Glider	Sch-I, Part-IV	Threatened
18	<i>Argiope Anasuya</i>	Signature Spider	Sch-I, Part-IV	Threatened
19	<i>Pholcus phalangoides</i>	Long-bodied Cellar Spider	Sch-I, Part-IV	Threatened
20	<i>Heteropoda venatoria</i>	Pantropical Hunterman Spider	Sch-I, Part-IV	Threatened

Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

**FIGURE 1.E.2: FAUNAL SPECIES IN CHATRA SOUTH, CHATRA NORTH & LATEHAR FOREST DIVISION
AS PER FOREST WORKING PLAN/OTHER SECONDARY INFORMATION**



1. *Macaca mulatta* (Monkey), 2. *Hyaena hyaena* (Striped Hyena), 3. *Sus scrofa* (Wild Boar), 4. *Alcedo meninting* (Blue-eared Kingfisher), 5. *Axis axis* (Chital), 6. *Vulpes bengalensis* (Indian Fox), 7. *Neaja naia* (Indian Cobra)

Raghuendra Kumar
Head-projects (Site) TL
NKTL - Hazaribagh

1.E.3 PHYTOSOCIOLOGICAL CHARACTERISTICS

Randomised quadrat method was used for analysis of Importance Value Index (IVI) and vegetation diversity richness along the proposed transmission line route.

IVI measures of how dominant a species in a given forest area. The importance value is calculated as the sum from (i) the relative frequency; (ii) the relative density; and (iii) the relative abundance.

$$IVI = \text{Relative density} + \text{Relative frequency} + \text{Relative abundance.}$$

The importance value ranges between 0 and 300.

Frequency is calculated as the number of plots where a species is observed divided by the total number of survey plots. Relative frequency is calculated by dividing the frequency by the sum of the frequencies of all species, multiplied by 100 (to obtain a percentage).

$$\text{Frequency} = \frac{\text{Total no. of quadrates in which the species occurred}}{\text{Total no. of quadrates studied}} \times 100$$

$$\text{Relative Frequency} = \frac{\text{Frequency of a species}}{\text{Frequency of all specie}} \times 100$$

Density is calculated as the total number of individuals of a species. Relative density is calculated by dividing the density by the sum of the densities of all species, multiplied by 100 (to obtain a percentage).

$$\text{Density} = \frac{\text{Total no. of individuals of a species}}{\text{Total no. of quadrates studied}}$$

$$\text{Relative density} = \frac{\text{Number of individuals of a species}}{\text{Number of individuals of all species}} \times 100$$

Dominance is calculated as the total basal area of a species. Relative dominance is calculated by dividing the dominance by the sum of the dominance of all species, multiplied by 100 (to obtain a percentage).

$$\text{Basal Area (in square meters): Area} = \pi r^2 = \pi (d/2)^2$$

$$\text{Abundance} = \frac{\text{Total number of individuals of a species.}}{\text{Total number of quadrates in which the species occurred}}$$

$$\text{Relative Abundance} = \frac{\text{Abundance of individuals of a species}}{\text{Total Abundance of all species}} \times 100$$

In this method sampling was done by plotting quadrat, 10 X 10 meter for tree species, 5 X 5 meter for shrub, and 1 X 1 meter for herb species. 3 study site was taken randomly for study in the concerned forest division.



Ragh
Raghvendra Kumar
Head-Projects (Site) TL
NHTL - Hazaribagh

Inventory of floral species and their occurrence observed during field survey within RoW of North Karanpura to Gaya (Jharkhand Portion) line under Latehar Forest division is presented in (Table 1.E.3)

TABLE 1.E.3: INVENTORY OF FLORAL SPECIES OBSERVED DURING FIELD SURVEY WITHIN RoW OF NORTH KARANPURA TO GAYA (JHARKHAND PORTION) LINE – PROJECT AREA

S. No.	Scientific Name	Local Name	Family	Occurrence
1	<i>Mangifera indica</i>	Aam	Anacardiaceae	VL
2	<i>Terminalia tomentosa</i>	Aashan	Combretaceae	VL
3	<i>Ficus bengalensis</i>	Bargad	Moraceae	VL
4	<i>Terminalia bellirica</i>	Bahera	Combretaceae	VL
5	<i>Aegle marmelos</i>	Bael	Rutaceae	VL
9	<i>Syzigium cumini</i>	Jamun	Myrtaceae	VL
10	<i>Nauclea parviflora</i>	Karam	Rubiaceae	VL
11	<i>Millettia pinnata</i>	Karani	Fabaceae	VL
12	<i>Artocarpus heterophyllus</i>	Kathal	Moraceae	VL
13	<i>Bauhinia variegata</i>	Koamar	Fabaceae	VL
14	<i>Schleichera oleosa</i>	Kusum	Sapindaceae	VL
15	<i>Madhuca Indica</i>	Mahua	Sapotaceae	M
16	<i>Butea monosperma</i>	Palas	Fabaceae	L
18	<i>Ficus religiosa</i>	Pipal	Moraceae	VL
22	<i>Shorea robusta</i>	Sakhua	Dipterocarpaceae	VH
23	<i>Shorea robusta</i>	Sal	Dipterocarpaceae	VL
24	<i>Lagerstroemia parviflora</i>	Sidha	Lythraceae	VL
25	<i>Bombax ceiba</i>	Simar	Malvaceae	VL
26	<i>Albizia lebbek</i>	Sirish	Fabaceae	VL
27	<i>Diospyros melanoxylon</i>	Tendu	Ebenaceae	VL
28	<i>Semecarpus anacardium</i>	Velwa	Anacardiaceae	L

*VL = Very Low, L = Low, M = Moderate, H = High, VH = Very High

The seasonal variation of the species count data collected from the representative zones of study areas showed clear inferences regarding the change in the species diversity and composition pattern. This difference was more prominent in case of herbaceous plants and shrubs. During monsoon, due to high moisture contents and favourable growth conditions, a higher number of herb and shrub species were observed, while, in case of summer, most of the herbaceous and shrub species got wiped out due to the excessive heat and dry conditions.



Raghu
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

Frequency, Abundance, Density and Vegetation Classifications

Vegetation classification of the plant community of the study area was done using the Raunkier's Classification and the Whitford's Classification. In the Raunkier's classification, the plant community was classified on the basis of the frequency of the different plant species of the area. The Whitford's classification was done on the basis of the ratio of the species abundance to its frequency.

Vegetation Community Structure Indices Based on the quadrat count of the floral species in the study area, several vegetation community structure indices were calculated as per standard formula. The index values were calculated to study the effect of seasonal variation on them. In addition to this, correlation coefficients were calculated between the species count of herbs, shrubs and trees versus the soil nutrients (viz. N, P, K).

Raunkier's Classification: (Raunkier's, 1918) The plant community was classified on the basis of the values of frequency of different plant species of the area. The classification may be represented by the following chart:

A	0-20%
B	21-40%
C	41-60%
D	61-80%
E	81-100%

Whitford's Classification

Whitford's classification of the vegetation communities were classified according to the formula of Whitford and Craig, 1918 (Mukherjee & Sharma, 2014). This is another index where classification is done based on the ratio of abundance to frequency. It signifies the pattern of association of plant species in an area. The classification may be represented as:

REGULAR	<0.025
RANDOM	0.025-0.5
CLUMPED	>0.05

Data reflected that, in the study area during winter all the species were found to exist in clumped pattern thus indicating that none of the plant species were opportunistic in nature. However, during the monsoon some of the species were seen to exist in random patterns. This indicates that during the monsoon season due to high moisture and high soil nutrients, some of the species expressed opportunistic and dominant behaviour (Mukherjee and Sarma, 2014).

Percentage distribution of species to frequency classes in the selected study area suggested that, there was not much seasonal variation in the percentage of species falling under different frequency classes as shown in the table below. However, the number of species in frequency class 'E' has diminished to none during the summer. In both the seasons, highest number of species belonged to frequency class 'C' thus suggesting that about half of the species existing in the zone is unstable and short-lived (Mancera et al., 2013).

Sampling for assessment of IVI at selected forest stretch along the proposed Transmission line



Perd
Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

has been conducted (Table 1.6.2).

The IVI of various tree species found within the RoW of proposed NKG (within Jharkhand portion) transmission line is presented in Table 1.E.4 to 1.E.8. The analysis indicates that maximum IVI was found for the species *Shorea robusta* (202.32).

TABLE 1.E.4: DETAIL OF SAMPLING LOCATIONS FOR ASSESSMENT OF IVI WITHIN ROW-PROJECT AREA

S No.	Division	Stretch	X- coordinate	Y- coordinate
1	Latehar	SCH 1	84°53'5.96"E	23°53'50.70"N
2	Chatra South	SCH 2	84°53'24.05"E	23°57'25.94"N
3	Chatra South	SCH 3	84°51'38.03"E	24° 4'2.74"N
4	Chatra North	SCH 4	84°50'37.32"E	24°14'58.20"N
5	Chatra North	SCH 5	84°49'32.31"E	24°17'22.06"N

TABLE 1.E.4(a): FREQUENCY, DENSITY & BASAL AREA OF TREES FALLING WITHIN ROW OF NORTH KARANPURA TO GAYA (JHARKHAND PORTION) TRANSMISSION LINE- PF STRECH SCH1

S No	Name of Species	Frequency (%)	Density (trees/ha)	Basal Area (Sq.m/ha)
1	<i>Shorea robusta</i>	60	260	1598.38717
2	<i>Madhuca latifolia</i>	80	260	3364.97472
3	<i>Butea monosperma</i>	40	60	18.997
4	<i>Semicarpus anacardium</i>	20	40	1.92325
5	<i>Anogeissus latifolia</i>	20	20	0.628
6	<i>Sterculia villosa</i>	20	20	21.12592
7	<i>Cassia fistula</i>	20	20	0.628
Total/Overall		-	680	5006.66406

TABLE 1.E.4(b): IMPORTANCE VALUE INDEX OF TREES FALLING WITHIN ROW OF NORTH KARANPURA TO GAYA (JHARKHAND PORTION) TRANSMISSION LINE- PF STRECH SCH1

S No	Name of Species	RF	Rden	Rdom	IVI
1	<i>Shorea robusta</i>	23.08	38.24	31.93	93.24
2	<i>Madhuca latifolia</i>	30.77	38.24	67.21	136.21
3	<i>Butea monosperma</i>	15.38	8.82	0.38	24.59
4	<i>Semicarpus anacardium</i>	7.69	5.88	0.04	13.61
5	<i>Anogeissus latifolia</i>	7.69	2.94	0.01	10.65
6	<i>Sterculia villosa</i>	7.69	2.94	0.42	11.06
7	<i>Cassia fistula</i>	7.69	2.94	0.01	10.65



Raghvendra Kumar
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4	<i>Sterculia villosa</i>	10.00	5.00	0.32	15.32
5	<i>Cassia fistula</i>	5.00	2.50	0.79	8.29
6	<i>Butea monosperma</i>	5.00	2.50	0.10	7.60
7	<i>Pongamia pinnata</i>	20.00	12.50	4.12	36.62
8	<i>Terminalia tomentosa</i>	10.00	5.00	1.26	16.26
9	<i>Ficus benghalensis</i>	5.00	2.50	7.05	14.55
10	<i>Semecarpus anacardium</i>	5.00	2.50	5.57	13.07
11	<i>Streblus asper</i>	5.00	2.50	0.06	7.56

TABLE 1.E.7(a): FREQUENCY, DENSITY & BASAL AREA OF TREES FALLING WITHIN ROW OF NORTH KARANPURA TO GAYA (JHARKHAND PORTION) TRANSMISSION LINE- PF STRECH SCH4

S No	Name of Species	Frequency (%)	Density (trees/ha)	Basal Area (Sqm/ha)
1	<i>Anogeissus latifolia</i>	80	360	426.162
2	<i>Lagerstroemia parviflora</i>	40	120	62.800
3	<i>Diospyros Melanoxylon</i>	100	280	177.247
4	<i>M. philipp.</i>	20	160	108.595
5	<i>Holarrhena antidysenterica</i>	100	200	98.125
6	<i>Semecarpus anacardium</i>	60	80	75.988
7	<i>Shorea robusta</i>	20	20	0.831
8	<i>Aegle marmelos</i>	20	20	15.700
9	<i>Adina cordifolia</i>	20	20	2.388
10	<i>Cassia siamea</i>	60	80	27.772
11	<i>Acacia catechu</i>	20	20	1.413
Total/Overall		-	1360	997.021

TABLE 1.E.7(b): IMPORTANCE VALUE INDEX OF TREES FALLING WITHIN ROW OF NORTH KARANPURA TO GAYA (JHARKHAND PORTION) TRANSMISSION LINE- PF STRECH SCH4

S No	Name of Species	RF	Rden	Rdom	IVI
1	<i>Anogeissus latifolia</i>	14.81	26.47	42.74	84.03
2	<i>Lagerstroemia parviflora</i>	7.41	8.82	6.30	22.53
3	<i>Diospyros Melanoxylon</i>	18.52	20.59	17.78	56.88
4	<i>M. philipp.</i>	3.70	11.76	10.89	26.36
5	<i>Holarrhena antidysenterica</i>	18.52	14.71	9.84	43.07
6	<i>Semecarpus anacardium</i>	11.11	5.88	7.62	24.61
7	<i>Shorea robusta</i>	3.70	1.47	0.08	5.26
8	<i>Aegle marmelos</i>	3.70	1.47	1.57	6.75
9	<i>Adina cordifolia</i>	3.70	1.47	0.24	5.41
10	<i>Cassia siamea</i>	11.11	5.88	2.79	19.78
11	<i>Acacia catechu</i>	3.70	1.47	0.14	5.32



Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

TABLE 1.E.8(a): FREQUENCY, DENSITY & BASAL AREA OF TREES FALLING WITHIN ROW OF NORTH KARANPURA TO GAYA (JHARKHAND PORTION) TRANSMISSION LINE- PF STRECH SCHS

S No	Name of Species	Frequency (%)	Density (trees/ha)	Basal Area (Sqm/ha)
1	<i>Cassia fistula</i>	100	340	2681.951
2	<i>Butea monosperma</i>	80	100	310.899
3	<i>Dalbergia latifolia</i>	80	80	155.783
Total/Overall		-	520	3148.633

TABLE 1.E.8(b): IMPORTANCE VALUE INDEX OF TREES FALLING WITHIN ROW OF NORTH KARANPURA TO GAYA (JHARKHAND PORTION) TRANSMISSION LINE- PF STRECH SCHS

S No	Name of Species	RI	Rdom	Rdom	IVI
1	<i>Cassia fistula</i>	38.46	65.38	85.18	189.02
2	<i>Butea monosperma</i>	30.77	19.23	9.87	59.87
3	<i>Dalbergia latifolia</i>	30.77	15.38	4.95	51.10

1.F DESCRIPTION OF FOREST AND HABITAT CONDITION

The proposed site is situated within the legal jurisdiction of Chatra South, Chatra North & Latehar Forest Division.

CHATRA SOUTH FOREST DIVISION

The Chatra South Division is a part of Chatra district of Chotanagpur plateau. This area is full of several plateaus, mountains and valleys. Chatra South Forest Division is situated between Latitude 24° 12' 54" N to 84° 51' 37" E Longitude. This Division is bounded by Gaya (Bihar) District in the north, Chatra South Forest Division in south & east and Medniragar (Palamu) District in the west. The jurisdiction of Chatra South Forest Division consists of Five Territorial ranges viz. Chatra Forest Range, Simaria Forest Range, Lawalong Forest Range, Piri Forest Range & Tandwa Forest Range and two Overlapping Afforestation ranges viz Chouparan & Simariya Afforestation Range. The forest of Chatra South Division is full of a variety of medicinal plants, Kendu leaves, Bamboo, Sal, Teak, other timber species and a wide range of carnivorous & herbivorous wild animals.

CHATRA NORTH FOREST DIVISION

Chatra North Forest Division is part of Chatra Circle of Hazaribagh Region and, wholly lies in the district of Chatra. It is situated between 24° 10' N to 24° 32' N Latitude and 84° 07' E to 84° 27' E Longitude. This Division is bounded by Gaya (Bihar) District in the north, Chatra South Forest Division in the south & east, and Medniragar (Palamu) District in the west. The jurisdiction of Chatra North Forest Division consists of Four Territorial Ranges viz. Hunterganj, Pratappur, Kunda & Rajpur and Two Overlapping Afforestation Ranges viz. Chatra & Hunterganj Afforestation. All these forest ranges fall within the jurisdiction of Hunterganj, Pratappur Kunda and Chatra Sadar (Part) & Kanhachatti of Chatra District.


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The forests of the Division conform broadly to Champion and Seth's sub-group S-B, namely, Northern Tropical Dry Deciduous Forests. It is full of a variety of plants Khair, Sal, Safal, Sidha, and other timber species, Bamboo and Medicinal Plants, Herbs, etc, and a wide range of carnivorous & herbivorous wild animals. In this division, the principal wild animals that are found are Leopards, Bear, Nilgai, Sambhar, Peacock, Wild Boar, and Deer, together with a variety of snakes and birds. Hunterganj Range of Chatra North Forest Division is the gateway to Jharkhand from Bihar.

LATEHAR FOREST DIVISION

Latehar has 20648 hectares of reserved forest, 111736 hectares of protected forest with a total forest of 132384 hectares. The forest flora-plant species of the district includes important species like Sal, Asan, Gamhar, Karam, Harre, Bahera, Sidha, Arjun, Sissoo, Teak, Khair, Kend, Kusum, Mahua, Piar, Palas, Semal, Salai, Bamboo, Jamun, Karanj, Imli, Mahulan, Kanod etc. Latehar district has repositories of medicinal plant species that are native to the region. There is a large number of species which yield valuable minor forest produce, the important ones being tendu leaves, mahulan leaves, myrobalans etc.

The forest fauna-animal resources include, besides lower animal forms, several species of amphibians, reptiles, birds and mammals. Tiger, Leopard, Elephant, Cheetal, Sambhar, Barking Deer, Black Buck, Gaur, Neelgai, Wild Boar, Wolf, Wild Dog, Sloth Bear, Hyaena, Langur, Rhesus Monkey, Porcupine etc are the important mammals. The district has National Park and Wildlife Sanctuaries for *in situ* conservation and development of wildlife. The Bethla National Park comes within the district of Latehar. Project Tiger, Project Elephant and Mahuadanr Wolf Sanctuary are the national conservation projects running in this district. Therefore, the Forest Department is one of the key line departments of the district which is working for sustainable development of the district by blending the forest and other resources for the benefits of the people of the district, state and the nation.

1.6&H MOVEMENT OF WILDLIFE & MAN-ANIMAL CONFLICT & DEPREDACTIONS CAUSED BY WILD ANIMALS

A map showing Man – Elephant conflict villages in the buffer zone of 400 KV North – Karanpura to Gaya Transmission Line (Jharkhand Portion) of NKTL is attached as **Annexure – 6.C.2**

The recorded scenario from the data provided by the DFOs depicts that most of the conflicts are resultant of crop raiding by Elephant, Nilgai, Wild Boar. Poaching is also an issue in both the divisions. Besides few incidences of cattle killing and injuries to human is due to presence of Jackel and Hyena. Apart from this during the village level survey in the sample area and talking to local peoples it was found that most of the conflicts are resultant of crop raiding by Elephant, Blue bull (Nilgai), Wild Boar and conflict was due to Hyena and Jackal. Herbivores are found of maize and paddy crop. Besides this snake bite cases have been reported from almost all the



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places. A few incidences of cattle killing/lifting due to presence of Hyena, Jackal, was reported during the survey. Such man-animal conflicts should be resolved giving attention towards sensible scientific & compassionate approach.

The details in respect of Mega wildlife movement including Elephant as well as depredation/damage caused due to man animal conflict as provided by respective forest divisions i.e., Latehar, Chatra North & Chatra South is enclosed as **Annexure – 6.D.1**

Further the reasons of human Elephant conflict and protection measures to be adopted for minimizing the human – Elephant conflict as suggested by Jharkhand Forest Department is enclosed as **Annexure – 6.D.2**

1.I SURVEY OF WORKING PLAN PRESCRIPTION FOR MANAGEMENT OF FORESTS AND WILDLIFE

The working/management plan of the concerned Forest Division prescription for management of forest and wildlife has mentioned the major strategy for wildlife management i.e., Habitat Management of protection of micro habitat.

Forest officials prescribed the implementation of----

- Artificial Nesting Platforms
- Canopy bridge construction for arboreal mammals' movement in canopy break area.
- Power line Bird Diverters.
- High temperature Power line marker.
- Anti climbing devices.
- Chain-link Fencing around tower base area to restrict Elephant movement.

1.J INDICATIVE PLAN SHOWING LOCATION OF OTHER PROJECTS IN THE IMPACT ZONE

Since there is no other linear projects/infrastructure developed in the project impact zone of 400 KV North Karanpura-Gaya Transmission Line project so that no requirement of any Indicative Plan.

1.K APPROACH & METHODOLOGY INVOLVED IN STUDY

1.K.1 Framework for Ecological Impact Assessment

The state-of the art method have been used for ecological impact assessment study (Figure 1.3.1). The present study was exploratory in nature based on primary as well as secondary data. The following step wise approach was followed in order to achieve conformity with the scope of work for baseline data collection.

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Step 1: Reconnaissance Survey- A reconnaissance survey was undertaken to understand the complexity of terrain, habitats available, approach for various locations enroute to transmission line corridor and potential areas for species enumeration.

Step 2: Secondary Data Collection- Available secondary data through published research papers, books and periodicals and PhD thesis from the area was reviewed and enlisted to confirm the presence of species. Secondary data was also collected on the historical surveys in the area. Working & Management plan of the respective forest division and protected area, if any was also reviewed. Consultation with the locals and forest officials were also made.

Step 3: Primary Data Collection- Primary surveys were undertaken to understand the actual baseline and analyse the impacts of the proposed project on ecological baseline (Figure 1.3.2).

Step 4: Biodiversity Impact Assessment- Assessment of impact of the various construction and operation activities on the ecological baseline.

Step 5: Wildlife Management & Conservation Plan-Preparation of Wildlife Management & Conservation plan for mitigation of major impacts of construction and operation activities

1.K.2 Methodology for Primary Data Collection

Primary data collection methods for flora and fauna species are discussed hereunder (Figure 1.3.3 to 1.3.5).

1.K.2.1 Floral Assessment

Floral assessments were focused on:

- Enumeration of Trees, Shrubs, Herbs, climbers, and orchids likely to encounter on the transmission line route and its immediate vicinity.
- Undertake phytosociology along the transmission line corridor to calculate frequency, density, and abundance for plant species along with the IVI and calculation of species richness and species diversity.
- The enumerated list of floral species will be compared to Indian Red Data Book and species listed in the IUCN Red data list to confirm their conservation status.
- Following will be emphasized.
 - Species with conservational significance (Indian Red Data Book)
 - Endemic flora species
 - Species with high commercial value

The detailed methodology for data collection for each floral group (Habit) are presented here under.

Trees: Quantitative data was collected using standard quadrat methods of sample plot size 10 m x 10 m for trees in various habitat types along the transmission line route and immediate vicinity.

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Shrubs: Quantitative data was collected using standard quadrat methods of sample plot size 5 m x 5 m for shrubs in various habitat types along the transmission line route and immediate vicinity.

Annuals (Herbs, Grasses, Pteridophytes, etc.): Quantitative data was collected on plateaus associated with transmission line using standard quadrat methods of sample plot size 1 m x 1 m for herbs, grasses.

Climbers: Quantitative data was collected using standard quadrat methods of sample plot size 10 m x 10 m for large climbers (lianas) in various habitat types along the transmission line route and immediate vicinity.

1.K.2.2 Faunal Assessment

- Faunal assessment was carried out through enumeration of herpetofauna (amphibians and reptiles), avifauna (resident and migratory) and mammals likely to encounter on the transmission line route and its immediate vicinity.
- Assessment of various faunal habitats.
- The enumerated list of faunal species will be compared to Indian Wildlife Protection Act, 1971 schedules and species listed in the IUCN Red -List v.2018.2 to confirm their conservation status.
- Following will be emphasized.
 - Species with conservational significance (Sch. I of IWPA, 1972, IUCN v2018.2 Red -List species)
 - Endemic faunal species
 - Species listed in CITES Appendix I & II

The detailed methodology for data collection for each faunal group are presented here under. Four Transects were laid to enumerate.

Herpetofauna: In view of the activity pattern of herpetofauna, diurnal and nocturnal surveys were carried out in the study area. Amphibians and reptiles are known to inhabit various habitats and remain among leaf litter or under rocks and thus special efforts were taken to locate and study those using following methods:

- **Direct Search Method:** This method involves searching thoroughly the known habitats of amphibians and reptiles. Intensive searching was carried out in most of the habitats by removing stones, logs, among leaf litter and on trees. This is not a time constrained method, so considerable and roughly equal amount of time was spent in most of the habitats.
- **Searching streams:** This method was utilized to study amphibians and certain reptiles which are closely associated with aquatic habitats. The surveys were conducted mostly during the night. A few streams coming in or close to the Transmission Line route were surveyed.



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Raghendra Kumar
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- **Opportunistic records:** The local nature enthusiasts are photographing amphibians and reptiles and posting these images on social networking sites. A few of them send these images for identification to us. This network of local contacts was used to understand the herpetofauna diversity in the study area. The identification of images taken by locals were confirmed by detailed observations.
- **Systematic Analysis:** In the study area except a few frogs and lizards, there is less ambiguity in the taxonomy of most of the known amphibians and reptiles. A through taxonomic examination was carried out for most of the herpetofauna encountered during field surveys. The identification was based on recent and historical publications.

Avifauna: In view of the activity of the Avifaunal species early morning and evening surveys were undertaken for enumerating species presence along the transmission line route and buffer area. Day surveys were undertaken to enumerate the soiling birds. Following methods were implied.

- Total or flock / block count method: Sricharan 1989¹, Bhupathy 1991², Thompson 2002³ were adopted to assess the status of aquatic birds in dam /water bodies and point count method in the riparian forest along stream / river side (Gregory et al. 2002)⁴ of the project area. Birds in the riparian forests were recorded and enumerated within 50 m radius as part of point count.
- Point Count (Hutto et al. 1986⁵, Bibby et al. 1992⁶, Rosentod et al. 2002⁷, Salim and Rahul 2002⁸) and area search (Dieni and Jones 2002⁹) techniques were applied to assess the status of terrestrial birds. Point counts in the forest and allied habitats were made within 50 m radius, while in agriculture that include fallow lands, and scrub / grassland / barren area habitats, birds were recorded within 100 m radius.
- Additional effort was made to locate/identify the presence of any breeding/nesting sites /roosting sites of avifauna.
- Species identification was confirmed using the field guides for the avifaunal species

Mammals

Mammalian fauna was assessed at each sampling locations in different habitats through recording both direct and indirect evidence.

- Status and distribution of different mammalian fauna was quantified using direct count covering all the terrestrial habitats of the transmission line and Right of way area adopting road count (Burnham et al. 1980¹⁰, Sale and Berkmuller 1988¹¹, Rodgers 1991¹²). These survey routes were the area between two sample points and the forest trails that traverse across different habitats and land uses.
- In addition, indirect evidence (pellets, dungs, droppings, scats and other tracks and signs), were searched within circular (25m radius) plots at each sampling location, which provide relative abundance of presence of mammalian fauna (Thompson et al. 1989¹³, Rodgers 1991, Henke and Knowlton 1995¹⁴, Allen et al. 1996¹⁵).

- Further presence of different faunal species was also ascertained and substantiated by interviewing the local people with pictures of the mammals from the field guides that could probably occur in the area and discussion with local experts.

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**FIGURE 1.K.1: MAP OF STUDY AREA SHOWING PROJECT AREA & BUFFER ZONE (10 km both side of ROW)
—400 KV (D/C) LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)**



Segment wise Map of study area i.e., Project area & 10 km buffer area of 400 kv (d/c) line from North Karanpura to Gaya (Jharkhand portion) is enclosed as Annexure – 6.C.1

Raghuendra Kumar
NKTL - Hazaribagh
Head-projects (Site) TL



FIGURE 1.K.2: MAP SHOWING SAMPLING LOCATIONS FOR BIODIVERSITY STUDY WITHIN THE PROJECT AREA OF 400 KV (D/C) LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)



FIGURE 1.K.3: INITIATION FIELD SURVEY FOR ECOLOGICAL IMPACT ASSESSMENT OF PROPOSED 400 KV (D/C) LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)



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Head-projects (Site) TL
Narendra Kumar**

FIGURE 1.K.4: FIELD SURVEY FOR FLORAL ASSESSMENT AT SELECTED FOREST STRETCH OF PROPOSED 400 KV (D/C) LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)



Raj
Raghendra Kumar
Head-Projects (Site) TL
NKTIL - Hazaribagh

FIGURE 1.K.5: FIELD SURVEY FOR FLORAL ASSESSMENT AT SELECTED STRETCH OF PROPOSED 400 KV (D/C) LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)



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to Gaya
Project
Site
NKTL - Hazaribagh

LIST OF EXPERTS

PROJECT ADVISOR

Prof Dipankar Dasgupta
Director, IISWBM

PROJECT DIRECTORS

Prof (Dr) Subhas Ch Santra
A Grade NABET Accredited Biodiversity Expert

Prof (Dr) Abhijit Mitra
Aquatic Biodiversity Expert, University of Calcutta

Prof (Dr) Krishna M. Agrawal
Environmental Expert, IISWBM

Dr. Pranjulendu Ray
Principle Scientist (ex), ZSI/NMNH, MoEF&CC

PROJECT TEAM MEMBERS

Dr. Subhash C. Santra, Professor, DoES, Kalyani University
Dr. Abhijit Mitra, Professor, DoMS, University of Calcutta
Dr. Krishna M. Agrawal, Professor & Dean (Ex), IISWBM
Dr. Pranjulendu Ray, Principle Scientist (ex), ZSI/NMNH, MoEF&CC
Dr. Debasish Mondal, Chief Scientist, GEEC
Dr. Sarbani Mitra, Professor, IISWBM
Ms. Moumita Sarkar, Project Officer
Mr. Rahul Chakraborty, Research Fellow
Mr. Sourav Bardhan, Project Fellow

PROJECT COORDINATOR

Prof (Dr) Krishna M. Agrawal Head
MBA-PS & Dean (Ex), IISWBM



Rag
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

CHAPTER – 2.0

ECOLOGICAL & ENVIRONMENTAL IMPACT



2.A IMPACT OF THE PROJECT ON FOREST/ENVIRONMENT

The proposed project is likely to have both positive and negative impact on environment and ecological setup of the project region. The likely ecological & environmental impacts with specific reference to the various activities related with construction and maintenance of proposed 400 kV Transmission Line from North Karanpura to Gaya (Jharkhand Portion) is presented in subsequent sections.

2.A.1 Project Benefits

The Project will facilitate evacuation of power from the 3x660 MW (1980 MW) super thermal power project of NTPC, thereby increase in productivity in Industrial sector and improve power availability in the area.

The beneficiaries (Long Term Transmission Customer) under the TSA (Transmission Service Agreement) for the NKTL projects are as under, which comprising of Jharkhand, Bihar, Odisha and West Bengal.

- West Bengal State Electricity Distribution Co. Ltd. (West Bengal)
- GRIDCO Ltd. (Odisha)
- North Bihar Power Distribution Company Ltd. (Bihar)
- South Bihar Power Distribution Company Ltd. (Bihar)
- Jharkhand Bijli Vitran Nigam Ltd. (Jharkhand)

The evacuation of power will help the power generation and distribution companies. Entire region and beneficiary states will get benefited from the availability of reliable energy. Various sectors of economy like manufacturing industry, banking, manpower, engineering etc. will get benefited due to improved power supply.

The project will provide direct and indirect employment during Construction & Operation phase and shall improve the socio-economic status of the region and result in overall economic development.

2.A.2 Impact on Forest Area

Out of total area i.e., 320.804 ha falling within ROW of proposed 400 kV D/C North Karanpura to Gaya (Jharkhand Portion) transmission line, 197.0115 ha is forest area and remaining 123.7925 ha is non-forest area (Table 2.A.1). The analysis of division wise forest area falling under the proposed transmission line reveals that 15.3589 ha area falls under Latehar Forest Division while 119.8806 ha of forest area falls under Chatra South division, The remaining 61.772 ha area falls under Chatra North Forest Division.



TABLE 2.A.1: DETAIL OF TYPE OF LAND FALLING UNDER PROPOSED TRANSMISSION LINE

S No	Forest Division	Forest Area in ha	Non-Forest Area in ha	Total Area in ha
1	Latehar	15.3589	41.9412	57.3001
2	Chatra South	119.8806	61.1881	181.0687
3	Chatra North	61.772	20.6632	82.4352
	Total	197.0115	123.7925	320.804

The component wise forest area utilization within ROW for construction of proposed 400 kV D/C North Karanpura to Gaya (Jharkhand Portion) transmission line is presented in Table 2.A.2. The analysis reveals that only 3.4612 ha forest area will be required for setting up tower foundations whereas 96.763 ha area would be required for stringing and remaining ROW area i.e., 96.7873 ha is required for maintaining minimum clearance between conductors and forest canopy for safety.

Ravi
Ragivendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

TABLE 2.A.2: COMPONENT WISE FOREST AREA UTILIZATION

Sl. No.	Component	Forest Land				Non Forest Land		
		Tower Foundation Area in Ha	Stringing Area in Ha	Remaining ROW Area in Ha	Total Forest Area in Ha	Tower Foundation Area in Ha	Stringing Area in Ha	Remaining ROW Area in Ha
1	Laying of Transmission Line	3.4612	96.763	96.7873	197.0115	1.156	64.6026	58.0339
								123.7925

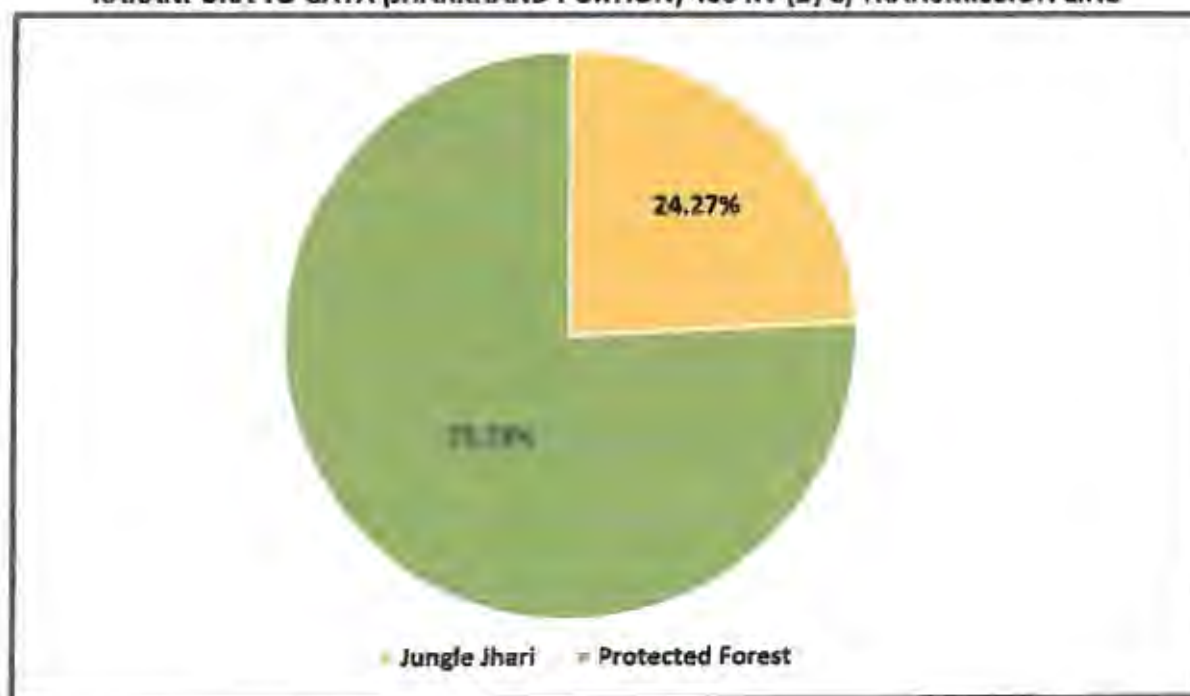

 Rajivendra Kumar
 Head-Projects (Site) TL
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Out of total forest area i.e., 197.0115 ha., 149.1959 is Protected forest (PF) and 47.8156 ha is Jungle Jhari (JJ). Latehar forest division 8.5899 ha. belongs to Protected Forest (PF) and 6.769 ha. is Jungal Jhari (JJ), Chatra South 88.677 ha. belongs to (PF) and 31.2036 ha. is Jungal Jhari (JJ) and Chatra North 51.929 ha. belongs to (PF) and 9.843 ha. is Jungal Jhari (JJ) forest area (Table 2.A.3 & Figure 2.A.1).

TABLE 2.A.3: DIVISION WISE DETAIL OF TYPE OF FOREST LAND FALLING UNDER PROPOSED TRANSMISSION LINE

S No	Forest Division	Notified Forest Area (PF) in ha	Jungle Jhari Forest Area (JJ) in ha	Total Forest Area in ha	Density of Forest
1	Latehar	8.5899	6.769	15.3589	0.6
2	Chatra South	88.677	31.2036	119.8806	0.8
3	Chatra North	51.929	9.843	61.772	0.5
Total		149.1959	47.8156	197.0115	

FIGURE 2.A.1: DISTRIBUTION OF TYPE FOREST LAND FALLING UNDER THE PROPOSED NORTH KARANPURA TO GAYA (JHARKHAND PORTION) 400 KV (D/C) TRANSMISSION LINE



Detail along with geo-coordinate of major forest area falling within the study area is presented in Table 2.A.4.



Page
Raghendra Kumar
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TABLE 2.A.4: DETAIL OF FORESTS AREA FALLING WITHIN STUDY AREA

Sl. No.	Forest Type	X-Coordinate (°E)	Y-Coordinate (°N)
1	Dense mixed jungle near Luta village	84.8863	24.386
2	Open mixed jungle near AP-89 tower	84.8622	24.3686
3	Open mixed jungle between AP-85 and AP-86	84.8393	24.3347
4	Dense mixed jungle dominated by Bamboo near AP-78	84.8256	24.291
5	Fairly Dense mixed jungle near Bhogta Dih	84.7776	24.3604
6	Protected Forest near AP-89	84.7868	24.3685
7	Dense mixed bamboo near Senduari	84.802	24.273
8	Dense bamboo jungle between AP-65 AP-70	84.8193	24.2519
9	Dense mixed jungle near Patar	84.8193	24.2519

The Map showing forest type falling under study area is enclosed as Annexure – 6.G

The satellite imagery reveals the forest covers and Jungle Jhari areas falling under the RoW of proposed route which is presented in Figure 2.A.2 considering 5 km stretches per figure for better field of view.

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Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

NORTH KARANPURA TO GAYA (JHARKHAND PORTION) 400 kV (D/C) TRANSMISSION LINE – 5-10 KM STRETCH



Head-projects (Site) T. Hazaribagh
Raghvendra Kumar Tiwari

FIGURE 2.A.2(c): MAP SHOWING TYPE OF FOREST LAND FALLING UNDER ROW OF THE PROPOSED NORTH KARANPURA TO GAYA (JHARKHAND PORTION) 400 kV (D/C) TRANSMISSION LINE – 10-15 KM STRETCH



Raghu
Raghendra Kumar
Head-Projects (Site) TL
NKTIL - Hazaribagh

FIGURE 2.A.2(d): MAP SHOWING TYPE OF FOREST LAND FALLING UNDER ROW OF THE PROPOSED



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FIGURE 2.A.2(f): MAP SHOWING TYPE OF FOREST LAND FALLING UNDER ROW OF THE PROPOSED NORTH KARANPURA TO GAYA (JHARKHAND PORTION) 400 KV (D/C) TRANSMISSION LINE – 25-30 KM STRETCH



Rajendra Kumar
 Head-projects (Site) TL
 NKTL - Hazaribagh

FIGURE 2.A.2(h):- MAP SHOWING TYPE OF FOREST LAND FALLING UNDER ROW OF THE PROPOSED NORTH KARANPURA TO GAYA (JHARKHAND PORTION) 400 KV (D/C) TRANSMISSION LINE – 35-40 KM STRETCH



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Head-Projects (Site) TL
NKTJ - Hazaribagh

FIGURE 2.A.2(j): MAP SHOWING TYPE OF FOREST LAND FALLING UNDER ROW OF THE PROPOSED



FIGURE 2.A.2(k): MAP SHOWING TYPE OF FOREST LAND FALLING UNDER ROW OF THE PROPOSED NORTH KARANPURA TO GAYA (JHARKHAND PORTION) 400 KV (D/C) TRANSMISSION LINE – 50-55 KM STRETCH



for
Rajivendra Kumar
Head-Projects (SIR) T.E.
NKTJ - Hazaribagh



FIGURE 2 A 3011- MAP SHOWING TYPE OF FOREST LAND FALLING UNDER ROW OF THE PROPOSED



FIGURE 2.A.2(m): MAP SHOWING TYPE OF FOREST LAND FALLING UNDER ROW OF THE PROPOSED NORTH KARANPURA TO GAYA (JHARKHAND PORTION) 400 KV (D/C) TRANSMISSION LINE – 60-65 KM STRETCH



Raj
Ragivendra Kumar
Head-Projects (GIS)
NKTIL - Hazaribagh

FIGURE 3 A 2/(-). MAP SHOWING TYPE OF FOREST | AND FAILING UNDER ROW OF THE PROPOSED NORTH KARANPURA TO GAYA



2.A.3 Assessment of NDVI

Nearly all satellite Vegetation Indices employ the difference formula to quantify the density of plant growth on the Earth — near-infrared radiation minus visible radiation divided by near-infrared radiation plus visible radiation. The result of this formula is called the Normalized Difference Vegetation Index (NDVI). Written mathematically, the formula is:

$$\text{NDVI} = (\text{NIR} - \text{VIS}) / (\text{NIR} + \text{VIS})$$

Calculations of NDVI for a given pixel always result in a number that ranges from minus one (-1) to plus one (+1); however, no green leaves give a value close to zero. A zero means no vegetation and close to +1 indicates the highest possible density of green leaves.

Very low values of NDVI correspond to barren areas of rock, sand, or snow. Low values represent low vegetation cover, shrub and grassland. Healthy vegetation falls between 0.2 and 0.8.

NDVI of Study Area

The Normalized Difference Vegetation Index (NDVI) of the study area was analysed on GIS platform using Landsat-8 data of May 24, 2023 (Figure 2.A.3). The analysis revealed the vegetation cover of the study area within 10 km radius of NKG (Jharkhand Portion) 400KV D/C Transmission Line of NKTCL. Out of 1459.435 km² of the study area, around 430.33 Km² is having low vegetation cover that is approximately 29.48% of the entire study area (Table 2.A.5). Whereas 277.99 km² of the study area is covered by moderately healthy vegetation i.e., 19.05% of the study area. According to NDVI analysis, vegetation that falls under "Very Dense/Healthy Vegetation Cover" is 163.69 Km² that accounts for 19.05% of the study area. The project area also consists of 455.96 km² of land that is not covered by any vegetation which is nearly around 31.24% of the entire study area. A small portion of the study area is occupied by water bodies (131.47 km² or 9.01%).

NDVI Map of the Study Area of proposed NKG (Jharkhand Portion) 400 kV D/C Transmission Line is enclosed as Annexure – 6.H

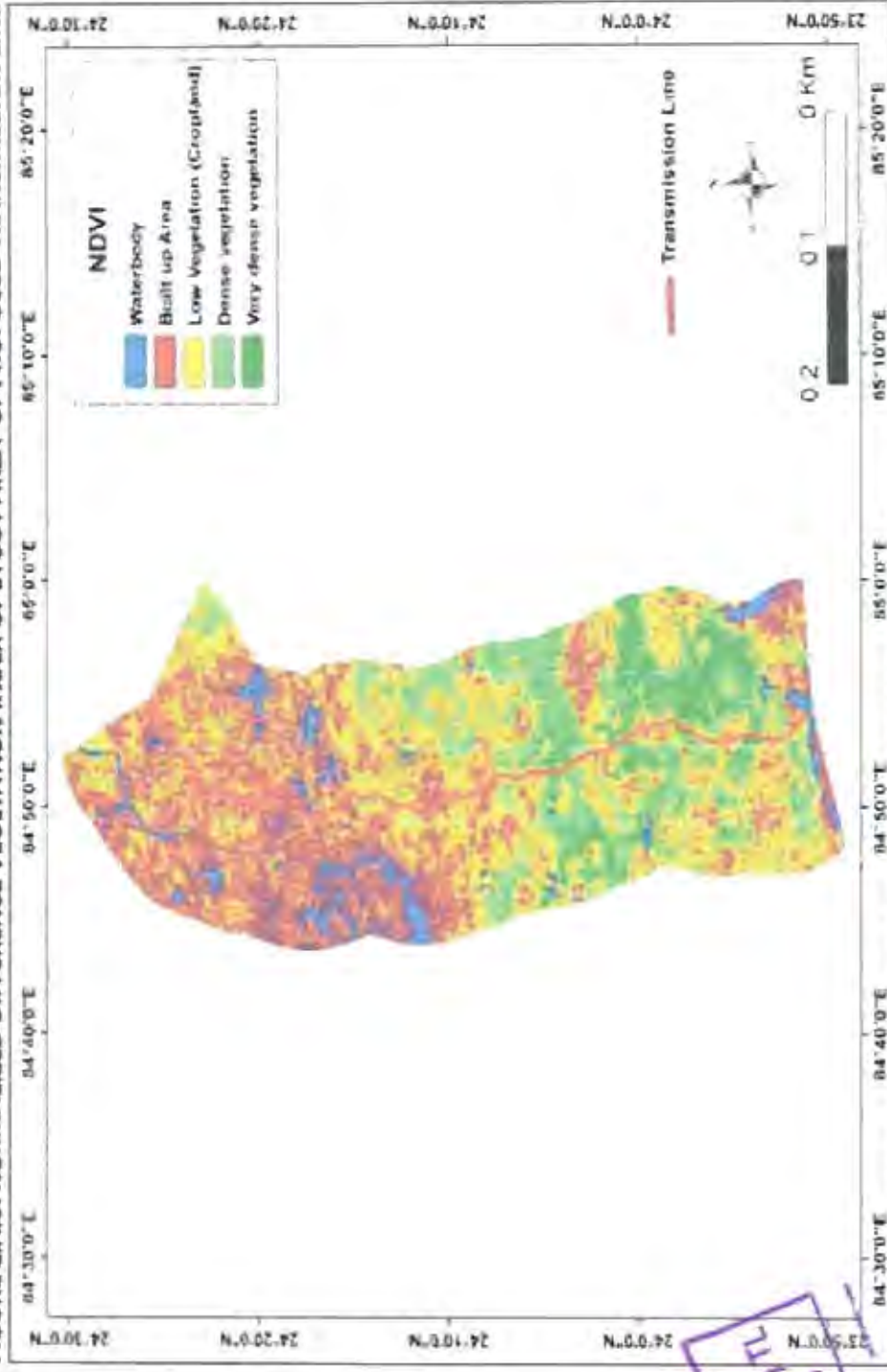
TABLE 2.A.5: STATUS OF NDVI OF THE STUDY AREA

Reclassification Value	NDVI		Pixel* Count	Features	Area (sq. km)	%
	Minimum	Maximum				
0	0.04	0.14	146079	Waterbody	131.47	9.01
1	0.14	0.16	506625	Built up Area	455.96	31.24
2	0.16	0.20	478141	Low Vegetation Cropland)	430.33	29.48
3	0.20	0.23	308877	Dense Vegetation	277.99	19.05
4	0.23	0.44	181873	Very Dense Vegetation	163.69	11.21
Total			1621595		1459.43	100

* Spatial Resolution = 30 m

Page
Raghuendra Kumar
Head, Projects (S&T)
NKTCL - Hazaribagh

FIGURE 2.A.3: NORMALIZED DIFFERENCE VEGETATION INDEX OF STUDY AREA OF PROPOSED TRANSMISSION LINE



*NDVI Analysis Based on Landsat-8 Data of May 24, 2023

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Raghendra Kumar
Head-Projects (Site) TL
NKTCL - Hazaribagh



2.A.4 Impact on Environmental Sensitive Receptors

Detail of various water bodies which are located in the vicinity of project area is presented in Table 2.A.6.

TABLE 2.A.6: DETAIL OF WATER BODIES FALLING WITHIN STUDY AREA

S. No.	Name	X-coordinate (°E)	Y-coordinate (°N)	Distance from transmission line (in Km)
1	Nilanjan river	84°47'38.96"E	24°19'54.48"N	4.6
2	Water body near Kenrimoh	84°54'42.24"E	24°22'19.84"N	6.49
3	Water body near Birlututdag	84°58'42.60"E	24°22'41.22"N	9.2

The Map showing water bodies falling under study area is enclosed as **Annexure – 6.I**

Details of Forest villages which are located in the vicinity of the project area in presented in Table 2.A.7.

TABLE 2.A.7: DETAIL OF FORESTS VILLAGES FALLING WITHIN STUDY AREA

S. No.	Village	X-coordinate	Y-coordinate
1	Kasiatu	84°53'25.81"E	23°57'26.87"N
2	Makra	84°54'19.71"E	23°55'31.71"N
3	Kusamha	84°54'19.65"E	23°55'5.48"N
4	Phulwaria	84°57'25.39"E	23°56'42.98"N
5	Bhatchara	84°51'59.54"E	23°54'44.53"N
6	Soparam	84°56'28.54"E	23°54'54.49"N
7	Naudina	84°57'17.05"E	23°55'27.18"N
8	Tatej	84°50'32.56"E	24° 4'18.34"N
9	Chandadih	84°49'32.62"E	24° 4'32.71"N
10	Bhanda	84°50'15.00"E	24° 7'8.12"N
11	Jogliadih	84°51'6.18"E	24° 6'44.18"N
12	Sijua	84°45'34.27"E	24°10'32.27"N
13	Tanku	84°45'0.31"E	24°18'2.26"N

The Map showing Fforest villages falling under study area is enclosed as **Annexure – 6.J**

2.B QUANTUM OF POLLUTANTS PRODUCED BY THE PROJECT

Following pollutants are released during execution of transmission line projects—

- i. Dust of cement, coarse and fine aggregates as well as cement lumps formed at the time of foundation activity.
- ii. Packaging material waste during Foundation & Stringing activity.

These are the pollutants which is released by the project during execution activities. However, the quantity release is so negligible that it has least minimal effect on soil, air, water, vegetation & animals.

2.C DEGRADATION ANTICIPATED ON ACCOUNT OF THE PROJECT IMPLEMENTATION

Species-wise & girth-wise enumeration of trees falling within ROW of North Karanpura to Gaya (Jharkhand Portion) Transmission Line under Latehar Forest Division is presented in Table 2.C.1. The analysis indicate that the total number of trees falling in the corridor of 46 meters is **20879** no's out of which **1264** numbers of tree are impacting tower base area and **12327** numbers of trees are impacted in the corridor of transmission line, total **13591** trees (tower base area and corridor) which will be cut during construction of transmission line, trimming of **6117** numbers of trees will be done which are lying in corridor of transmission line during stringing work and rest **1171** numbers of tree will remain unharmed and shall continue standing in corridor as it is.

Ray
Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

TABLE 2.C.1 (a): SPECIES-WISE & GIRTH-WISE ENUMERATION OF TREES FALLING WITHIN ROW OF NORTH KARANPURA TO GAYA (JHARKHAND PORTION) TRANSMISSION LINE -- LATEHAR DIVISION

S- No.	Scientific Name	Local Name	(0-30)cm.	(31- 60)cm.	(61- 90)cm.	(91-120)cm.	(121-150)cm.	(>150)cm.
1	<i>Mangifera Indica</i>	Aam	0	0	0	0	0	1
2	<i>Terminalia Tomentosa</i>	Aashan	0	1	0	3	0	1
3	<i>Ficus Bengalensis</i>	Bargad	0	0	2	2	1	14
4	<i>Bahera</i>	Bahera	0	0	1	0	2	1
5	<i>Aegle Marmelos</i>	Bell	0	0	0	0	0	1
6	Others	Dhamtha	0	1	3	0	0	0
7	Others	Doka	3	17	16	2	1	0
8	Others	Girahan	0	1	0	0	0	0
9	<i>Syzgium Cumini</i>	Jamun	1	6	8	2	0	1
10	Others	Karam	1	0	0	0	0	0
11	<i>Karanj</i>	Karanji	0	1	0	0	0	0
12	<i>Artocarpus Heterophyllus</i>	Kathal	0	1	0	0	0	0
13	Others	Kolnar	0	1	0	0	0	0
14	Others	Kusum	0	2	1	1	1	3
15	<i>Madhuca indica</i>	Mahua	3	39	71	27	11	48
16	<i>Butea Monosperma</i>	Palas	0	21	30	11	4	1
17	Others	Pharad	1	6	2	0	0	0
18	<i>Ficus Religiosa</i>	Pipal	0	0	1	1	1	0
19	Others	Piyar	3	20	1	0	0	0
20	Others	Rani	0	0	5	0	2	0
21	Others	Rodli	0	1	1	2	0	0
22	<i>Shorea Robusta</i>	Sakhua	141	632	535	313	51	38
23	<i>Shorea Robusta</i>	Sal	0	0	2	6	2	7
24	<i>Lagerstroemia Parviflora</i>	Sidha	1	13	9	1	1	0

Ragnvendra Kumar
Head-projects (Site)
NKTL - Hazaribagh



S. No.	Scientific Name	Local Name	10-30 cm.	31-50 cm.	51-90 cm.	91-120 cm.	121-150 cm.	(≥150) cm.
17	<i>Anacardium Occidentale</i>	Kaju	2	0	0	0	0	0
18	<i>Adena Cardifolia</i>	Karam	1	28	13	3	5	23
19	<i>Diosporus Melanoxylon</i>	Kendu	3	22	6	2	1	0
20	<i>Acacia Catechu</i>	Khair	12	105	12	15	5	4
21	<i>Eucalyptus</i>	Liptus	0	1	6	1	0	1
22	<i>Madhuca Indica</i>	Mahuwa	1	62	68	60	40	155
23	<i>Sweetinia Mahagony</i>	Mahagony	6	2	1	1	1	0
24	<i>Azadirachta Indica</i>	Neem	3	22	15	5	1	1
25	<i>Butea Monosperma</i>	Palash	23	340	263	111	42	20
26	<i>Ficus Religiosa</i>	Pipal	0	2	1	1	1	0
27	<i>Tectona Grandis</i>	Sagwan	56	680	84	7	1	1
28	<i>Shorea Robusta</i>	Sakhuwa	130	2901	1808	645	110	94
29	<i>Lagerstroemia Parviflora</i>	Sidha	117	1829	665	207	59	28
30	<i>Bombax Ceiba</i>	Simal	1	32	26	16	7	10
31	<i>Albezia Labbeck</i>	Sirish	1	15	17	11	5	4
32	<i>Dalburgia Sisoo</i>	Shisham	19	17	11	4	1	0
33	Others	Amra, Amruth, Amla, Bandarlauri, Bakain, Charki, Chirchari, Chireta, Dhautha, Dhoka, Dhonta, Farhad,	130	2008	890	237	87	57
Total			644	8816	4212	1025	441	517
Sub Total (No. of Trees.)			16135					

Signature
Rajendra Kumar
Head-Projects (Site) TL
NRII - Hazaribagh



TABLE 2.C.1 (c): SPECIES-WISE & GIRTH-WISE ENUMERATION OF TREES FALLING WITHIN ROW OF NORTH KARANPURA TO GAYA (JHARKHAND PORTION) TRANSMISSION LINE – CHATRA NORTH DIVISION

Sr. No.	Scientific Name	Local Name	(0-30)cm	(31-50)cm	(51-90)cm	(91-120)cm	(121-150)cm	(151-180)cm
1	Others	Akola	0	3	0	0	0	0
2	Others	Amrut	0	0	1	0	0	0
3	<i>embelica officinalis</i>	Amla	0	0	0	0	1	0
4	<i>Acacia Arabica</i>	Babul	0	0	1	0	0	0
5	<i>Melia Azadirachta</i>	Baken	0	2	0	0	0	0
6	Bamboo	Bamboo	14	0	0	0	0	0
7	Others	Ber	0	0	1	1	4	0
8	<i>Aegle Marmelos</i>	Bel	14	111	21	3	2	0
9	Others	Bhedha	0	0	0	0	0	1
10	<i>C.Siamia</i>	Chakundi	5	97	121	16	5	0
11	Others	Chamkora	4	18	2	0	0	1
12	Others	Chidiwa	1	7	2	0	0	0
13	Others	Chireta	15	101	11	3	2	1
14	<i>Semecarpus Anacardium</i>	Velwa	5	42	3	0	0	0
15	Others	Dhoshakarna	0	15	2	0	1	0
16	Others	Dudgodhara	0	2	0	0	0	0
17	<i>Gmelin Arborea</i>	Gamhar	1	6	4	2	0	0
18	Others	Gulmohar	0	0	3	0	0	0
19	Others	Ikaishi	0	2	6	0	0	0
20	<i>Tamarindus Indica</i>	Imli	0	0	0	1	0	0
21	<i>Syzigium Cumini</i>	Jamun	1	4	3	1	2	2
22	<i>Bombax Ceiba</i>	Simul	2	17	9	2	3	1
23	<i>Anthocephalus Cadamba</i>	Kadam	0	3	0	0	0	0
24	Others	Kahua	0	9	5	1	1	0

9/9/21
Ragendra Kumar
Head-projects (Site) T19
NKT - Hazaribagh

Sr. No.	Scientific Name	Local Name	(0-30)cm	(31-60)cm	(61-90)cm	(91-120)cm	(121-150)cm	(>150)cm
25	Others	Karam	1	20	7	7	3	2
26	Others	Kekar	0	4	0	0	0	0
27	<i>Diosporus Melanoxylon</i>	Kendu	0	0	1	0	0	0
28	<i>Acacia Catechu</i>	Khair	4	47	16	4	2	0
29	Others	Khajur	0	0	6	23	5	2
30	<i>Madhuka Indica</i>	Mahua	0	3	13	8	6	25
31	Others	Makron	0	5	1	0	0	0
32	Others	Munga	0	1	0	0	1	0
33	<i>Azadirachta Indica</i>	Neem	2	12	5	2	0	2
34	Others	Pharda	0	2	9	3	0	0
35	<i>Ficus Religiosa</i>	Pipal	0	0	1	0	1	0
36	<i>Shorea Robusta</i>	Shakhuwa	9	60	5	5	0	1
37	Others	Sharol	0	2	0	0	0	0
38	Others	Shigodha	0	1	1	1	1	0
39	Others	Shikita	2	31	3	0	0	0
40	Others	Shimar	3	10	6	1	1	1
41	<i>Lagerstraemia Parviflora</i>	Sidha	79	468	139	39	13	5
42	<i>Dalburgia Sisoo</i>	Sisham	1	41	126	71	19	2
43	<i>Borasis Flebilifer</i>	Taar	0	1	1	1	6	4
44	<i>Butea Monosperma</i>	Palas	12	153	96	38	12	8
Total			174	1302	631	233	91	58
Sub Total (No of Trees.)			2488					

Raghuendra Kumar
Head-Projects (Site) TL
NRI, Hazaribagh

TABLE 2.C.2: SUMMARY TABLE SHOWING DETAILS OF TREES ENUMERATED AND TO BE FELLED/TRIMMED

Division	Total nos. of trees enumerated	Tree proposed for felling/trimming/lopping		Trees not affected (i.e., not to be felled / trimmed)	Remark (felling details)
		To be felled	To be trimmed		
Latehar	2256	1016	1069	171	1016 (i.e., Tower base 229 & corridor 787)
Chatra South	16135	10789	4617	729	10789 (i.e., Tower base 898 & corridor 9891)
Chatra North	2488	1786	431	271	1786 (i.e., Tower base 137 & corridor 1649)
Total	20879	13591	6117	1171	-


 Raghvendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

2.D NATURE OF THREATS TO THE FLORA AND FAUNA ON ACCOUNT OF THE PROJECT IMPLEMENTATION

The ecological and environmental threat of the proposed North Karanpura to Gaya (Jharkhand Portion) 400 kV D/C transmission line corridor passing through selected forest stretches and other adjacent forest patches has been categorized into the following categories:

- Threats on forest & wildlife during Construction Phase
- Threats on forest & wildlife during Operation Phase

Unlike other linear projects the impacts of proposed 400 kV transmission line on biodiversity are much lower in scale. Most of the impacts are confined to activities such as tower foundation, tower erection and stringing. The ground disturbances, if any, are likely to be regenerated on the ground. The operation phase will have limited impacts w.r.t. vegetation clearance below the line is to maintain the desired ground clearance as per the established electrical safety norms.

2.D.1 Threats During Construction Phase

The following impacts are envisaged during the construction stage on the forest and wildlife of the Transmission Line route:

- Impacts during route survey and planning.
- Impacts during vegetation clearance on approach roads.
- Impacts during vegetation clearance on Tower locations.
- Impacts during man and material transportation on each of the tower location.
- Impacts during storage of construction material.
- Impacts during construction activities.
- Impacts during stringing of conductor.

The study area along the corridor of proposed 400 kV transmission line showed a few protected forests and Jungle Jhari (Degraded Scrub Land) intermingled with village settlements and crop field. However, there are number water bodies and streams/rain fed rivers. Due to unique setting of undulated landform, faunal diversity of the landscape is fairly rich.

2.D.1.1 Receptor

The forest area of this region belongs to two major categories viz., Sal Forest and mixed forest. In addition, there are many plantation patches where plants like *Eucalyptus*, *Akashmoni*, *Karanj*, *Amlaki*, *Tamarind*, *Jamun*, *Teak* etc. were planted. There are couple of invasive alien plant species often found in the forest viz. *Lantana*, *Chromolaena*, *Hyptis*, *Imperata*, *Argemone* etc. were also found in forest patches.

Based on the field survey a total of 2,256 individuals of various tree species are enumerated in Latehar whereas 16135 and 2488 tree species are enumerated in Chatra South and Chatra North divisions respectively within the RoW of 46 m for North Karanpura to Gaya (Jharkhand Portion) 400 kV D/C transmission line. However, the tower location and stringing to maintain the required



Rag
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

mandatory ground clearance.

In study area, faunal species comprising of twelve (12) species of amphibians, twenty-six (26) species of reptiles, ninety-four (94) species of avifauna and twenty-five (25) species of mammals are reported from Forest division. Apart from these, there are a total of twenty (20) species of butterflies, insects and spider reported in forest division. Some are IUCN listed threatened species.

2.D.1.2 Impact Significance

Vegetation clearance along the transmission tower locations and corridor area for the various construction activities may lead to habitat loss, habitat disturbance to faunal species. It may also lead to loss of natural vegetation resulting to reduced vegetal cover, shrinkage in natural forest cover, loss of nesting and foraging for avifaunal species, arboreal amphibians, reptiles and movement pattern of mammal species in the study area.

Habitat Loss & Fragmentation

Powerlines or specially powerline corridors, are known to affect many different animal groups, predominantly birds. These impacts are largely associated with fragmentation & degradation of wildlife habitats along the powerline corridor i.e. Right of Way. In case of 400 kV (D/C) North Karanpura to Gaya (Jharkhand Portion) Transmission line the RoW is considered as 46 meters wherein the standing trees are required to be either felled, looped/pruned as necessary for casting of tower foundation, tower erection & electrical conductor stringing. The felling of trees along the line corridor might impact the nesting sites of birds as well as habitat and movement of other arboreal species like monkeys, primates etc. available in that areas (Figure 2.D.1).

In Latehar, out of total 2256 trees enumerated, only 1016 no. of trees are required to be felled and about 1069 required be trimmed/ lopped to maintain the minimum clearance and balance while 171 no. of trees shall be retained. For Chatra South division, out of the total trees enumerated, 10789 trees will be felled and 4617 are required to be trimmed/lopped and 729 trees will be retained. In Chatra North division, out of the total number of enumerated trees, number of trees that will be felled and trimme/lopped will be 1786 and 431 respectively whereas 271 will be retained. In total, out of the total 20879 trees enumerated, 13591 will be felled and 6117 trees will be trimmed/lopped whereas 1171 will be retained in the Project Area. Hence the impact will be limited to the activity areas i.e. transmission Tower and RoW areas and will not cause a significant change and therefore the impact magnitude has been deemed as Medium.

Rag
Raghuendra Kumar
Head-Projects (Site) TL
SKTL - Hazaribagh



The excavation, leveling and removal of vegetation may also result in soil erosion which will be washed and drained with the occurrence of rains will runoff to the natural streams and change the stream characteristics, impacting the aquatic habitat associated amphibians and reptile and mammalian species.

Construction manpower will be required for execution of the project and makeshift construction camps and will be set up at the tower foundation/erection sites as per site requirement. Generally, for tower foundation works, local manpower/workers will be engaged. However, for specialized works like tower erection and stringing, migrant laborer are usually engaged.

The impact will be limited to the activity areas and transmission line RoW activity areas as described above and will not cause a significant change in the population of these species and therefore the impact magnitude has been deemed as Medium. The construction period suggested is around 14 months hence, the impact duration suggested as "Short term" and likely to be reduced in subsequent years due to high re-generation rate.

Removal of vegetation, development of approach roads and construction activities can have a direct and indirect impact on the local ecology. The impact is limited to the construction phase of the Project, following which the vegetation can recover, however, recovery as back to original

stage will require significant duration of undisturbed state. The significance of the residual impacts is Minor for habitats and species.

2.D.2 Threats During Operation Phase

The following threats are envisaged during the Operation Phase:

- Mortality due to Electrocutation and Collision of Avifaunal species
- Mortality due to Electrocutation and Collision of arboreal mammalian species

2.D.2.1 Context of Threat

The context of various impacts during the operation phase are presented in Table 2.D.1.

TABLE 2.D.1: CONTEXT OF VARIOUS THREATS DURING THE OPERATION PHASE

Threats during the Operation Phase	Context
Threats due to electrocution and collision of avifaunal species with conductor.	Mortality by Electrocutation: Electrocutation may happen if the avifaunal species sitting on the conductor and touching two-phase. Mortality by collision: Mortality by collision may happen if the avifauna flying near the conductor did not spot the conductor and collides with it in full force, leading to physical injury (Like broken wings etc) resulting into death.
Disturbance to vegetation during maintenance of required ground clearance.	Preventive and Corrective Maintenance of the transmission line and for maintenance of the mandatory vertical clearance between vegetation and the lowest point of conductor sag. This will involve lopping and pruning of existing tree species leading to loss of nesting and perching sites.
Electrocution of Arboreal mammals.	The arboreal mammals in the area may face changes in the movement within traditional corridors and mortality due to electrocution while moving from one canopy to another canopy with transmission line as the barrier in between.

2.D.2.2 Impact Significance

The proposed North Karanpura to Gaya (Jharkhand Portion) 400 kV D/C transmission line will not pass through any protected areas such as National Parks or Wildlife Sanctuary. However, there are some Schedule I species, IUCN listed CR and VU species reported in forest division.



Raghvendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

Electrocution & Accidental Collision of Birds

As per available/listed data, the risk of electrocution of birds are mostly related to distribution/transmission lines up to 110 kV due to dimensions and spacing between two conductors, electrocution of Bird/Raptor by EHV lines of 132 kV & above is quite rare. Moreover, collision of birds are mostly reported during landing and takeoff in area close to water bodies, designated bird areas/ sanctuary having large congregation of birds or line intersecting identified bird fly or migratory paths hence bird diverter even if placed on EHV line can only be effective if it is installed in the fly path of birds. NKTL, following its cardinal principle of avoidance take utmost care to avoid such areas while selecting the optimum line route of proposed transmission line.

The impacts described above will not cause a significant change in the population of these species as sufficient habitat is present in the study area and the larger landscape. The impact duration is "Long term" as the impacts will be applicable for entire project cycle. Hence the impact magnitude is deemed as moderate as effect may causes a substantial change in abundance and/or reduction in distribution of a population over one, or more generations, but does not threaten the long-term viability/ function of that population dependent on it. Overall impact assessed for the operational phase as moderate for habitat and species.

2.D.2.3 Residual Impact

The residual impacts for the operational phase impacts are deemed as Low as the implementation of mitigation measures suggested will lower the impact magnitude from moderate to low.

2.E PROBABLE INCREASE IN THE VEHICULAR TRAFFIC AND ITS IMPACT

The impact of the vehicular traffic of the proposed North Karanpura to Gaya (Jharkhand Portion) 400 kV D/C transmission line passing through selected forest stretches and other adjacent forest patches has been categorized into the following categories:

- **Impact during Construction Phase:**

Vehicular movement in the proposed corridor will last only 15 months of execution period.

- **Impact during Operation Phase:**

There is minimal vehicular movement in operational period for maintenance and checking purpose of Transmission line.

2.F NOISE, WATER, AIR & UNDERGROUND POLLUTIONS AND ITS IMPACT ON FLORA AND FAUNA

Unlike other linear projects the impact on Flora and Fauna due to Noise, Water, Air & Underground pollutions of proposed 400 kV transmission line are much lower in scale. Most of the impacts are confined to activities such as tower foundation, tower erection and stringing.



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Rajivendra Kumar
Head Projects (Bihar) TL
NKTL Hazaribagh

1.6 STUDY TECHNIQUES ADOPTED BY THE EXPERTS

1.6.1 Framework for Ecological Impact Assessment

The state-of-the-art method has been used for ecological impact assessment study (Figure 1.3.1). The present study was exploratory in nature based on primary as well as secondary data. Following step-wise approach was followed in order to achieve the conformity with the scope of work for baseline data collection.

Step 1: Reconnaissance Survey- A reconnaissance survey was undertaken to understand the complexity of terrain, habitats available, approach for various locations enroute to transmission line corridor and potential areas for species enumeration.

Step 2: Secondary Data Collection- Available secondary data through published research papers, books and periodicals and PhD thesis from the area was reviewed and enlisted to confirm the presence of species. Secondary data was also collected on the historical surveys in the area. Working & Management plan of the respective forest division and protected area, if any was also reviewed. Consultation with the locals and forest officials were also made.

Step 3: Primary Data Collection- Primary surveys were undertaken to understand the actual baseline and analyse the impacts of the proposed project on ecological baseline (Figure 1.3.2).

Step 4: Biodiversity Impact Assessment- Assessment of impact of the various construction and operation activities on the ecological baseline.

Step 5: Wildlife Management & Conservation Plan- Preparation of Wildlife Management & Conservation plan for mitigation of major impacts of construction and operation activities.

1.6.2 Methodology for Primary Data Collection

Primary data collection methods for flora and fauna species are discussed hereunder (Figure 1.3.3 to 1.3.5).

1.6.2.1 Floral Assessment

Floral assessments were focused on:

- Enumeration of Trees, Shrubs, Herbs, climbers, and orchids likely to encounter on the transmission line route and its immediate vicinity.
- Undertake phytosociology along the transmission line corridor to calculate frequency, density, and abundance for plant species along with the IVI and calculation of species richness and species diversity.
- The enumerated list of floral species will be compared to Indian Red Data Book and species listed in the IUCN Red data list to confirm their conservation status.
- Following will be emphasized.
 - Species with conservational significance (Indian Red Data Book)
 - Endemic flora species



Paul
Raghwendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

- Species with high commercial value

The detailed methodology for data collection for each floral group (Habit) are presented here under.

Trees: Quantitative data was collected using standard quadrat methods of sample plot size 10 m x 10 m for trees in various habitat types along the transmission line route and immediate vicinity.

Shrubs: Quantitative data was collected using standard quadrat methods of sample plot size 5 m x 5 m for shrubs in various habitat types along the transmission line route and immediate vicinity.

Annuals (Herbs, Grasses, Pteridophytes, etc.): Quantitative data was collected on plateaus associated with transmission line using standard quadrat methods of sample plot size 1 m x 1 m for herbs, grasses.

Climbers: Quantitative data was collected using standard quadrat methods of sample plot size 10 m x 10 m for large climbers (lianas) in various habitat types along the transmission line route and immediate vicinity.

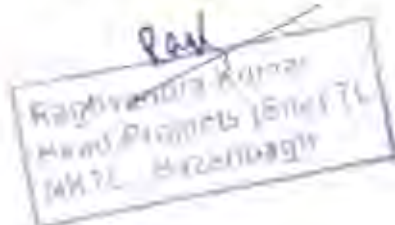
1.G.2.2 Faunal Assessment

- Faunal assessment was carried out through enumeration of herpetofauna (amphibians and reptiles), avifauna (resident and migratory) and mammals likely to encounter on the transmission line route and its immediate vicinity.
- Assessment of various faunal habitats.
- The enumerated list of faunal species will be compared to Indian Wildlife Protection Act, 1971 schedules and species listed in the IUCN Red -List v.2018.2 to confirm their conservation status.
- Following will be emphasized,
 - Species with conservational significance (Sch. I of IWPA, 1972, IUCN v2018.2 Red -List species)
 - Endemic faunal species.
 - Species listed in CITES Appendix I & II

The detailed methodology for data collection for each faunal group are presented here under, Four Transects were laid to enumerate:

Herpetofauna: In view of the activity pattern of herpetofauna, diurnal and nocturnal surveys were carried out in the study area. Amphibians and reptiles are known to inhabit various habitats and remain among leaf litter or under rocks and thus special efforts were taken to locate and study those using following methods:

- **Direct Search Method:** This method involves searching thoroughly the known habitats of amphibians and reptiles. Intensive searching was carried out in most of the habitats by removing stones, logs, among leaf litter and on trees. This is not a time constrained



method, so considerable and roughly equal amount of time was spent in most of the habitats.

- **Searching streams:** This method was utilized to study amphibians and certain reptiles which are closely associated with aquatic habitats. The surveys were conducted mostly during the night. A few streams coming in or close to the Transmission Line route were surveyed.
- **Opportunistic records:** The local nature enthusiasts are photographing amphibians and reptiles and posting these images on social networking sites. A few of them send these images for identification to us. This network of local contacts was used to understand the herpetofauna diversity in the study area. The identifications of images taken by locals were confirmed by detailed observations.
- **Systematic Analysis:** In the study area except a few frogs and lizards, there is less ambiguity in the taxonomy of most of the known amphibians and reptiles. A thorough taxonomic examination was carried out for most of the herpetofauna encountered during field surveys. The identification was based on recent and historical publications.

Avifauna: In view of the activity of the Avifaunal species early morning and evening surveys were undertaken for enumerating species presence along the transmission line route and buffer area. Day surveys were undertaken to enumerate the soaring birds. Following methods were implied,

- Total or flock / block count method: Sridharan 1989¹, Bhupathy 1991², Thompson 2002³ were adopted to assess the status of aquatic birds in dam /water bodies and point count method in the riparian forest along stream / river side (Gregory et al. 2002)⁴ of the project area. Birds in the riparian forests were recorded and enumerated within 50 m radius as part of point count.
- Point Count (Hutto et al. 1986⁵, Bibby et al. 1992⁶, Rosentod et al. 2002⁷, Salim and Rahul 2002⁸) and area search (Dieni and Jones 2002⁹) techniques were applied to assess the status of terrestrial birds. Point counts in the forest and allied habitats were made within 50 m radius, while in agriculture that include fallow lands, and scrub / grassland / barren area habitats, birds were recorded with in 100 m radius.
- Additional effort was made to locate/identify the presence of any breeding/nesting sites /roosting sites of avifauna.
- Species identification was confirmed using the field guides for the avifaunal species

Mammals

Mammalian fauna was assessed at each sampling locations in different habitats through recording both direct and indirect evidence.

- Status and distribution of different mammalian fauna was quantified using direct count covering all the terrestrial habitats of the transmission line and Right of way area adopting road count (Burnham et al. 1980¹⁰, Sale and Berkmuller 1988¹¹, Rodgers 1991¹²). These survey routes were the area between two sample points and the forest trails that traverse across different habitats and land uses.



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Raghendra Kumar
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- In addition, indirect evidence (pellets, dungs, droppings, scats and other tracks and signs), were searched within circular (25m radius) plots at each sampling location, which provide relative abundance of presence of mammalian fauna (Thompson et al. 1989¹³, Rodgers 1991, Henke and Knowlton 1995¹⁴, Allen et al. 1996¹⁵).
- Further presence of different faunal species was also ascertained and substantiated by interviewing the local people with the pictures of the mammals from the field guides that could probably occur in the area and discussion with local experts.



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Ragendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh



**FIGURE 2.G.1: MAP OF STUDY AREA SHOWING PROJECT AREA & BUFFER ZONE (10 km both side of ROW)
—400 KV (D/C) LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)**



Segment wise Map of study area i.e., Project area & 10 km buffer area of 400 kv (d/c) line from North Karanpura to Gaya (Jharkhand portion) is enclosed as Annexure – 6.C.1

FIGURE 2.G.2: MAP SHOWING SAMPLING LOCATIONS FOR BIODIVERSITY STUDY WITHIN THE PROJECT AREA OF 400 KV (D/C) LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)



FIGURE 2.G.3: INITIATION FIELD SURVEY FOR ECOLOGICAL IMPACT ASSESSMENT OF PROPOSED 400 KV (D/C) LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)



Rajendra Kumar
Head-projects (Site) TL
NKTJ - Hazarbagh

FIGURE 2.G.4: FIELD SURVEY FOR FLORAL ASSESSMENT AT SELECTED FOREST STRETCH OF PROPOSED 400 KV (D/C) LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)



Raghvendra Kumar
Head-Projects (Site) I
NKT - Hazaribagh

FIGURE 2.G.5: FIELD SURVEY FOR FLORAL ASSESSMENT AT SELECTED FOREST STRETCH OF PROPOSED 400 KV (D/C) LINE FROM NORTH KARANPURA TO GAYA (JHARKHAND PORTION)



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CHAPTER – 3.0

STRATEGIES FOR MITIGATION OF IMPACT ON WILDLIFE

3.A OBJECTIVES OF MANAGEMENT TO ADDRESS THE ISSUE OF WILDLIFE CONSERVATION AGAINST THE PROJECT IMPLEMENTATION

This chapter presents the objectives of the management and strategies to mitigate and minimize adverse impact likely to be observed with in the study area. The objective of the present study was to find solutions for mitigating impact on wildlife in the project area. During the construction work the disturbance of the habitat will be more and so the impact will be greater. Regular contact with the Forest Department will be maintained to monitor wildlife movement when the work starts. The mitigation work will start simultaneously with as the construction work starts on priority based in the forest area diverted. Based on identified impact in Chapter-2 the following mitigation measure will be carried out.

3.B STRATEGIES TO MITIGATE AND MINIMISE ADVERSE IMPACT ON WILDLIFE

3.B.1 MORTALITY OF ANIMALS DUE TO ELECTROCUTION

- xiii. Proper signage at strategic locations with suggestions to follow in order to have regulated construction & maintenance activities in ROW falling under the elephant movement/corridor route will be strictly followed.
- xiv. To check the signage of important species of animals with short information will be erected on strategic location of forest area along the ROW.
- xv. Monitoring for animal deaths due to electrocution and effectiveness of implemented measures.
- xvi. Safe passage by providing minimum ground clearance of 30 feet for wild animals and special elephant crossing to cross.
- xvii. In the project design every transmission tower and pole will have a danger sign and an anti-climbing barbed wire for the safety purposes for wild animals.
- xviii. Exchange of information with NKTL and forest department regarding presence of elephant in the area.

3.B.2 HABITAT LOSS/DEGRADATION

- i. In any case, if there is a water course (whatsoever small or large may be) will not be disturbed, blocked or diverted. Water to be allowed to flow uninterrupted.
- ii. Wildlife and wildlife habitat will be protected in accordance with wildlife law and guideline issued by Chief Wildlife Warden.
- iii. Artificial nests will be installed on trees near pond/ water bodies and in villages for roosting and nesting of birds.
- iv. Plantation of native trees species.
- v. Barbed wire fencing with anticlimbing devices in tower falling in the vicinity of elephant movement zone would be constructed to protect the animals from electrocution.



Raghu
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

3.8.3 CONDUITS FOR INVASIVE ALIEN SPECIES

- i. In no case exotic/allen species will be planted in the project area.
- ii. The invasion of alien species should be checked by eradication at regular intervals.

3.8.4 LANDSLIDE AND SOIL EROSION

- i. Soil and water conservation measures to be practiced normally at the site.
- ii. Plantation of native species including grasses, sedges, bamboo, trees or shrubs of plant on both side of streams.
- iii. Soil binders like Bamboo will be planted to protect soil erosion particularly in the stream, water bodies where the chance of erosion is more.

3.8.5 INCREASED HUMAN PRESENCE AND POLLUTION

- i. Noise pollution generating activities will be restricted between sun set and sun rise. It would be mandated to all stakeholders to use modern noise reducing techniques during the construction as well as maintenance work.
- ii. Wildlife warning signs to be installed in high density areas and at known locations as a result of wildlife monitoring.
- iii. Hunting and disturbing of wildlife by project staff will not be permitted while working on the project sites.
- iv. No firearms will be permitted at construction sites.
- v. Herbicides will not be used for weed eradication.
- vi. The construction phase within the forest area should be quick, with minimum disturbance.

3.8.6 EFFECTS ON LOCAL AND INDIGENOUS PEOPLE

- i. Preference will be given to local people in employment during construction period.
- ii. The project will take responsibility for awareness generation and livelihood options among people of project village.

3.8.7 RISK OF FOREST FIRE DUE TO GREATER RANGE OF TEMPERATURE EXTREMES

- i. Latehar and Chatra district is becoming very hot during summer in recent years and the temperature can rise up to 45- 46° during day time. The minimum temperature in winter season falls below up to 40°. This shows greater range of temperature extremes.
- ii. The higher temperature increases forest fire risks which can be reduced by taking appropriate measures.

3.8.8 HIGHER WIND SPEEDS AND WIND THROW OF TREES IN FOREST AREAS

The impact of higher wind speed and wind through of trees can be reduced by plantation of more trees along the ROW of transmission line.



Ray
 Nagendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

- i. Removal of weed like Lantana management will be done.
- ii. Clearing will be undertaken in such a manner that there is no slashing of all understory vegetation without destroying native species.
- iii. Regular attempt will be taken to eradicate alien species.

- i. During construction, the digging of large pits is inevitable leading to casualty of burrowing animals like reptiles, hares, mongoose, porcupine etc. of animals at the project site. Suitable mitigative measures such as barricading of pits during foundation activities should be taken up regarding the same.
- ii. The project authority should take utmost care to motivate the labourers to avoid conflict with wild animals.
- iii. Wildlife will not be fed, befriended or harassed at construction areas.
- iv. Any problem related to wildlife will be reported immediately to the Forest Department.
- v. Orientation for Contractors and employees to be conducted that should include awareness of environmental protection measures for wildlife and wildlife habitat.
- vi. Any wildlife killed or injured during construction phase will be reported to Forest Department.
- vii. Regular contact with the Forest Department should be maintained to monitor wildlife movement when the work starts.

- i. The ground vegetation will be maintained or cut regularly to avoid any case of fire.
- ii. The cleared vegetation will be removed from the site.
- iii. The labourer will be made aware of fire hazard in forest areas due to their smoking habits.
- iv. The villagers deliberately create fire in forest area for new flush of grasses for their domestic cattle so they should be made aware of risk of serious fire. This will avoid deliberate fire.
- v. Fire line should be maintained to avoid spreading of deliberate fires near on both side of transmission line.

- i. Any substance creating pollution will not be left at the project sites.
- ii. No substance will be discharged in the water regimes.

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Raghvendra Kumar
Head-Projects (Site) TL
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3.8.1.1 ADDITIONAL ENHANCEMENT MEASURES

a) Monitoring for wildlife death

Toll free/phone number on signage in the forest area for information regarding any wildlife mortality at strategic locations of transmission route.

b) Habitat Management

Vegetation or other habitat features (e.g., rocks, fallen timber) are strategically placed, planted, or allowed to regrow so that animals are directed to preferred crossing locations.

c) Signage and warning systems

The purpose of animal warning signs and detection systems is to make people aware regarding presence of animals near the transmission line. Signs warning of wildlife will be put up along stretches of transmission line where animals are known to occur or use local habitat, to caution people about the potential presence of animals.

All warning signs can be grouped into the following five categories:

i. Caution signs

Simple caution signs are commonly used to alert people to the presence of wildlife crossing zones. In India, the most common caution signs near transmission lines are simple warning signs with silhouettes/outline of the animal that may be using the crossing, together with a written message.

ii. Enhanced caution signs

Many caution signs are enhanced by adding words like 'Deer Xing (Crossing)' or illuminated with reflective tape, in addition to silhouettes (Outline) of animals.

iii. Temporary wildlife warning signs

These signs may be put up to warn people of wildlife presence during specific times of the day or year e.g., during animal migration or active and/or breeding periods of amphibians and reptiles. These can be made and kept and during need can be installed.

iv. Posters and billboards

Color posters and billboards are put up as part of programmes and campaigns to reduce animal mortalities. They also help to generate awareness of this issue among the public. The size, shape, colour and material (reflective, non-reflective) of signs should be chosen to make the signs most effective.

v. Animal Detection

System should be installed in the elephant crossings. Camera/Video recorder can be installed on both side of transmission line.



3.8.14 STRATEGIES FOR MITIGATION ACTION PLAN

Mitigation is defined as measures to minimise impacts of the project on ecology, wildlife, local communities. While preparing Wildlife Management Plan for mitigating the impact on wildlife, special emphasis has been laid on schedule - I, II and III species because they hold important position in the ecosystem and have threatened status. The plan for protection of schedule-I species will take care for prey base and their habitat. While preparing this plan special emphasis has to be laid on mitigation measures for conservation of mammals, birds, reptiles and other lesser-known animals.

Based on above assumption, Wildlife Management Plan has been prepared for project area and buffer area as below:

1. Habitat Management & Enrichment
 - a. Food Management
 - b. Water Management
 - c. Shelter Management
2. Forest Fire Prevention, Control and Management
3. Research and Wildlife Monitoring
4. Anti-Depredation and Wildlife Conservation & Protection Activities
5. Eco/Community Development, Awareness Generation and Capacity Building.
6. Management and Evaluation

The objective of above plans and its importance for wildlife management and protection of its habitat has been discussed in detail in the subsequent chapters.

3.8.15 WILDLIFE MANAGEMENT & CONSERVATION PLAN

Where wildlife and biodiversity values of importance to conservation are associated with a project site or its area of influence, the formulation of a Integrated Wildlife Management Plan (IWMP) provides a useful means to focus a project's mitigation and management strategy. The development of IWMP for transmission line documents the process, actions, responsibilities and budget allocation. It also gives the opportunities to investigate the effectiveness of the mitigation measures suggested and provides a chance to revisit them and make timely changes to update/upgrade the mitigation actions for better management of forest & wildlife.

The wildlife management & conservation plan has been devised on the following aspects--

- Ecological Sensitivities along the transmission line corridor.
- Species of conservational significance along the transmission line corridor.
- Impacts during the construction and operation phase.
- Proposed mitigation measures.
- Parameters to be monitored.
- Measurement and frequency.
- Institutional responsibility.
- Implementation schedule.


 Raghwendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

The proposed wildlife management & conservation plan for proposed North Karanpura to Gaya (Jharkhand Portion) 400 kV (D/C) transmission line is presented in Table 3.B.15.1.

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Raghvendra Kumar
Head-Projects (Site) TL
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TABLE 3.8.15.1: WILDLIFE MANAGEMENT & CONSERVATION PLAN FOR PROPOSED TRANSMISSION LINE

Activity	Impact	Target Species Groups	Phase (Construction/Operation)	Proposed Mitigation Measures	Parameters to be monitored	Measurement and Frequency
Route Survey & Planning	Habitat disturbance due to clearance of bushes	Faunal groups (Herpetofauna, Avifauna and Mammals)	Construction Phase	- Habitat disturbances to be kept at minimum by using existing trails for transportation of man, material and machinery; - Any vegetation clearance required should be limited to the minimum area required for such passages;	Physical demarcation of the RoW before any vegetation clearance	Visual inspection on monthly basis during construction phase
Impacts during vegetation clearance on approach roads and RoW	Habitat Loss and Habitat disturbance, loss of nesting sites	Flora & Faunal groups	Construction Phase	- Tree cutting for the approach roads and RoW should be undertaken where it is absolutely necessary. - Tree enumeration for clearance should be undertaken in presence of forest department in order to seek guidance to avoid, restore and replant species of conservation significance - Tree felling should be in compliance of all the statutory requirements; tree felling in the nesting season (March to September) should carefully examine the active nest on trees before felling; relocation of active nest should be undertaken with the help of	Physical demarcation of the vegetation in ROW before clearance	Visual inspection on weekly basis during construction phase

Dr. Raghvendra Kumar
Head-Projects (Site) TL
NKT-IL - Hazaribagh

Activity	Impact	Target Species Group	Phase (Construction/Operation)	Proposed Mitigation Measures	Parameters to be monitored	Measurement and frequency
Impacts During vegetation clearance on Tower locations	Habitat loss and Habitat disturbance	Floral and faunal groups	Construction Phase	State Forest Department and/or wildlife NGO; - Cleared wood material removal should be undertaken as per guidance of the state forest department; - The ground dwelling fauna in the area should be approached carefully and removed from the direct path by trained experts, no direct attendance of the wildlife encounters	Physical demarcation during construction period	Visual inspection on weekly basis during construction phase


 Raghendra Kumar
 Head-Projects (Site) TL
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CHAPTER – 4.0

WILDLIFE CONSERVATION & MANAGEMENT PLAN FOR PROJECT AREA

4.A INTERVENTIONS TO BE IMPLEMENTED BY THE PROJECT AUTHORITIES

"Mitigation Measures" refer to the actions that can be implemented to minimize the magnitude of the project related impacts on ecology in general and forest & wildlife of the project area. Mitigation can carry on along three possible courses of actions, either by changing actions (1) at source, (2) on path (3) or at the receiving end.

Based on the present study it is very clear that the prevailing physical environmental conditions of the project location and associated project activities predicted to impact upon some ecological attributes (flora & fauna) of the project area which are at local, shorter period mainly during construction phase and magnitude of low to moderate levels in many cases. Overall impact statement identified impacts in construction and operation phase. The impact summary is provided in Table 4.A.1.

TABLE 4.A.1: SUMMARY OF LIKELY IMPACT ON FOREST & WILDLIFE

Impact Description	Impact Nature	Impact Significance	
		Without Mitigation	Residual (With Mitigation)
Construction Phase	Adverse	Moderate	Low
Operation Phase	Adverse	Moderate	Low

It is proposed that that at section of the 400 kv (D/C) transmission line of North Karanpura to Gaya (Jharkhand Portion) passing through selected forest area various mitigation measures are proposed to be adopted by NKTL during execution of the project.

As per Indian Electricity rule, the minimum ground clearance for 400 kV Transmission Line is 8.84 meter. However in the 66th meeting of Standing Committee of National Board of Wild Life, it was decided that maximum sag point of transmission lines should be a minimum of 10 m above ground on level terrain (slope < 20 degrees) so that no elephant can reach it even with raised trunk and a minimum of 15 m above ground on steeper terrain (slope > 20 degrees). The UA will strictly follow this condition. In addition to the above, it is proposed to maintain additional clearance 3 meter over and above minimum clearance above ground from the lowest conductor of Transmission Line for the areas specified above, if required.

The mitigation measures proposed to be adopted for protection of wildlife during the construction phase and operation phase are as discussed hereunder.

4.A.1 Mitigation Measures for Construction Phase

The proposed North Karanpura to Gaya (Jharkhand Portion) 400 kV D/C transmission line project is required diversion of 197.0115 ha of forest area which would impact as a loss of forest habitat, change in species composition, and change in abundance of faunal groups of the overall project area. The Transmission line route falls in the Peninsular Sal Forest habitat and Dry deciduous mixed forest area. The tower locations are in the low to moderately dense forest area.

Mitigation measures proposed to be adopted to protect wildlife during the construction phase are presented below:



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- To compensate the loss of diversion of 197.0115 ha of forest area, compensatory afforestation over degraded forest in twice extent i.e., over 394.7178 ha of degraded forest area is proposed in Chatra South (240 ha), Chatra North (124 ha) & Latehar Division (30.7178 ha).
- Further, dwarf/medicinal plantation in ROW of transmission line shall be taken up by forest dept. as per MOEF guidelines/conditions, if any stipulated under forest clearance of the project.
- Habitat disturbances to be kept at minimum by using existing trails for transportation of man, material, and machinery.
- Any vegetation clearance required should be limited to the minimum area required for such passages.
- Tree enumeration has already been done as a part of forest proposal. Tree felling shall be done in foundation and stringing of conductors.
- The trees on the remaining part of the transmission line corridor will be mostly loped and pruned which are required for stringing of conductor. In case of towers falling in hilltop locations where enough ground clearance is available, trees will not be felled. This will minimize the impact on nesting sites of birds as well as habitat of arboreal species.
- To minimize the disturbance to wildlife, no new approach road shall be constructed in the forest area. The existing village tracts/paths will be utilized for carrying tower materials and also manual excavation of tower foundation will be done.
- Ecofriendly engineering practices in the construction works and due care be taken properly so as to avoid injury to wildlife.
- All pollution-related aspects and waste management will be duly taken care of during the implementation of the project.
- Construction activity, man and material movement should be limited to the daytime and early morning, late evening and night activity should be completely avoided to allow the unrestricted wildlife movement.
- No night stay at the construction site should be planned, proper planning of day work (within the daylight hours) should be done.
- Movement within the wildlife area should be entirely regulated, each work force party/gang should be trained in do's and don'ts and how to deal in a situation of wildlife encounter before entering the wildlife area
- Tree felling should be done in compliance of all the statutory requirements, tree felling in the nesting season of endemic avifaunal species should carefully examine the active nest on trees before felling, relocation of active nest should be undertaken with the help of State Forest Department and/or forest expert.
- Hunting, trapping and poaching by the employed work force should be completely banned and work force/contractors shall be made aware about no poaching tolerance strategy.



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- The excavated pits for foundation towers shall be properly barricaded and fenced so as to prevent accidental falling of mammals in the vicinity of the construction sites.
- Vehicle speed while travelling to the activity area should be regulated and minimized as required.
- Proper housekeeping of the construction areas should be followed during and after construction phase is completed.
- Monitoring shall be done to oversee the mitigation measure implementation during the construction phase.
- Before start of work in the selected protected forest stretches awareness, campaign will be taken up to create maximum awareness among the construction workers regarding safeguard of forest and wildlife.

Mitigation measures proposed to be adopted by User Agency under the guidance of DFO to protect wildlife during the construction phase are presented below:

- To compensate the loss of diversion of 56.3254 ha of forest area, compensatory afforestation over degraded forest in twice extent i.e. over 113 ha of degraded forest area is proposed in Chatra South (56.00 ha) & Latehar Division (57.00 ha).
- Further, dwarf plantation in ROW of Transmission Line shall be taken up by forest dept. as per MOEF guidelines/conditions, if any stipulated under forest clearance of the project.
- Habitat disturbances to be kept at minimum by using existing trails for transportation of man, material and machinery;
- Any vegetation clearance required should be limited to the minimum area required for such passages;
- Tree enumeration for clearance has been already undertaken. During the vegetation removal, a trained ecologist will be consulted in order to seek guidance to avoid, restore and replant species of conservation significance.
- The specific and important tree species must be identified and marked separately and protected during the construction of the Transmission Line.
- The trees on the remaining part of the Transmission Line corridor will be mostly loped and pruned which are required for stringing of conductor. In case of towers falling in hill top locations where enough ground clearance is available, tree will not be felled. This will minimize the impact on nesting sites of birds as well as habitat of arboreal species.
- To minimize the disturbance to wildlife, no new approach road will be constructed in the forest area. The existing village tracts/paths will be utilized for carrying of tower materials and also manual excavation of tower foundation will be done.
- Ecofriendly engineering practices in the construction works and due care be taken properly so as to avoid injury to wildlife.
- All pollution related aspects and waste management will be duly taken care during the



Paul
Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

implementation of the project.

- Construction activity, man and material movement should be limited to the day time and early morning. late evening and night activity should be completely avoided to allow the unrestricted wildlife movement;
- No night stay at the construction site should be planned, proper planning of day work (within the daylight hours) should be done.
- Movement within the wildlife area should be entirely regulated, each work force party/gang should be trained in dos and don'ts and how to deal in a situation of wildlife encounter before entering the wildlife area.
- Tree felling should be in compliance of all the statutory requirements, tree felling in the nesting season of endemic avifaunal species should carefully examine the active nest on trees before felling, relocation of active nest should be undertaken with the help of wildlife expert under the guidance of State Forest Department ;
- Hunting, trapping and poaching by the employed work force should be completely banned and no poaching tolerance strategy should be covered under contractual obligations;
- The excavated pits for foundation towers shall be properly barricaded and fenced so as to prevent accidental falling of mammals in the vicinity of the construction sites.
- Vehicle speed while travelling to the activity area should be regulated and minimized as required;
- The vegetation clearance along the RoW of the Transmission Line will create a canopy break for the arboreal mammals (Tree dwelling) construction of *canopy bridges* at strategic locations (where such canopy breaks are very evident) under the guidance of SFD.
- Proper housekeeping of the construction areas should be followed during and after construction phase is completed.
- Before start of work in the selected protected forest stretches *awareness campaign* will be taken up by NKTL in association with Forest Dept. to create maximum awareness among the construction workers regarding safeguard of forest and wildlife.

Mitigation Measures for Operation Phase to be done by User Agency under the guidance of DFO

Operational Phase impacts will be associated to the routine and corrective maintenance, potential risk of electrocution and collision for avifaunal species and electrocution for arboreal mammalian species. In the routine maintenance, in order to require the mandatory vertical clearance pruning and lopping of trees may be required within the RoW. Mitigation measures proposed to be adopted by User Agency under the guidance of DFO for protection of wildlife during the operation phase are presented below:

- Any routine and corrective maintenance schedule planned should be undertaken only after pre-informing the forest department;



Ravi
Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

- Pre nest search before commencing any pruning and lopping to be undertaken;
- *Artificial nest boxes* along the Transmission Line route to mitigate the loss of nesting sites along the Transmission Line route (Figure 6.1);
- Periodic review of condition of *canopy bridges*, if any and undertake required maintenance;
- Installation of *bird diverters* on the conductor and *perch rejecters* on transmission tower along the Transmission Line corridor should be undertaken along the wildlife stretch;
- In addition to the above, *artificial nesting platform* for raptor species to be built along the Transmission Line at a distance of 200 m;
- Structures to climb transmission towers should have a restriction guards (to avoid access to for arboreal species (Maccaques, Langurs, Loris, Giant Squirrels etc.).
- Rapid carcass search along the Transmission Line corridor for possible victims of collision and electrocution should be undertaken once in 2 months

4.A.2 Mitigation Measures for Operation Phase

Operational Phase impacts will be associated to the routine and corrective maintenance, potential risk of electrocution and collision for avifaunal species and electrocution for arboreal mammalian species. In the routine maintenance, in order to require the mandatory vertical clearance pruning and lopping of trees may be required within the RoW.

Mitigation measures proposed to be adopted for protection of wildlife during the operation phase are presented below:

- Routine and corrective maintenance should be undertaken on a regular basis.
- Pre nest search before commencing any pruning and lopping to be undertaken.
- Suggesting artificial nest boxes along the transmission line route to mitigate the loss of nesting sites along the transmission line route. (Figure 4.A.1)
- In addition to the above, artificial nesting platform for raptor species to be built along the transmission line at suitable location, if required.
- Structures to climb transmission towers should have restriction guards (to avoid access to for arboreal species (Maccaques, Langurs, Loris, Giant Squirrels etc.).
- Rapid carcass search along the transmission line corridor for possible victims of collision and electrocution should be undertaken once in 6 months.

Raghendra Kumar
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NH TL - Hazaribagh

FIGURE 4.A.1: WILDLIFE PROTECTION DEVICES/STRUCTURES FOR PROPOSED TRANSMISSION LINE



4.B LOCATIONS OF THE PROPOSED INTERVENTIONS AND MAPS OVERLAID IN THE PROPOSED LAND USE PLAN MAP

Maps of proposed interventions within the study area of North Karanpura-Gaya (Jharkhand Portion) 400KV D/C Transmission Line enclosed as Annexure – 6.A.1 & 6.A.2.

A.0 RELEVANT PROVISIONS OF ENVIRONMENT MANAGEMENT PLAN FOR THE PROJECT

Detail of major mitigation measures proposed to be adopted for protection of wildlife are presented in subsequent sections:

Safeguard of Birds from Electrocution and Accidental Collision

Transmission lines are known to affect many different animal groups, predominantly birds. These impacts are largely associated with fragmentation and degradation of wildlife habitats. Transmission lines, where vegetation has been cleared or cut back along way leaves or servitude areas, also affect animal movement and permeability of habitat, similar to road and railway corridors.

Electrocution has grown to become a significant threat for a range of animals, from small birds to large mammals such as elephants that have been electrocuted by sagging transmission lines. Transmission lines cause large-scale mortality of birds due to electrocution and collision. Transmission line located close to important bird areas (especially water bodies having large congregation of birds, or carcass or garbage dumps), or bisecting critical flight paths, pose a significant risk of electrocution or collision in birds. Apart from structural aspects of transmission line, biological characteristics of birds, including body size, age class and behaviour, affect electrocution risk. Birds with large wings spans that show preference for using power poles during hunting are known to be more susceptible to electrocution. Raptors and storks are reported to be most at risk of electrocution, since they use power poles extensively as nesting platforms. Ecological factors such as the availability and distribution of prey, and landscape features, are known to affect electrocution risk in birds. Noticeably, electrocution of wild animals is not limited birds, however mammals such as bats, apes and elephants are also vulnerable.

Collision occurs when a bird in flight physically connects with overhead transmission lines, resulting in death or serious injury. Collision is most common with high voltage transmission lines. Collision occurs specifically with the earth wire on the transmission lines that is less visible to birds. The risk of bird collision with transmission lines is affected by biological and ecological factors. Collision are mainly reported to occur in fast-flying species with poor manoeuvrability and poor forwards vision like eagles and cranes, which have a large blind sector in their forwards-facing visual field, and are more prone to collision with transmission lines. Migratory birds are said to be more susceptible to collisions as juveniles are unfamiliar with new landscapes, this factor is reported to be the main cause of mortality in fledged whooping cranes. Reduced visibility in poor weather- particularly foggy conditions in winter- cause a high number of bird collision with transmission lines.

Thus a transmission line along with other adverse impact of forest and wildlife mainly causes habitat loss, habitat fragmentation and disturbance induced behavioural changes impacting arboreal animals/gliders and birds. It also causes impediment to movement and thereby causing injury and mortality impacting large mammals, arboreal animals/gliders and birds. Therefore to balance the developmental goals with conservation necessity, mitigation



Raghu
Raghvendra Kumar
Head-Projects (Site) T.L.
NKTL, Hazaribagh

should be goal oriented and must follow a hierarchy of measures. Mitigation measures must be addressed as an integral part of project planning and implementation to target significant impacts.

The clearing of native vegetation in transmission line affect permeability of habitat for a wide range of wildlife. In addition, animals other than birds may be injured or killed as a result of collisions with or electrocution by transmission lines. However, the main impacts of transmission lines are undoubtedly on birds. Electrocution of birds, and their collision with transmission lines, is not only a topic of conservation concern but also an issue of serious economic and financial costs.

Appropriate routing and structure of transmission lines is said to reduce the risks of bird collision and electrocution by 50% and more. Early planning and rigorous Environmental Impact Assessment (EIA) can reduce bird mortality and minimise the risk of costly power outages. Planning should include the use of state-of-the-art bird protection equipment. A database should be prepared that includes relevant information which must be taken into account in planning transmission line corridors: location of protected area networks, important bird and wildlife habitat, presence of threatened bird species that are particularly vulnerable to collision or electrocution, their flight routes between feeding, breeding and resting habitats, as well as information on migratory corridors. A post construction monitoring programme should be developed to check the efficiency of mitigation measures and enable further improvement. Management of facilities and sites near transmission lines that are known to attract birds- especially raptors, such as carcass and garbage dumps, can minimise bird mortalities. Measures to prevent bird electrocution are of paramount importance and are relatively easier to achieve than measures to prevent collisions. Places where adequate separation are not possible between wires, bare parts of poles like phase wire, insulators, jumper wires should be covered by a non-conductor insulated material. Installation of phase wires below the cross arms, using suspension insulators, can reduce electrocution risk. Artificial bird perchers or nesting platforms can be provided away from the poles thereby helping to prevent electrocution. Potential collision risk can be reduced by keeping or creating all key bird areas on the same side of the transmission line corridor, providing a safe flyway by minimising the need for birds to cross that corridor. Birds frequently collide with the earth wires installed at the top of transmission lines, as it is less visible and smaller in diameter. Using line marker devices should increase their visibility. Marker devices are available in several colours and are visible to birds from a long distance. Many type of marker devices are available, such as spheres, swinging plates, spiral vibration dampers, strips, flight diverters, bird flappers, ribbons, tapes, flags and crossed bands. Line markers should be as large as possible. Spacing between them should be 10 m. Marker devices should be chosen to contrast as much as possible with the background colours and importantly should be visible at night as most bird collisions are said to occur at night.

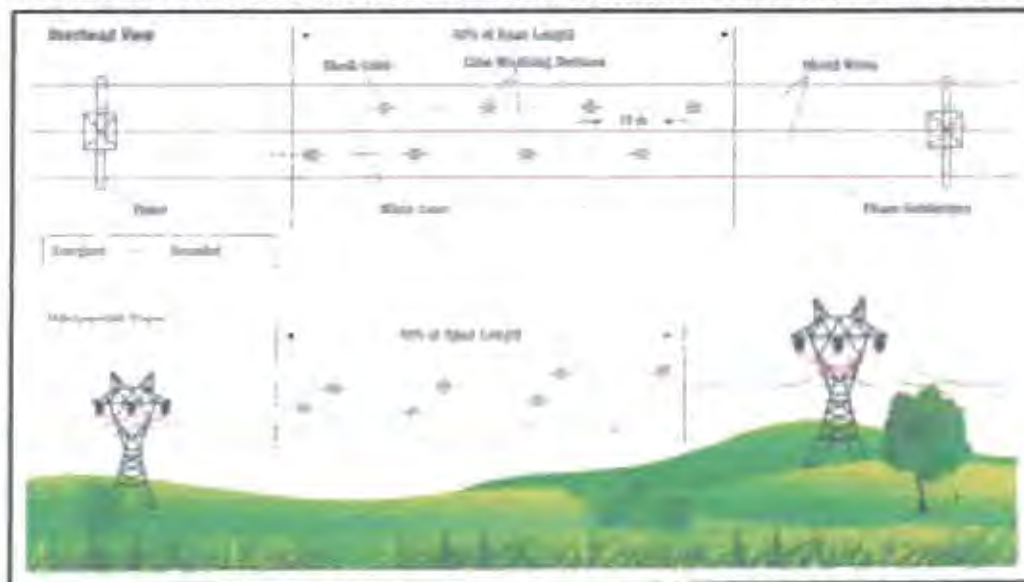


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FIGURE 4.C.1: BIRD DIVERTER, COLOURED CONTRAST MARKER & BIRD GUARD PROPOSED TO BE INSTALLED ON TRANSMISSION LINE PASSING THROUGH SELECTED FOREST STRETCH



FIGURE 4.C.2: DESIGN & CONFIGURATION OF BIRD MARKERS TO BE INSTALLED TO REDUCE BIRD COLLISION ON TRANSMISSION LINE PASSING THROUGH SELECTED FOREST STRETCH



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Anti-Climbing Devices

Many different designs of tower exist for 400 kV lines with standardisation becoming more focused in recent years. Anti- Climbing Devices (ACD's) are being used at tower four corners gates with two opening and two non-opening fenced by using barbed wire and accessories (Figure 4.C.3).

FIGURE 4.C.3: ANTI-CLIMBING DEVICES PROPOSED TO BE INSTALLED ON TRANSMISSION LINE PASSING THROUGH SELECTED FOREST STRETCH



In addition to above, any other measures as envisaged by the competent authorities / MoEF&CC as a part of Forest clearance shall be adhered to during execution of the project by NKTL.

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 Raghvendra Kumar
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CHAPTER – 5.0

WILDLIFE CONSERVATION & MANAGEMENT PLAN FOR BUFFER AREA



5.4 INTERVENTIONS TO BE ADOPTED BY THE DIVISIONAL FOREST OFFICERS

This chapter presents the Interventions to be done by the State Forest Department within the buffer area of the proposed 400 KV D/C North Karanpura - Gaya Transmission line. The financial outlay and plan to be implemented has been distributed over 10 years for proper implementation. The suitable provision for interim review has been made. Some essential work needs to be implemented on forest land. Such scheme has been identified in a separate budgetary provision for implementation by Forest Department in this Chapter. Following are the interventions adopted by the Divisional Forest Officers--

5.4.1 HABITAT MANAGEMENT & ENRICHMENT

A Food Management

- i. **Bamboo Plantation** – The wildlife, including all herbivores including elephants, prefers bamboo as food. Also, bamboo is important to forest growth and is an indicator of the good health of forests. A total of 50 Ha. in the impact area is suggested (as per SoR of APCCF Development) to be undertaken for bamboo Plantation. This additional plantation will help in increasing food stock for huge animals like elephants and help in forest growth.
- ii. **Cleaning/Decongestion of Bamboo Clumps** – Failure of cultural operation and management of bamboo clumps has prevented it from growing more and clumps have started degenerating. The buffer forest could be seen with bushes like bamboo clumps everywhere which also acts as major food for wildlife as well as cattle. The bamboo clumps will be cleaned and loaded with soil for better regeneration in the area.

B Water Management

Water is essential not only for animals but also for plants, microbes and all ecological processes. Both in-situ and ex-situ conservation of water should be done by various means. It will be ensured that catchments always remain covered with vegetation by protection and plantation, so that erosion and runoff will be kept at the minimum. Works like creation of contour trenches, gully plugging etc. will be carried out wherever necessary from time to time through annual plans. DE siltation of main reservoirs even in the villages will also be done periodically, so that water will remain available even in summer months.

- i. **Construction of Earthen/Pucca Check Dams/Water Holes:** The waterhole management and provision of water to wildlife in this dry zone is essential during summer. The natural waterholes have to be maintained and small reservoir/Pucca check dams should be created at various places on drainage lines to recharge the waterholes as well as forest area. It is also important to take special measures for creation/development of pond for water management on both side of elephant crossing proposed.
- ii. **De-siltation, Renovation & Maintenance of Water Bodies:** Water becomes an important threat to wild animals immediately after March and till the time monsoon outbreaks in



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 Raghvendra Kumar
 Head-Projects (Site) TL
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this region. The condition remains the same up to July. This time period may also get extended sometimes due to delay in arrival of monsoon and rainy season. Even after the rainy season, accumulation of water is localized at few places. Such a condition has arisen due to the siltation of all streams which has reduced their water holding capacity. In view of this situation, maintenance and renovation of Old/Traditional Water Storage/Conservation Structures such as Check Dams, SDD, Water Holes, Ponds, etc. is required around the surrounding project areas to improve the water regime of the habitat throughout the year.

C SHELTER MANAGEMENT

Forest Restoration through Silviculture Operation/Activities: Forest cover or shelter is another important requirement for the welfare of the species. The cover may be natural or artificial. Caves or holes are required for their resting and breeding period for carnivores and reptiles. The lack of such natural caves or holes is limiting factor for animals. These animals will never stay in an area which is devoid of the above type of shelter.

On the whole it can be said that different kinds of covers like winter cover, summer cover, refuse cover, breeding cover, fawning cover, resting cover, ambush cover and nesting cover are required for different animals for different purposes. It can be ensured by strict protection of habitat, that includes dens, caves, rocks, nallas, ravines, vegetal cover etc and further, by improvement of habitat by planting in blanks with suitable plant species listed in site specific survey separately listed for the concerned two divisions, for rehabilitation of degraded forest areas as well as habitat change due to construction of transmission line etc. The occurrence of fire incidence greatly hampers the availability of nesting and reproductive cover for birds. So, incidence of fire should be checked efficiently.

Apart from this for birds, since the area is also IBA, it is important that for birds nesting and roosting the plant listed in site specific survey should be encouraged for plantation, since they are the native flora of the area.

The project has included in its design the planting of trees to replace those that will have to cut down and as an effort to reverse the high rate of deforestation. The program will be implemented in collaboration with the Forest Department who have forestry offices and nurseries in their jurisdiction. Recommended types of trees will be determined by the Forest Department. The program shall be community based and accompanied by awareness and sensitization of the people.

Grand Total under the head 'Habitat Management & Enrichment' = Rs. 755.16 lakh



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Raghvendra Kumar
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1.4.3 FOREST FIRE PREVENTION, CONTROL & MANAGEMENT

Most of the fires in the forest are intentional fires set by villagers for obtaining new flush of grasses for grazing and for the collection of Mahua flower or Sal seed or Kendu leaves suitable for bidi making. In addition, sometimes accidental fires are caused by throwing cigarette butts or bidis without extinguishing by villagers unintentionally.

These fires naturally go against the conservation values of the area as the food and cover base of the wild fauna is destroyed and the soil is exposed to the danger of erosion and run off, weed infestation and, therefore, replacement of natural flora with unnatural and unpalatable species. It is always better to have controlled burning as a management tool. Otherwise, fire is harmful because it leads to loss of cover of herbivores as well as destruction of eggs and nests of ground birds like Jungle fowl quail, peafowl and partridge or bush living birds. Besides it accelerates soil erosion, deteriorates the forest and ultimately reduces the aesthetic value of the forest.

A. Fire Fighting Squad: To deal with forest fire, Fire Fighting Squad along with following points need to be implemented--

- i. **Engagement of Fire-watchers/Fire-Fighters:** The areas should be protected from forest fire through community support and modern techniques. People through EDCs/JFMCs will be deployed for 04 months in the fire season who will work as fire watchers.
- ii. **Rapid Response Team:** For combating the menace of fire, a Firefighting squad/Rapid Response Team will be employed on daily wage every year during summer for the purpose of early detection and control. This budget has provision of purchasing the **Fighting Equipements like Fire Blowers, Fire Safety Equipements, Fire Fighting Kits, First Aid Kits etc. and Ration like Sattu, Gur (Jaggery), and Glucose etc.** The occurrence of fires, location, causes, extent of damage etc. will be properly documented for improving the fire management plan periodically. A network of fire lines should be created to avoid incidence of fire.
- iii. **Fire Theme Plan:** A fire management theme plan will be prepared for the entire area and detailed planning on fire management will be made. Approx 3 fire lines of maximum length of 6 kms per sub beat will be laid and maintained every year. It should be laid as per the theme plan before fire season.
- iv. **Accident Insurance or Hospitalisation/Medical Expenses:** Provision for accidental insurance or medical expenses for appointed fire-watchers, fire-fighters, Rapid Response Team, Forest Personnel etc. in case of injury on duty has been considered for 10 years for providing immediate treatment to injured.

Grand Total under the head 'Forest Fire Prevention, Control & Management' = Rs. 111.50 lakh



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Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

minimize this situation, Gaj Mitras//Vanjiva Mitras are suggested to be deployed for crop guarding during crop season from July-November of every year.

- iii. **Anti-Depredation Squad/Quick Response Team:** Quick response team armed with 1 no 4x4 vehicle and all elephant anti-depredation materials such as dragon torches, crackers etc with provision of trained manpower on elephant anti depredation is proposed to be deployed in each range office for managing man-wildlife conflict especially avoiding man elephant conflict, rescue and rehabilitation of wild animals with basic rescue equipment including expense of accident insurance, hospitalization and medical expense for appointed QRT members and elephant trackers in case of injury on duty.
- iv. **Veterinary Services Suport Such as Veterinary Doctor etc:**Provision of veterinary doctors will be made available to forest field formations for providing of timely and effective veterinary services to any needy wild animal..
- v. **Establishment of Temporary treatment and rehabilitation centre:**Temporary treatment and rehalilitation centres will be established for injured wild animals/birds with basic equipment and facilities including caretaker wages.
- vi. **Provision of 10 nos. motorcycles for patrolling and monitoring:** Motorcycle will be purchased which will be used as patrolling vehicle inside forest area by forest guards. These vehicles will be used to monitor the field area and patrol camps.
- vii. **Provision of 01 No. ADS/QRT Vehicle(4x4) for Patrolling and Monitoring** -1 no of 4x4 vehicle is proposed to be provided to ADS/QRT team in each division which will be extensively used for research and monitoring purpose inside respective forest areas including of evaluation of IWMP activities.
- viii. **First Aid Kit:** First aid kit will be provided to ADS/QRT in case of usage of minor injury during man animal conflict. Basic first aid kit handling and usage training will be imparted to ADS/QRT expert professionals.

Grand Total under the head 'Anti Depredation & Wildlife Conservation & Protection'= Rs. 404.25 lakh

5.A.5 ECO/COMMUNITY DEVELOPEMNET, AWARENESS GENERATION & CAPACITY BUILDING

5.A.5.1 DEVELOPEMNET AND CAPACITY BUILDING OF LOCAL COMMUNITY AND FOREST PERSONNEL

- i. **Community Capacity Building Acitvies:** The population within 10 Km of the impact zone of the proposed Transmission project consists of primarily of tribal's who depend upon nearby forests. The development of these villages through Eco- development initiatives



Raghu
Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

and convergence of developmental programs of other departments of state govt. is essential for reduction of their dependency on forest.

The implementation of Eco-development activities shall be carried out in accordance with micro-plan prepared by the DFO of all three forest divisions. The following indicative activities are being proposed to be undertaken:

- Provision of LPG connection/ refilling or provision of improved and eco-friendly stoves/challahs.
 - Provision of drinking water facilities, deep tube well with overhead tank.
 - Distribution of smell-proof grain tanks, Solar Street Lights & Solar Lanterns.
 - Making available good quality plants of fuel, fodder and horticulture species.
 - Promotion of vegetable cultivation.
 - Promotion of education includes making available computers and modern education aids to schools located in the impact zone.
 - Establishment of Kisan nurseries.
 - Promotion of Bee keeping.
 - Community Capacity Building through Eco-tourism activities and Climate Resilient livelihood activities.
- ii. **Training/Exposure visit:** Training and exposure visit will be conducted for JFMC members/villagers/Forest staff for capacity building/skill development programme and financial support will be provided for value addition of NTFP, minimize dependence on forest resources and local community will be made aware regarding income generation schemes by promotion of stall breeding by introduction of high yield variety of cattle through dairy farming schemes of State Govt.
- iii. **Human/Veterinary Healthcare Camps:** The water storage, wet land created by storage and spilling of water during agriculture use will create pools of water best for breeding of various type of mosquitos, leeches and snails which are potential carrier for large no. of diseases in human and cattle. Awareness will be created among local community regarding possibility of spread of water borne and air borne diseases by organizing healthcare camps and distribution of pamphlets for steps to be undertaken for its prevention around the impact zone. Efforts will be made to immunize the domestic animals in and around the proposed area against contagious diseases like Food & Mouth disease, Rinderpest etc. In order to avoid the spread of disease the stall feeding should be encouraged by supporting grassland development on community or private fellow land.
- iv. **Capacity Building of Forest Personnel:** The staff has to be trained on basic knowledge of all the Acts, laws (Wildlife Protection Act, Biodiversity Act, Forest Act and Environment Act etc.), basic wildlife monitoring technique, use of GPS and other equipment, firefighting, handling man-animal conflict situations, checking forest and wildlife crimes



Raghu
Raghendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

5.B LOCATIONS AND MAPS OF AREAS OF THE PROPOSED INTERVENTIONS

Maps of proposed interventions within the study area of North Karanpura-Gaya (Jharkhand Portion) 400KV D/C Transmission Line enclosed as **Annexure – 6.C.1 & 6.C.2.**

5.C RESEARCH, MONITORING & EVALUATION

Research

The research component used to be given less priority in forestry. There has never been an attempt to conduct or promote research by any project to generate information about ecology, biology etc. of various species which are involved in conflict with the human eg. Elephant, Sloth Bear, Wild Boar, Jackal, Blue bull, Hyena, etc. As a result of this, information on many aspects is highly inadequate to make suitable plans and strategies for different species. Lack of priority and funding for this purpose have been the main cause behind this.

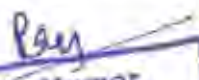
In order to overcome this deficiency, information on many aspects, which do not involve any technical expertise, like animals sighted, number, age/sex distribution, location, habitat description, general activity, plant phenology, fire outbreaks, extent of burnt area, animal killings, observations pertaining to dens, caves etc. should be initiated by the department on its own or through support by project authorities.

On the other hand, for those aspects which need considerable skill and technical expertise like ecology and biology of important wild animals eg. Elephant, Sloth Bear, Jackal, Blue Bull, Hyena, reptiles, amphibians, fishes, Birds, invertebrates and aquatic flora and fauna etc., causes of decline in wildlife populations, making detailed inventories of flora and fauna, contractual engagements or consultancies with experience NGOs working in the field of Wildlife & Environment or University should be made. The detailed inventory of invertebrates, lower plants, medicinal plants, amphibians, reptiles, birds, lesser-known animals etc. for carrying out research to elicit information on habit and habitat of different species, their distribution, population trends, densities etc.

In addition, a rainfall gauge and best quality scientific digital thermometer should be placed at different locations within the project area and regular data should be noted down beginning from the first year of the plan. The forest staff deployed can be trained to take observation and the report should be sent monthly to the concerned Forest Division. The data will be used for preparation of the next ten-year plan.

MONITORING

The overall objective of environmental and social monitoring is to ensure that mitigation measures are implemented.

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 Rajivendra Kumar
 Head-Projects (Site) TL
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Environmental monitoring will be carried out to ensure that all construction activities comply with and adhere to environmental provisions and standard specifications. The project authorities will maintain regular contact with all the DFOs concerned. The contractor will have a responsibility to ensure that the proposed mitigation measures are properly implemented during the construction phase.

5.C.1 Internal Monitoring

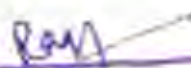
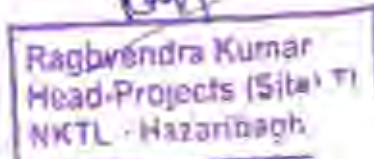
It is the responsibility of Forest Department in collaboration with NKTL Authorities to conduct regular internal monitoring of the project to verify the results of implementation of environmental mitigation measures contained in the Wildlife Conservation Plan. The responsibility for mitigation monitoring during the operation phase will lie with the Project Authorities.

5.C.2 External Monitoring and Evaluation

DFOs, of concerned three Forest Division has the overall responsibility for issuing approval for the project and ensuring that their environmental guidelines are followed during project implementation. Its role therefore is to review compliance documentation submitted by the implementing authorities. A midterm impact review is essential for implementation of management plan. So, site specific wildlife management plan must be reviewed at an interval of 5 years for proper implementation of mitigations measures and if necessary further amendment can be made in the plan in the existing situation. An undertaking is to be given by Project Authorities for implementing the wildlife management plan.

Further, Project Authorities through third party evaluation/consultant will provide Forest Department with reports on environmental/wildlife compliance during implementation as part of their annual progress reports and annual environmental auditing reports.

The intervention to be adopted by divisional forest officers in the project impact area as well as the interventions by the project authority is included in the table. The provisions in the budget have been designed to improve the habitat in terms of food, water and shelter. Attempt has been taken to reduce the human-animal interface conflicts by habitat improvement for wildlife, awareness programme and training programme for the villagers. Provision for regular monitoring by the forest officials has been made to ensure that all condition imposed by Govt. of India should be adhere to its letter and spirit.



 Ragbendra Kumar
 Head-Projects (Sita) T1
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5.D BUDGET FOR INTEGRATED WILDLIFE MANAGEMENT PLAN GIVEN BY FOREST DEPARTMENT OF CHATRA SOUTH, CHATRA NORTH & LATEHAR DIVISION

The cost of implementation for Integrated Wildlife Management Plan for the proposed 400 kV D/C North Karanpura to Gaya (Jharkhand Portion) Transmission line is prepared considering different project specific activities as well as management actions by forest department in buffer area.

The overall cost for implementation of the Integrated Wildlife Management Plan (IWMP) is **1909.89 Lakhs** INR which is around **11.43%** of the total project cost.

The cost for management actions to be implemented is around **1909.89 Lakhs** INR. This includes cost for habitat management & habitat enrichment with plantation of fruit bearing species/fuel & fodder plantation & creation of artificial nest boxes/nesting platforms; cost for implementing fire protection measures; cost for Biodiversity monitoring during construction and operation phase; cost for training & awareness to EDC/FPC for wildlife conservation & protection as well as cost for printing of brochure, boards & signage etc.

The detailed budget for intervention of Wildlife conservation & Management by DFOs of Chatra South, Chatra North Division and Latehar Forest Division, are presented in Table 5.D.2 (A - C).

**TABLE 5.D.1: SUMMARY OF COST OF IMPLEMENTATION OF WILDLIFE MANAGEMENT PLAN FOR 400 KV (D/C) NORTH
KARANPURA-GAYA TRANSMISSION LINE**

S. No.	Name of the activity	Chitra South Forest Division	Chitra North Forest Division	Latter Forest Division	Budget (Rs. Int Lakhs)
Cost for Intervention for Conservation & Management of Wildlife (In Lakhs)					
1	Habitat Management & Enrichment- (Food Management, Water Management & Shelter Management)	318.76	276.40	160.00	755.16
2	Forest Fire Prevention, Control and Management- (Fire Fighting Squad, along with Fire Fighting Equipments, Theme Plan, Insurance, etc.)	34.25	34.25	43.00	111.5
3	Research & Wildlife Monitoring	38.00	38.00	49.00	125.00
4	Anti-Depredation and Wildlife Conservation & Protection Activities-- (Anti-Depredation Activities, Site Specific HWC Mitigation Plan)	122.75	142.50	139.00	404.25
5	Eco/Community Development, Awareness Generation and Capacity Building- (Development, Capacity Building of Local People as well Forest staff & Conservation Awareness activities, Climate Resilient Livelihood Forest Based and Others)	67.50	74.00	69.00	210.5
6	Management and Evaluation	8.00	20.50	0.00	28.5
	Sub Total	589.26	585.65	460.00	1634.91
	Escalation @ 20% per annum	117.85	117.13	0.00	234.98
	Contingency LS	15.00	15.00	10.00	40
	Grand Total (Total Cost of the Plan in Lakhs)	722.11	717.78	470.00	1909.89

Raghyendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

User Agency  Raghendra Kumar Head-Projects (Site) TL NKTL - Hazaribagh	DFO, Chatra South FD  Mukesh Kumar I.F.S Divisional Forest Officer Chatra South Forest Division	CF, Chatra  Conservator of Forests Territorial Circle, Chatra	RCCF, Hazaribag  Regional Chief Conservator of Forests Hazaribag
DFO, Chatra North FD  Ratan Kumar I.F.S Divisional Forest Officer Chatra North Forest Division	DFO, Latehar FD  Raushan Kumar I.F.S Divisional Forest Officer Latehar Forest Division, Latehar	CF, Medininagar  Conservator of Forests Territorial Circle, Medininagar	RCCF, Medininagar  Regional Chief Conservator of Forests Palamu, Medininagar

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i	Restricting Elephants/other wild animals in their natural habitat (Installation of barriers such as elephant proof fence, hanging fences, bio-fence, chilly fence etc.) Guiding elephants/other wild animals back in to their natural habitat (repellents like Dragon Torches, Bee sound, Loud speakers, chili smoke, fire crackers etc.) & structures to minimize losses due to human animal conflict (Gajj Raksha Grib etc.)	25.00	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
ii	Crop guarding by Gaj Mitras/Vanjava Mitras /JPMC/ Elephant Trackers.	10.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
iii	Anti-Depredation Squad/Quick Response Team (with provision of Manpower and Materials) for managing man-wildlife conflict, rescue, and rehabilitation of wild animals with basic rescue equipments, (including expense of accident insurance and/ hospitalisation/medical expense for appointed QRT members and elephant trackers incase of injury on duty).	25.00	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
iv	Veterinary Service support such as Veterinary Doctor, etc.	5.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
v	Purchase & Operational/Maintenance Cost 10 motorcycles for patrolling & monitoring by field forest staffs.	32.50	14.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
vi	Purchase & Operational/Maintenance Cost of ADS/QRT vehicle (4x4) 01 No. (also to be used for research and monitoring purpose including of evaluation of IWMP activities)	23.75	16.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
vii	First Aid Kit	1.50	0.50	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.50	0.00	0.00
	Sub Total of Component 04: -	122.75	38.75	10.75	10.75	11.15	10.75	8.00	8.00	8.00	8.50	8.00	8.00
5	Eco/Community Development, Awareness Generation and Capacity Building												
A	Development and Capacity Building of Local Community and Forest Personnel												
I	Community Capacity Building Activities : Eco-tourism Activities, Climate Resilient Livelihood Activities and Entry Point Activities in project Impact Villages in and around Impact area (e.g. drinking water facilities, deep tube well with overhead tank, chabutra, community road/hall repairing, distribution of small-proof grain tanks, Solar Street Lights, Solar Lanterns, LPG connection/ refilling and/ or provision of improved and eco-friendly stoves/chullahs in identified poor households with high forest resource dependence etc.)	25.00	15.00	3.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Sub Total of Component 05:	30.00	11.00	13.00	5.50	3.50	2.50	0.50	0.50	0.50
6	Management and Evaluation										
i	Maintenance and running/POI, cost of field vehicles used for research and monitoring purpose including of IWMP activities.	6.00	1.20	1.20	1.20	1.20	1.20	0.00	0.00	0.00	0.00
ii	Essential items for monitoring and evaluation such as Computer & peripherals like UPS, Web Camera, Duplex Printer, Speaker, Projector, Drones etc.	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub Total of Component 06:	8.00	3.20	1.20	1.20	1.20	1.20	0.00	0.00	0.00	0.00
	Total	589.26	302.07	104.02	56.74	45.93	24.25	10.75	13.75	9.25	13.75
	Escalation @20% per annum	117.85	60.41	20.80	11.35	9.19	4.85	2.15	2.75	1.85	2.75
7	Contingency & Reserves (L.S.) -for unforeseen expenses	15.00	3.5	3	1.5	1.5	1.25	0.75	1	0.75	1
	Grand Total (Total Cost of the Plan)	722.11	365.98	127.82	69.59	56.62	30.35	13.65	17.50	11.85	17.50

User Agency	DFO- Chatra South	 Mukesh Kumar I.F.S. Divisional Forest Officer Chatra South Forest Division
CF- Chatra	RCCF- Hazaribagh	 Regional Chief Conservator of Forests Hazaribagh
		 Conservator of Forests Territorial Circle, Chatra

TABLE: S.D.2 (B) FINANCIAL FORECAST OF THE ACTIVITIES TO BE IMPLEMENTED BY FOREST DEPARTMENT UNDER WILDLIFE MANAGEMENT PLAN OF 400 KV (D/C) NORTH KARANPURA-GAYA (NKTL) FOR CHATRA NORTH FOREST DIVISION

Sl No.	Particulars of Items Proposed	Total Financial Outlays (In Lakhs)	Year									
			1	2	3	4	5	6	7	8	9	10
I	Habitat Management & Enrichment											
A	Food Management											
i	Bamboo Plantation - 50 Ha as per SoR of APCCF Development	50.61	50.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
i.i	Completion/Maintenance of Bamboo Plantation	30.88	0.00	17.58	7.08	6.22	0.00	0.00	0.00	0.00	0.00	0.00
ii	Cleaning/ Decongestion of Bamboo Clumps- 50 Ha as per SoR of APCCF Development	17.87	17.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ii.i	Completion/Maintenance of Cleaning/Decongestion of Bamboo Clumps	2.56	0.00	2.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub Total of Sub-component A: -	101.92	68.48	20.14	7.08	6.22	0.00	0.00	0.00	0.00	0.00	0.00
B	Water Management											
i	Construction of Earthen/Pucca Check Dams, Water Holes/Ponds/ & Others Water Storage Provision Structures, Providing Solar Powered Bore Wells, Salt Lacks near Water Bodies etc.	55.50	30.00	20.00	0.50	0.50	2.00	0.50	0.50	0.50	0.50	0.50
ii	De-siltation, Renovation & Maintenance of Old/Traditional Water Storage/Conservation Structures such as Check Dams, SDD, Water Holes, Ponds, etc.	25.00	10.00	0.00	0.00	5.00	0.00	0.00	5.00	0.00	0.00	5.00
	Sub Total of Sub-component B: -	80.50	40.00	20.00	0.50	5.50	2.00	0.50	5.50	0.50	0.50	5.50
C	Shelter Management											
i	Forest Restoration through Silviculture Operation/Activities; Advance Work 100 ha (1 st Year 50 ha, 2 nd Year 50 ha as per SoR by APCCF Development	69.90	34.95	34.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
i.i	Completion/Maintenance Work of Silviculture Operation/Activities with plantation of fruit, fodder and nut bearing, etc. trees.	24.08	0.00	6.73	9.38	5.31	2.66	0.00	0.00	0.00	0.00	0.00
	Sub Total of Sub-component C: -	93.98	34.95	41.68	9.38	5.31	2.66	0.00	0.00	0.00	0.00	0.00
	Sub Total of Component 01: -	276.40	143.43	81.82	16.96	17.03	4.66	0.50	5.50	0.50	0.50	5.50
2	Forest Fire Prevention, Control and Management											
A	Fire Fighting Squad											

I	Engagement of Fire-Watchers/Fire-Fighters through EDCs/JMCs/Locals for 04 months in the fire season	7.50	1.50	1.50	1.50	1.50	0.00	0.00	0.00	0.00	0.00	0.00
ii	Rapid Response Team-Provision of Manpower & Materials, (including Fire Fighting Equipments like Fire Blowers, Fire Safety Equipments, Fire Fighting Kits, etc. and Provision for Ration like Sattu, Gur (Jaggery), First Aid Kits and Glucose etc.)	22.50	7.70	6.70	2.70	2.70	0.00	0.00	0.00	0.00	0.00	0.00
iii	Fire Theme Plan	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
iv	Accident Insurance and/ or Hospitalisation/ Medical Expenses for appointed firewatchers, fire-fighters, Rapid Response Team, Forest Personnel, etc. in case of injury on duty	3.75	0.50	0.50	0.50	0.50	0.25	0.25	0.25	0.25	0.25	0.25
	Sub Total of Sub-component A:-	34.25	10.20	8.70	4.70	4.70	0.25	0.25	0.25	0.25	0.25	0.25
	Sub Total of Component 02:-	34.25	10.20	8.70	4.70	4.70	0.25	0.25	0.25	0.25	0.25	0.25
3	Research and Wildlife Monitoring											
	Research & Wildlife Management and Monitoring Cell at Divisional Level (including GIS & Remote Sensing Cell) with Manpowers and all necessary equipments, hardwares and softwares such as RS & GIS Software licenses (purchase/ renewal), purchasing toposheets/ maps, desktop PC, laptop, laser colour printer and related accessories etc	8.00	6.00	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.00
	Set of equipment for research, monitoring, evaluation and patrolling purposes (hand-held cameras, unmanned aerial vehicles, camera traps with battery, binoculars/ night-vision, GPS units, bearing compass and range finder & smart sticks etc.)											
ii	GIS Expert Wages@ Consolidated INR 30K/month (01 No.)	18.00	3.60	3.60	3.60	3.60	0.00	0.00	0.00	0.00	0.00	0.00
iii	Survey for Wildlife	3.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
iv	Watch Tower:- Monitoring of Elephants/ Other Wildlife and Forest Fire, etc	9.00	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub Total of Component 03:-	38.00	9.60	4.10	4.10	4.10	0.00	0.00	0.00	0.00	0.00	0.00
4	Anti-Depredation and Wildlife Conservation & Protection Activities											
i	Restricting Elephants/other wild animals in their natural habitat (Installation of barriers such as elephant proof trench, hanging fences beehive fence, Bio-fence, chilly fence etc.)	27.50	5.00	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
	Guiding elephants/other wild animals back into their natural habitat (repellents like Dragon Torches, Bee sound, Loudspeakers, chilli											

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ii	Training/ Exposure Visits of JPMC members/ villagers/Forest Staff for capacity building/skill development programme and financial support for value addition of N.T.F.P., minimising dependence on Forest Resources and income generating schemes, e.g. tailoring, repairing of mobile, pump set, apiary, piggery, duckery, mushroom cultivation etc.	10.00	4.00	2.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
iii	Wildlife training (including in the use of equipment, basic animal/ vegetation survey protocols, in wildlife law/ policy etc.) and all-round awareness programmes for EDCs/JMCs Members, Panchayat members, children, village level volunteers/ fire-fighting squad etc.	5.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
iv	Human/Veterinary Healthcare Camps	7.00	3.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00
Sub Total of Sub-component A: -		49.50	29.50	9.00	5.00	0.00	2.00	2.00	0.00	2.00	0.00	0.00
B Awareness Generation Activities												
i	Bird Watching/Nature Walk/Camping/Exposure tours, etc											
	Distribution of Environment Forest and wildlife books and other materials in Schools and Colleges preferably located in and around impact area											
ii	Celebration of important days such World Environment Day, World Elephant Day, etc.	17.00	5.00	3.00	3.00	3.00	3.00	0.00	0.00	0.00	0.00	0.00
	Organising awareness camps in local villages to address man-animal conflicts											
iii	Distributing booklets, pamphlets & banners regarding Forest & Wildlife conservation											
	Fixing of Wildlife & Forest Awareness Signage at vulnerable locations											
iv	Documentary Preparation/Film Making/Brochures/Comics, etc. for awareness generation & Documentary preparation/Film Making/ Photography / Documentation such as preparation of reports, etc. of the proposed work and activities to be undertaken and monitoring/ evaluation efforts.	7.50	2.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Sub Total of Sub-component B: -		24.50	7.00	4.00	4.00	3.50	3.50	0.50	0.50	0.50	0.50	0.50
Sub Total of Components 03:		74.00	36.50	13.00	9.00	3.50	5.50	2.50	0.50	2.50	0.50	0.50
6 Management and Evaluation												

TABLE: 5.D.2 (C) FINANCIAL FORECAST OF THE ACTIVITIES TO BE IMPLEMENTED BY FOREST DEPARTMENT UNDER WILDLIFE MANAGEMENT PLAN OF 400 KV (D/C) NORTH KARANPURA-GAYA (NKTU) FOR LATEHAR FOREST DIVISION

Sl No.	Particulars of Items Proposed	Total Financial Outlays (In Lakhs)	Year									
			1	2	3	4	5	6	7	8	9	10
1	Habitat Management & Enrichment											
i	Improvement of water regime in impact zone: - Soil & Moisture Conservation Activities like Construction/Renovation of Earthen/Pucca Check Dams/Water Holes/Ponds/Silt Detention Dam/Nala treatment/Cully Plugging/Loose Boulder Structure/Silt Licks/Traditional Water Structures etc.	105.00	65.00	40.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ii	Plantation of 1500 plants (preferably fruit bearing trees specially for birds) on one side of transmission line only.	55.00	22.80	11.40	9.80	11.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Forest Fire Prevention, Control and Management	160.00	87.80	51.40	9.80	11.00	0.00	0.00	0.00	0.00	0.00	0.00
i	Rapid Response Team - Provision of Manpower & Materials	22.00	4.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
ii	Engagement of Fire-Watchers Involving JFMCs & Locals	10.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
iii	Fire Theme Plan	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
iv	Watch tower: Monitoring for Forest Fire and Movement of wildlife	10.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Research and Wildlife Monitoring	43.00	16.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
i	Research and Wildlife Monitoring Cell at Division Level with Skilled Manpower and all the necessary equipments/logistical support.	44.00	6.00	6.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ii	Survey of Avifauna	5.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Anti-Depredation and Wildlife Protection Activities	49.00	9.00	6.00	4.00	3.00	3.00	3.00	4.00	4.00	4.00	4.00
i	Structural measures: Restricting Elephants in their natural habitat (installation of barriers such as elephant proof fence, hanging fences, bee hive fence, Bio-fence, chully fence etc.), Guiding elephants back in to their natural habitat (repellents like Dragon Torches, Bee sound, Loud speakers, chully smoke, fire crackers etc.) & Structures to minimize losses due to human animal conflict (Gaj Raksha Greh etc.)	47.00	15.00	8.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

User Agency <i>Rak</i> Raghvendra Kumar Head-Projects (Site) TL NKTL - Hazaribagh	DFO- Latehar <i>[Signature]</i> Divisional Forest Officer Latehar Forest Division
CF- Medininagar <i>Rak</i> Conservator of Forests Territorial Circle, Medininagar	RCCF- Medininagar <i>[Signature]</i> Regional Chief Conservator of Forests Palamu, Medininagar

6.0 MAPS & ANNEXURES

- **Annexure 6.A.1** - SOI Map showing Final Route Alignment for proposed 400 kV (D/C) North Karanpura to Gaya (NKG) Transmission line (Jharkhand Portion)
- **Annexure 6.A.2** - LULC Map & details of Land use pattern within the Study area of proposed 400 kV (D/C) NKG Transmission line (Jharkhand Portion)
- **Annexure 6.C.1** - Location Map showing with respect to Protected Area & 10 km Buffer Area of 400 kV (D/C) North Karanpura to Gaya Transmission line (Jharkhand Portion)
- **Annexure 6.C.2** - Map showing Elephant Corridors and Elephant conflict villages in the Buffer zone of proposed 400 kV (D/C) North Karanpura to Gaya Transmission line (Jharkhand Portion)
- **Annexure 6.D.1** - Map showing location of animal depredation / damage caused due to Man-Animal Conflict as well as Details of Mega Wildlife movement provided by respective Forest Divisions.
- **Annexure 6.D.2** - Reasons of Human Elephant conflict and protection measures to be adopted for minimizing the Human – Elephant conflict as suggested by Jharkhand Forest Department
- **Annexure 6.E.1** - List of Floral & Faunal species found in Latehar Forest division.
- **Annexure 6.E.2** - List of Floral & Faunal species found in Chatra South Forest division..
- **Annexure 6.E.3** - List of Floral & Faunal species found in Chatra North Forest division..
- **Annexure 6.F** - List of villages falling within Study area for proposed 400 kV (D/C) NKG Transmission line (Jharkhand Portion)
- **Annexure 6.G** - Map showing Environmental Sensitive receptors - Forest type falling under Study area of proposed 400 kV (D/C) NKG Transmission line (Jharkhand Portion)
- **Annexure 6.H** - Normalized Difference Vegetation Index (NDVI) Map of Study area for proposed 400 kV (D/C) NKG Transmission line (Jharkhand Portion)
- **Annexure 6.I** - Map showing Environmental Sensitive receptors - Water Bodies under Study area of proposed 400 kV (D/C) NKG Transmission line (Jharkhand Portion)
- **Annexure 6.J** - Map showing Environmental Sensitive receptors - Forest Villages under Study area of proposed 400 kV (D/C) NKG Transmission line (Jharkhand Portion)



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Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

ANNEXURE - 6.A.1

SOI MAP SHOWING FINAL ROUTE ALIGNMENT FOR PROPOSED 400 KV (D/C) NORTH KARANPURA TO GAYA (NKG) TRANSMISSION LINE (JHARKHAND PORTION)

MAP SHOWING DOPS SURVEYED
CO-ORDINATES AND BOUNDARY
OF FOREST LAND PROPOSED
TO BE DIVERTED FOR 400 KV D/C
NR. GARA 11, JHARKHAND PORTION



Scale 1:10,000



100
1:10,000
1:10,000
1:10,000



Forest Land

Proposed 400 KV D/C

Surveyed Area

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ISSUED BY: NORTH KARNATAKA TRANSCO LTD

DATE: 10/01/2018

BY: [Signature]

FOR: [Signature]

APPROVED BY: [Signature]

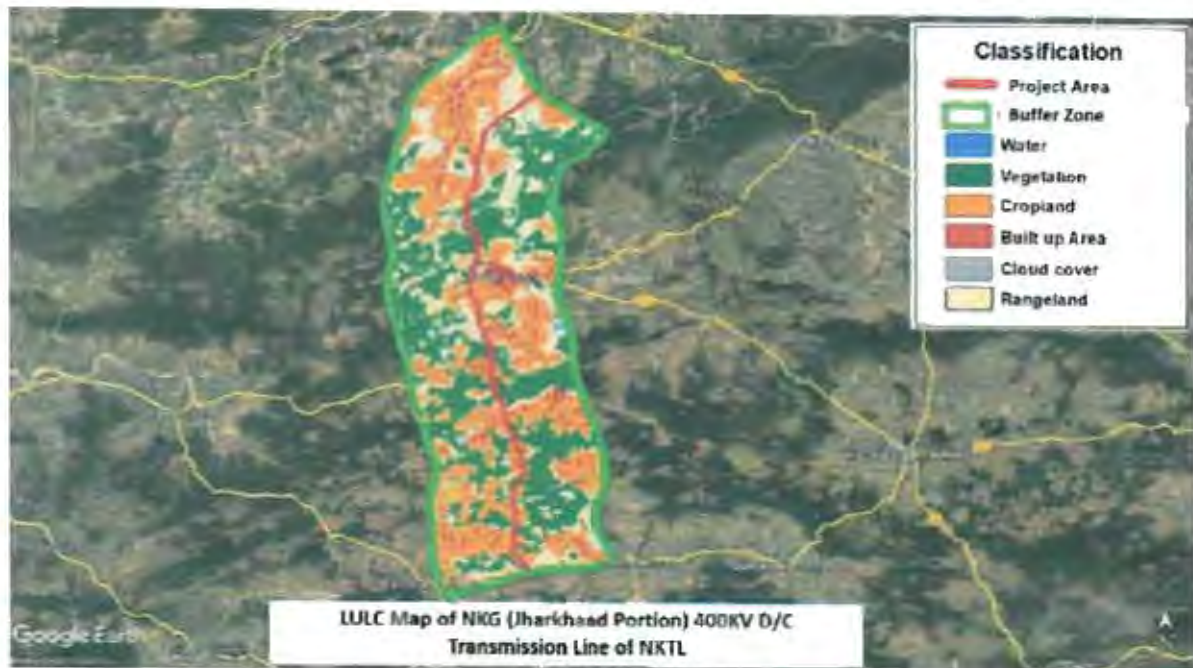
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ANNEXURE - 6.A.2

LULC MAP & DETAILS OF LAND USE PATTERN WITHIN THE STUDY AREA OF PROPOSED 400 KV (D/C) NKG TRANSMISSION LINE (JHARKHAND PORTION)

**Overall LULC Map of Study Area NKG (Jharkhand Portion) 400 KV D/C
Transmission Line of NKTL**



Ray

Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

Segment wise LULC Map of NKG (Jharkhand Portion) 400KV D/C Transmission Line of NKTL

1. Status of LULC Segment 1 (0-10 Km stretch)

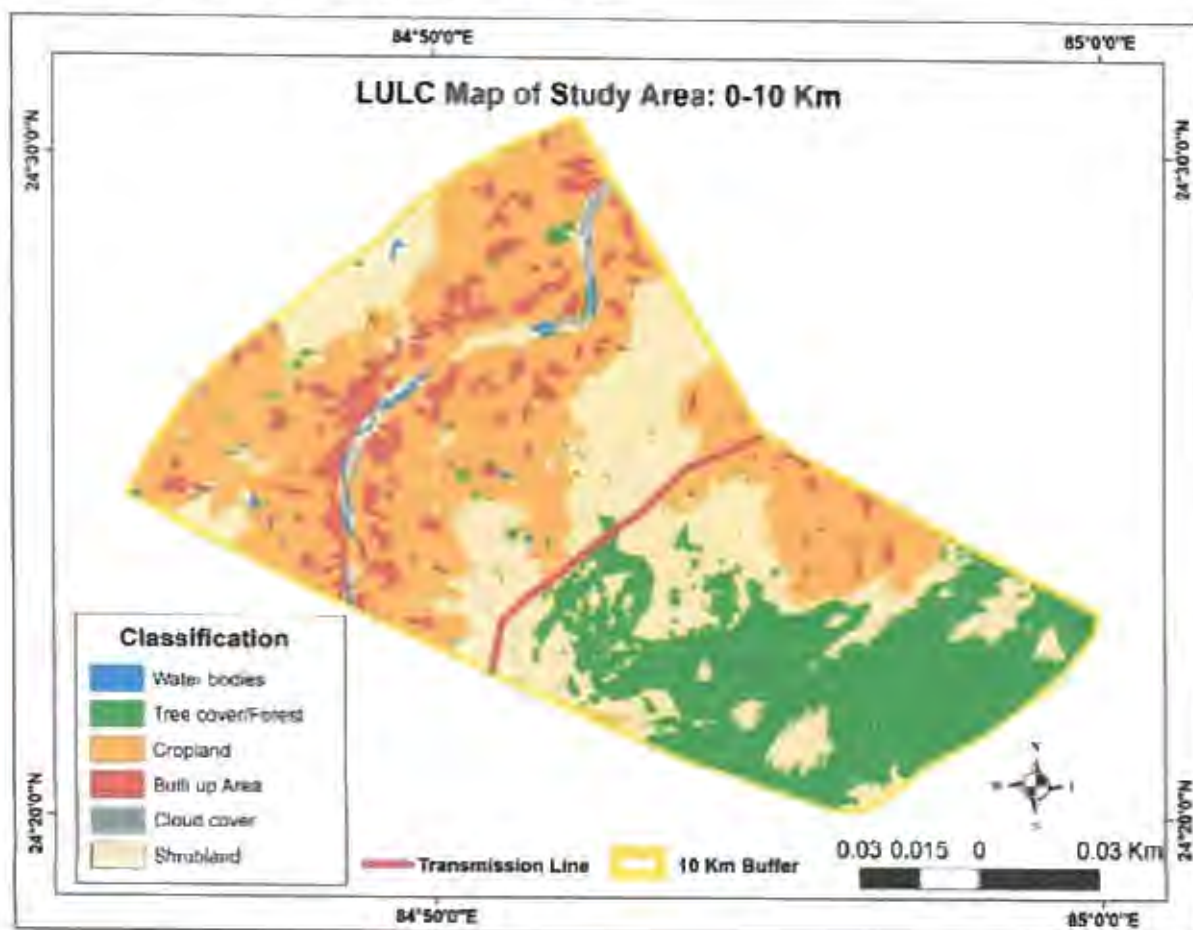


Table 1: Percentage distribution of LULC segment 1 (0-10 Km stretch)

Sr No	Land Use/Land cover	Area (Km ²)	Percentage (%)
1	Water bodies	1.32	0.56
2	Vegetation/Tree cover	51.50	23.34
3	Cropland	85.43	38.72
4	Built up Area	13.48	6.11
5	Shrub land	67.16	30.44
6	Cloud cover (Data unavailable)	1.71	0.78


 Raghvendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

2 Status of LULC segment 2 (10-20 Km stretch)

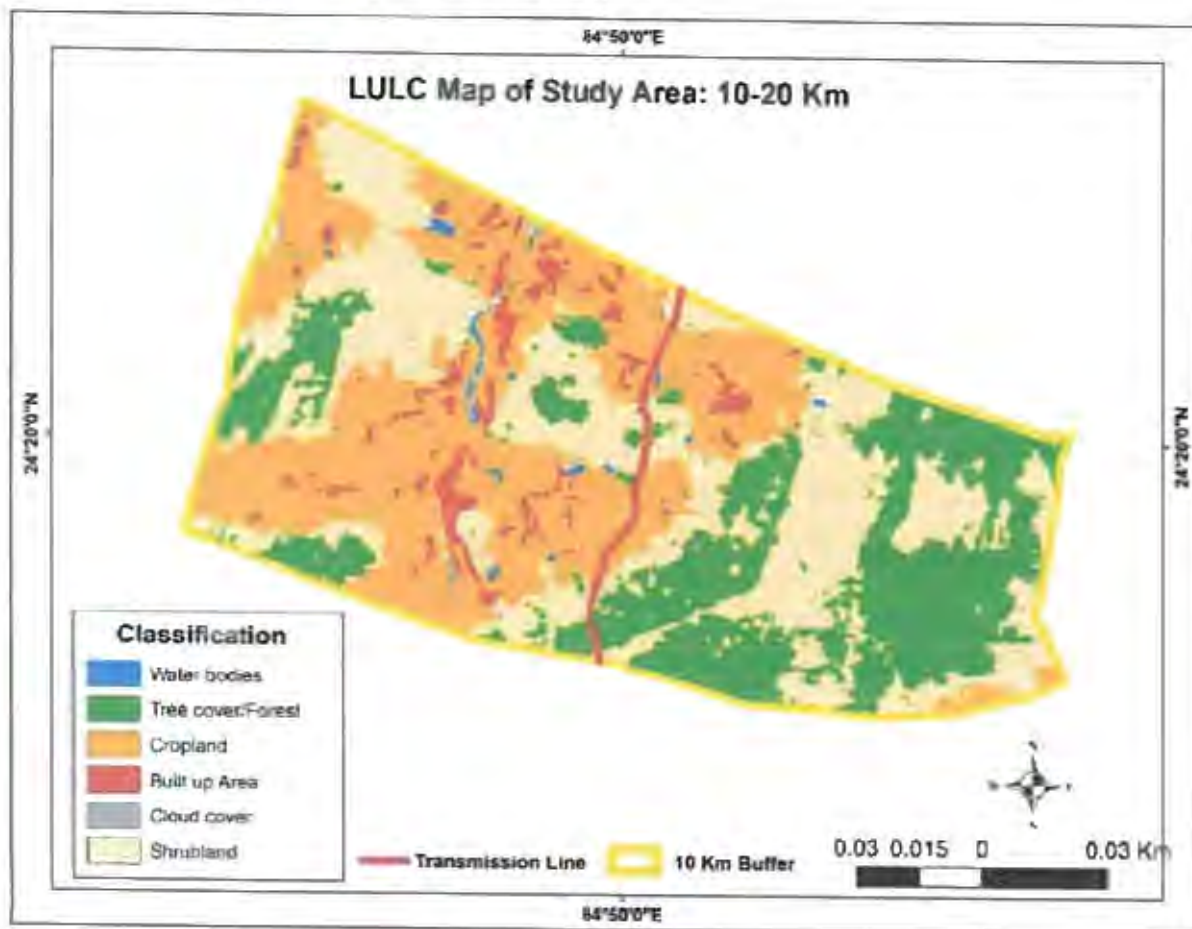


Table 2: Percentage distribution of LULC segment 2 (10-20 Km stretch)

Sr No	Land use/land cover	Area (Km ²)	Percentage (%)
1	Water bodies	1.15	0.56
2	Vegetation/Tree cover	54.89	26.65
3	Cropland	70.13	34.05
4	Built up Area	6.91	3.36
5	Shrub land	72.40	35.15
6	Cloud cover (Data unavailable)	0.49	0.24

Red
Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

3 Status of LULC segment 3 (20-30 Km stretch)

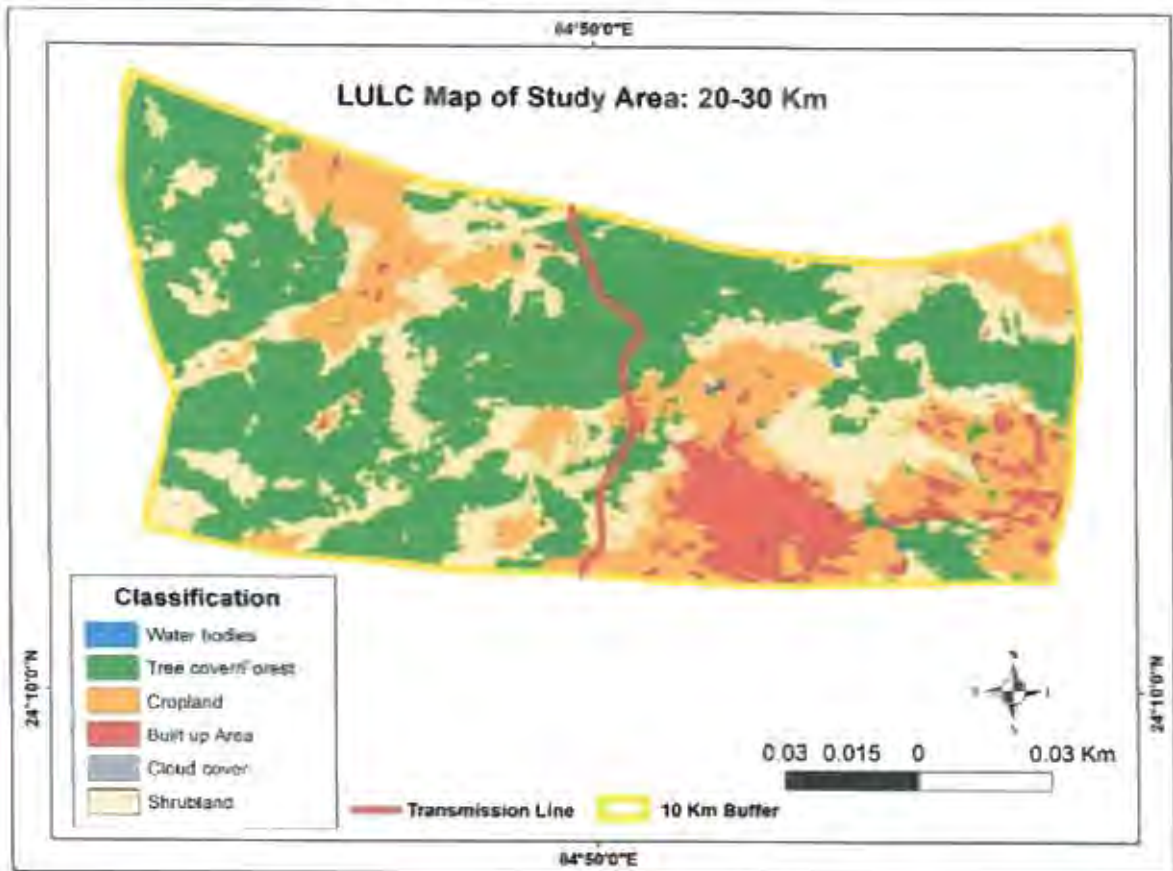


Table 3: Percentage distribution of LULC segment 3 (20-30 Km stretch)

Sr No	Land use/land cover	Area (km ²)	Percentage (%)
1	Water bodies	0.31	0.15
2	Vegetation/Tree cover	93.42	46.30
3	Cropland	38.81	19.23
4	Built up Area	13.22	6.55
5	Shrub land	55.97	27.74
6	Cloud cover (Data unavailable)	0.04	0.02

Raghyendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

4 Status of LULC segment 4 (30-40 Km stretch)

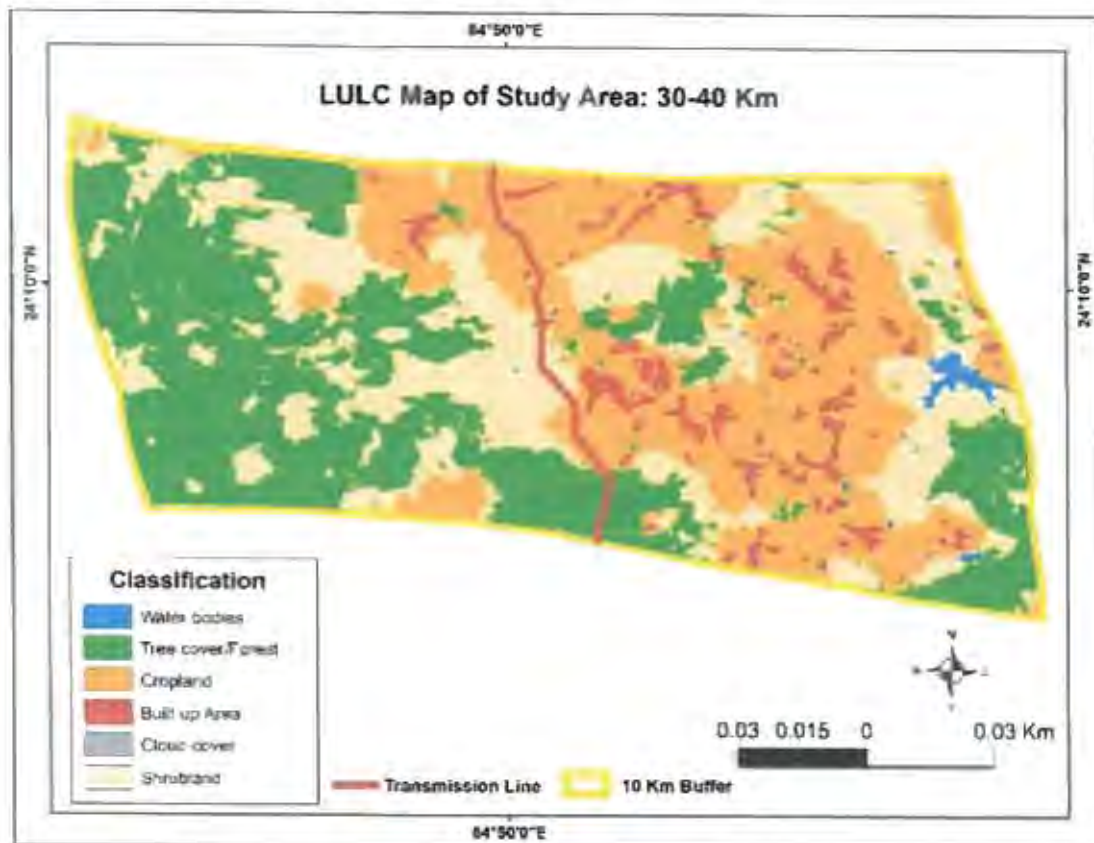


Table 4: Percentage distribution of LULC segment 4 (30-40 Km stretch)

Sr No	Land use/land cover	Area (Km ²)	Percentage (%)
1	Water bodies	1.32	0.62
2	Vegetation/Tree cover	74.44	34.92
3	Cropland	66.79	31.34
4	Built up Area	8.02	3.76
5	Shrub land	62.55	29.35
6	Cloud cover (Data unavailable)	-	-

Raghu
 Raghvendra Kumar
 Head-Projects (Site) TL
 NMTL - Hazaribagh

5 Status of LULC segment 5 (40-50 Km stretch)

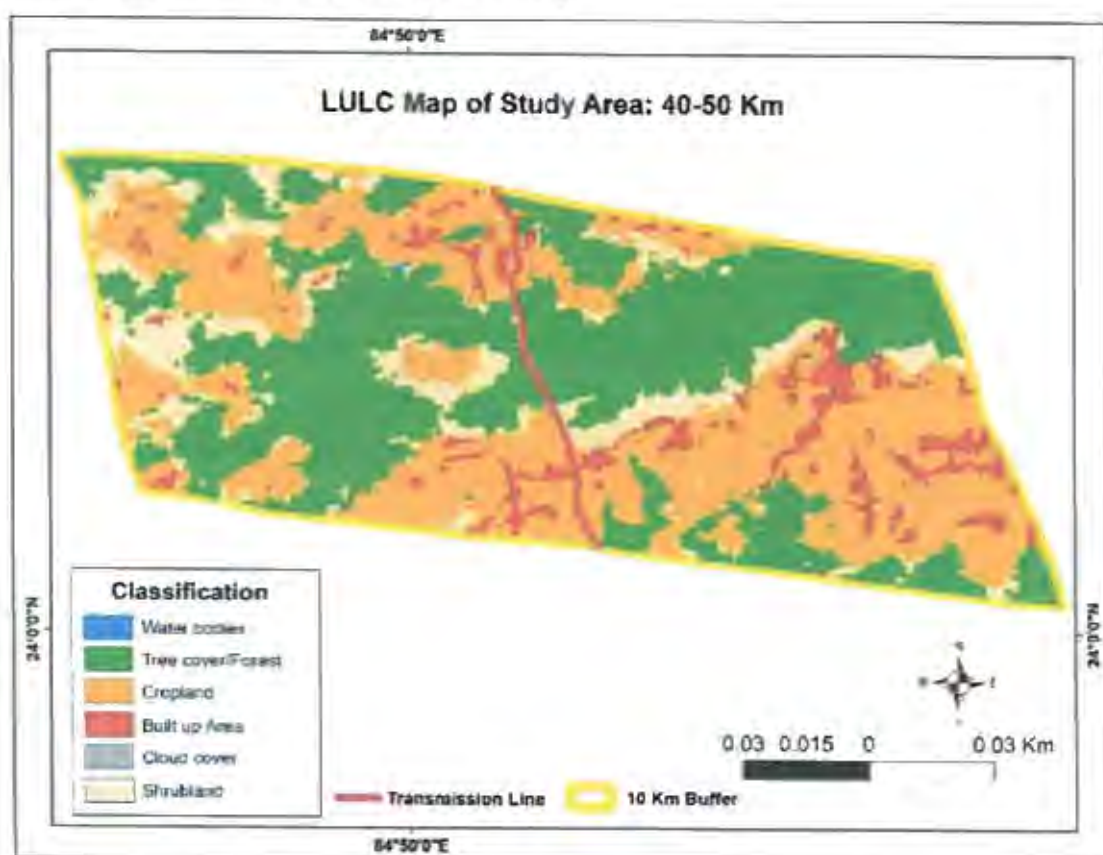


Table 5: Percentage distribution of LULC segment 5 (40-50 Km stretch)

Sr No	Land use/Land cover	Area (Km ²)	Percentage (%)
1	Water bodies	0.23	0.12
2	Vegetation/Tree cover	85.62	43.36
3	Cropland	75.14	38.05
4	Built up Area	10.24	5.19
5	Shrub land	26.20	13.27
6	Cloud cover (Data unavailable)	-	-

Raghu
 Raghyendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

7 Status of LULC segment 7 (60-69.74 Km stretch)

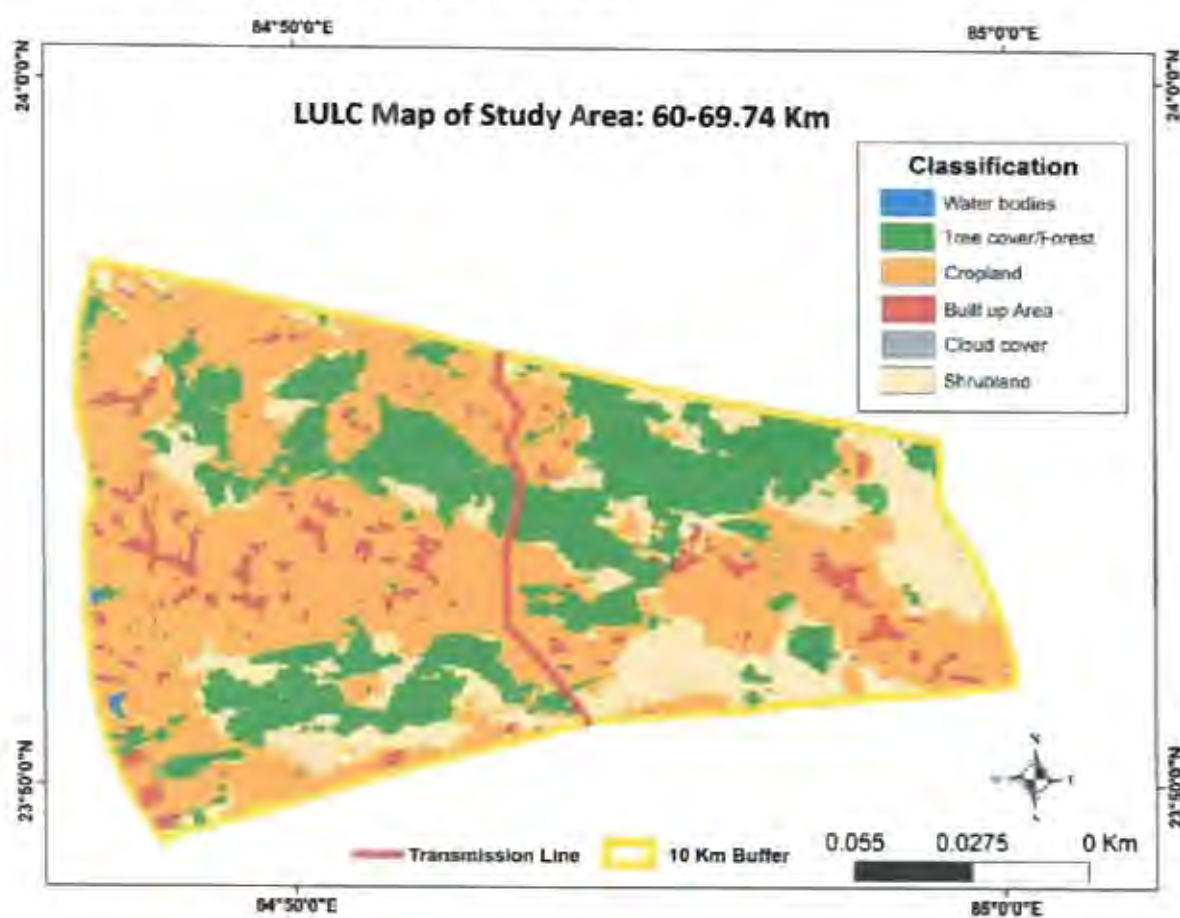


Table 7: Percentage distribution of LULC segment 7 (60-69.74 Km stretch)

Sr No	Land use/land cover	Area (Km ²)	Percentage (%)
1	Water bodies	0.51	0.23
2	Vegetation/Tree cover	57.74	26.53
3	Cropland	106.64	49.0025
4	Built up Area	8.29	3.81
5	Shrub land	44.37	20.39
6	Cloud cover (Data unavailable)	0.06	0.026

Ravi
Raghendra Kumar
Head-Projects (Site) TL
NRTI Hazaribagh

ANNEXURE - 6.C.1

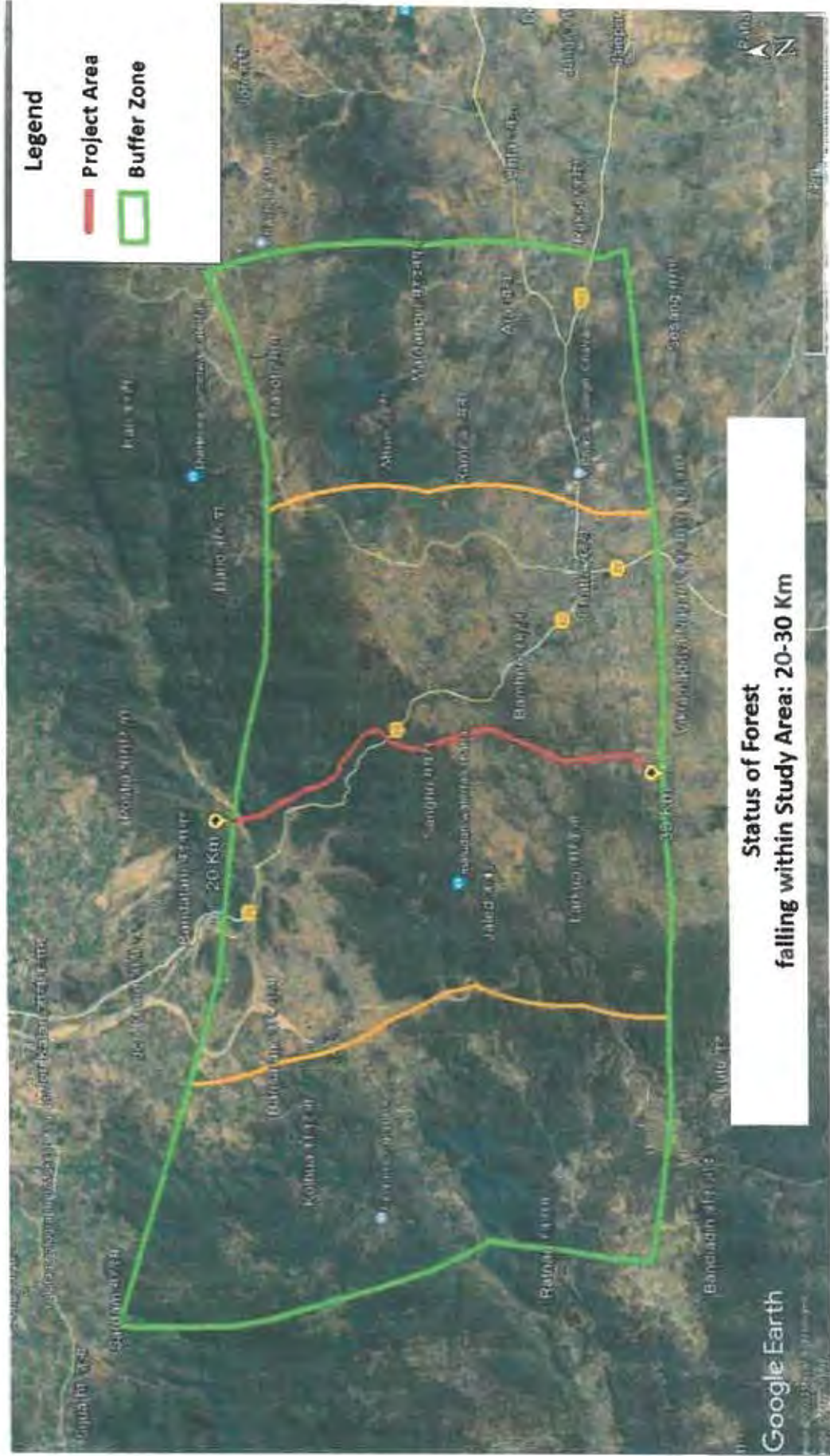
SEGMENT WISE LOCATION MAP SHOWING STUDY AREA I.E., PROJECT AREA & 10 KM BUFFER AREA OF 400 KV (D/C) NORTH KARANPURA TO GAYA TRANSMISSION LINE (JHARKHAND PORTION)



MR. Hazaribagh
Head-Projects (S&T)
Rajendra Kumar, Jr.
10/10/2010

SEGMENT WISE DETAIL VIEW OF FOREST AREA FALLING WITHIN STUDY THE AREA

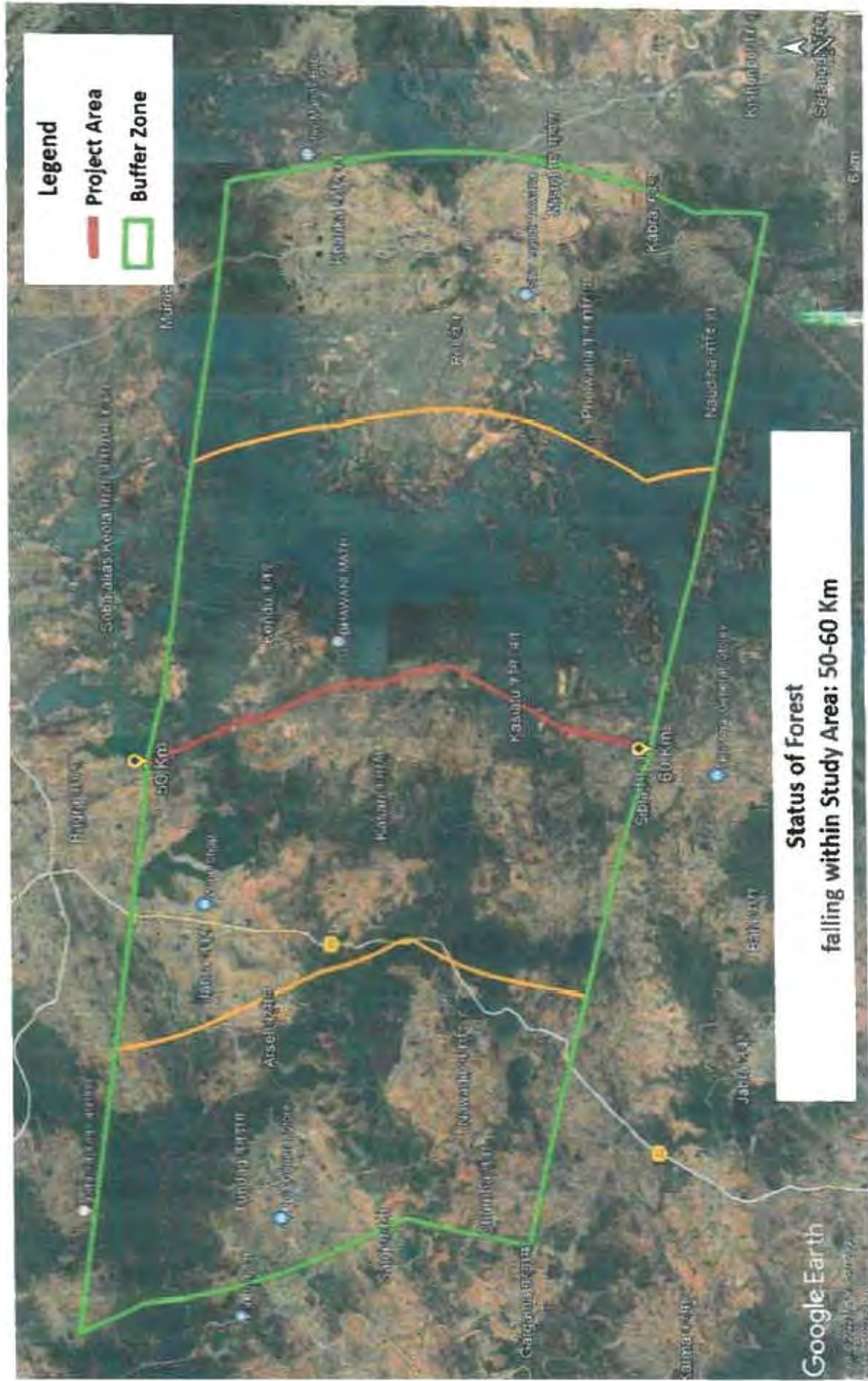




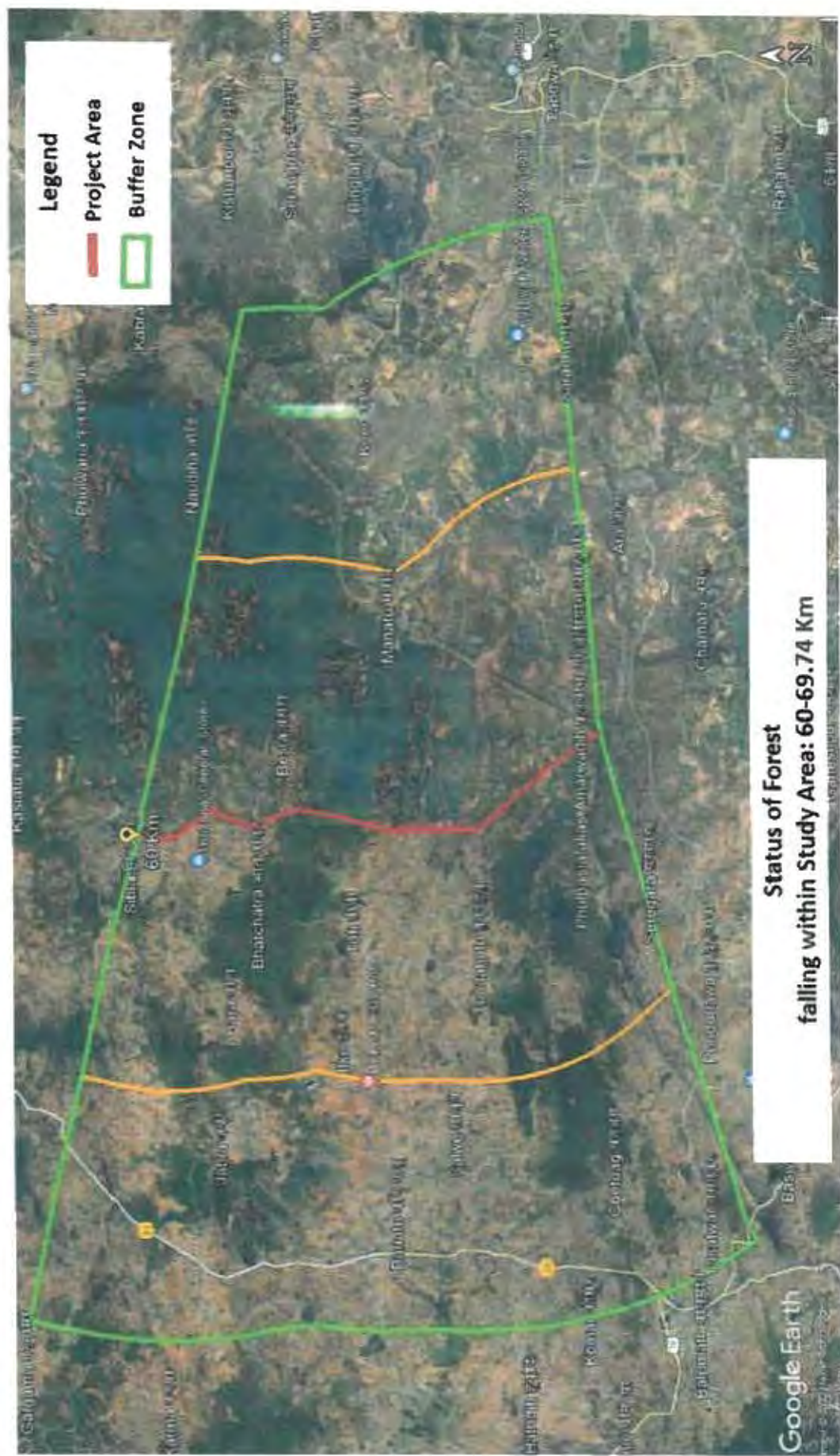
Rajendra Kumar
Head Projects (Site) TL
NKTL - Hazaribagh



Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh



Ragwendra Kumar
Ragwendra Projects (Site) TL
Head-Projects - Hazaribagh
NKTL - Hazaribagh



Ragunendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

ANNEXURE - 6.C.2

MAP SHOWING ELEPHANT CORRIDORS AND ELEPHANT CONFLICT VILLAGES IN THE BUFFER ZONE OF PROPOSED 400 KV (D/C) NORTH KARANPURA TO GAYA TRANSMISSION LINE (JHARKHAND PORTION)

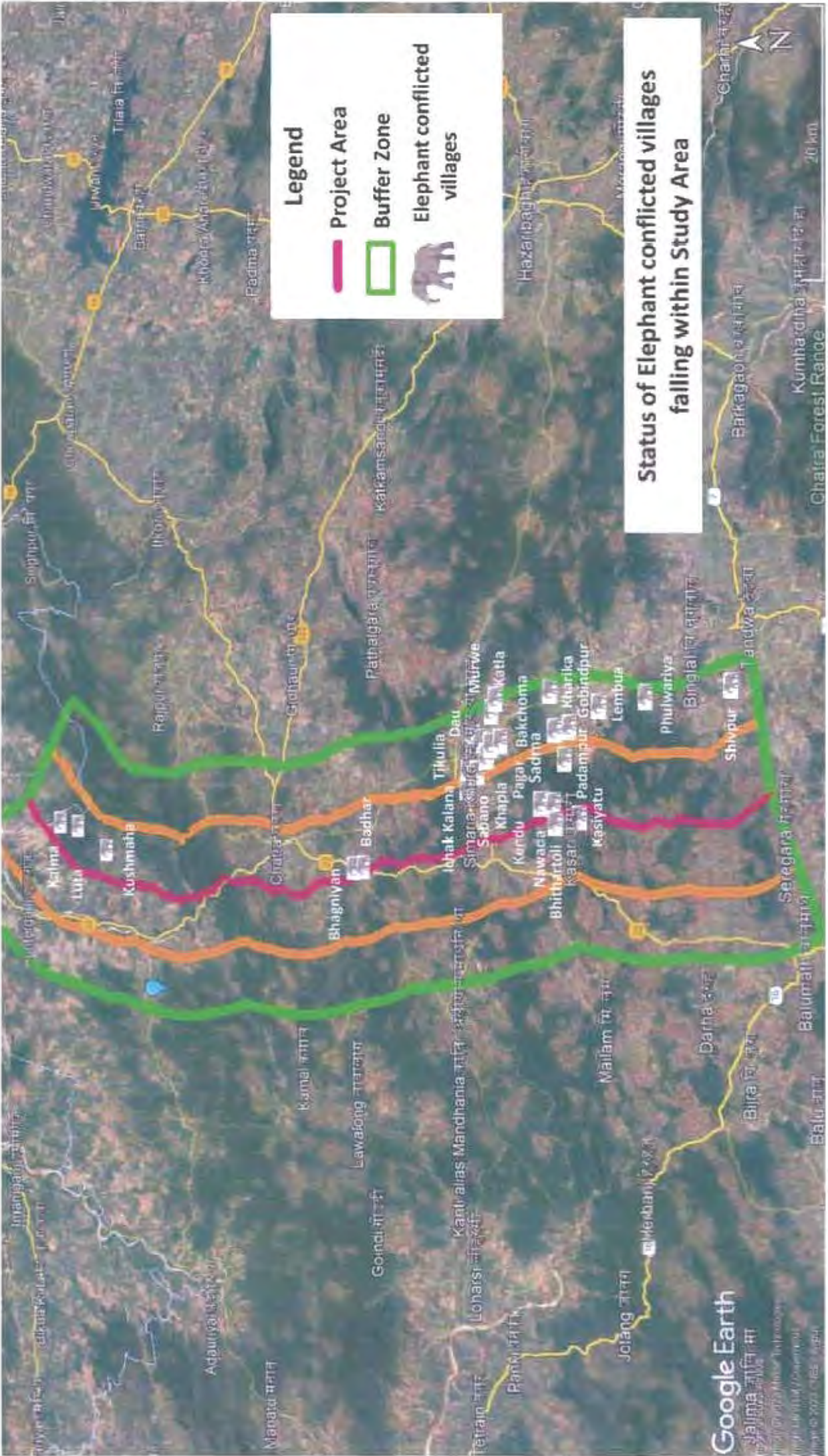
**DETAIL OF ELEPHANT CONFLICTED VILLAGES FALLING UNDER STUDY AREA OF PROPOSED
NKG(JH) TRANSMISSION LINE ALONG WITH GEO-COORDINATES**

Sr No	Village	X-Coordinate (°E)	Y-Coordinate (°N)	Nearest Tower Number	Approximate distance from transmission line
1	Hechabaliya	84.9825	23.8674	AP-22	9.1
2	Shivpur	84.977	23.9239	AP-27	9.4
3	Phulwariya	84.9722	23.9559	AP-29	8.5
4	Kharika	84.9852	23.9898	AP-33	9.34
5	Katla	84.9811	24.0287	AP-34 D	10
6	Murwe	84.9716	24.0322	AP-34 D	9.7
7	Lembua	84.9573	23.9772	AP-31	6.29
8	Gobindpur	84.9551	23.9872	AP-33	6.23
9	Padampur	84.9334	23.9816	AP-32	4.05
10	Kendu	84.8998	23.9995	AP-34 A	1.2
11	Nawada	84.8987	23.9905	AP-34	0.62
12	Bhithartoli	84.8849	23.9897	AP-34	0.8
13	Sadma	84.9486	24.0264	AP-34 C	7.25
14	Pagar	84.9462	24.0337	AP-35	7.42
15	Bakchoma	84.9497	24.0408	AP-35	7.71
16	Dau	84.9546	24.0462	AP-37	8.45
17	Khapla	84.9373	24.0371	AP-36	6.46
18	Sabano	84.9253	24.0445	AP-36	5.32
19	Tikulia	84.928	24.0512	AP-37	5.78
20	Ichak Kalan	84.9135	24.0524	AP-37	4.35
21	Kasiyatu	84.8887	23.9727	AP-31	0.78
22	Badhar	84.8522	24.1353	AP-48	0.31
23	Bhagniyar	84.8517	24.1427	AP-48	0.44
24	Kushmaha	84.8683	24.3547	AP-88	2.55
25	Luta	84.8894	24.3807	AP-90	4.02
26	Kalwa	84.8932	24.3968	AP-91	2.28

Raghu
Raghvendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

ANNEXURE - 6.D.1

**MAP SHOWING LOCATION OF
ANIMAL DEPREDATION /
DAMAGE CAUSED DUE TO MAN-
ANIMAL CONFLICT AS WELL AS
DETAILS OF MEGA WILDLIFE
MOVEMENT PROVIDED BY
RESPECTIVE FOREST DIVISIONS.**



Legend

Project Area

Buffer Zone

Elephant conflicted villages

Status of Elephant conflicted villages falling within Study Area

Digitized by Kumaon University, Nainital, Uttarakhand



— कार्यालय —

वन प्रमण्डल पदाधिकारी, लातेहार वन प्रमण्डल।

Email - dlf-latehar@gov.in

Mobile No. - 8987790240

Pin Code - 829206

पत्रांक 1144 / दिनांक 01.06.2023 /

सेवा में

चन्द्रशेखर सिंह,

सहायक प्रबंधक,

नार्थ कर्णपूरा ट्रांसको लिमिटेड राँची।

विषय :-

Diversion of 197.0115 Ha. (Chatra North- 61.772 ha., Chatra South- 119.8806 ha., & Latehar- 15.3589 ha.) forest land in favour of North Karanpura Transco Limited for construction of 400 KV D/C Transmission Line from North Karanpura (Tandwa) to Gaya Transmission Line under Chatra North, Chatra South & Latehar Forest Division in Chatra and Latehar Districts of Jharkhand. Regarding details of Wildlife spotting data.

प्रसंग -

आपका पत्रांक NKTL/NKG/2022-23/238 दिनांक 16.05.2023

महोदय,

उपर्युक्त विषयक प्रासंगिक पत्र के संबंध में सूचित करना है कि आपके द्वारा मागी गयी "Loss of Life/Property/Crops damage due to movement of Elephant, Nilgai & any Mega animal" से संबंधित विवरणी इस पत्र के साथ संलग्न कर भेजी जा रही है।

सूचनाार्थ समर्पित।

अनुलग्नक : यथोक्त।

विश्वासभाजन,

वन प्रमण्डल पदाधिकारी,
लातेहार वन प्रमण्डल।

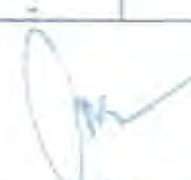
Ram
01.06.2023

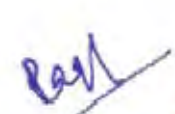
Ram
Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

**Detail of Loss due to Human-Elephant Conflict in and around the areas of
project 400 KV D/C Transmission Line from North Karanpura (Tandwa) to
Gaya**

Name of Division: Latehar Forest Division

Year	Type of Damage					
	No of Incidence					
	Crop	House	Injury	Cattle	Animal Death	Human Death
2018-19	47	10	0	6	2	1
2019-20	50	36	2	13	2	2
2020-21	423	58	1	89	13	1
2021-22	470	155	8	57	3	15
2022-23	251	183	0	132	2	4


 Divisional Forest Officer
 Latehar Forest Division


Raghvendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh



कार्यालय- वन प्रमंडल पदाधिकारी, चतरा दक्षिणी वन प्रमंडल।

वन भवन, चतरा - 825401 (झारखण्ड)

Ph. & Fax no. 06511-298011

E-mail - chatarasouth@forest.gov.in

पत्रांक- 782

दिनांक- 25/04/2023

प्रति,

श्री राघवेंद्र कुमार सिंह
सामयिक प्रशासक,
गार्ड कम्प्लेक्स टारको लिमिटेड।

विषय

Regarding Elephant Movement data समर्पित कूलने के संबंध में।

प्रमाण

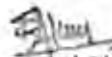
अधिका पत्रांक Ref. No. NKTL/NKG/2022-23/235 दिनांक 21.03.2023

महाराज

उपरोक्त विषयक सूचित करवा है कि आपके द्वारा विगत पीछ वर्षों में इस प्रमंडल अन्तर्गत हाथियों के आवागमन से संबंधित सूचना की मांग की गई है। विगत पीछ वर्षों तक इस प्रमंडल अन्तर्गत हाथियों द्वारा प्रभावित मौजों की सूची इस पत्र के साथ संलग्न कर भेजी जा रही है।

अंगुष्ठ-संशोभा।

विश्वासभाजन,


वन प्रमंडल पदाधिकारी,
चतरा दक्षिणी वन प्रमंडल।
24/4/23


Raghuendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

¹ 2010-2011 and 2011-2012, estimated from 2010-2011 and 2011-2012.

क्र.सं.	पंचायत का नाम	विधानसभा क्षेत्र	संसदीय क्षेत्र	संसदीय क्षेत्र का नाम
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35	...	...	...	...
36	...	...	...	...

Rag1
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

२१/०५/२०
 जन प्रमोद के. २०/५/२०
 माला रुक्मिणी के प्रमोद

CS CamScanner



कार्यालय:- वन प्रमंडल पदाधिकारी, चतरा दक्षिणी वन प्रमंडल।

वन भवन, चतरा- 825401 (झारखण्ड)

Ph. & Fax (o) - 06541- 222303

E-mail:- dfochatrasouth@gmail.com

पत्रांक 1329

दिनांक 08/06/2023

सेवा में,

Sri Chandra Shekhar Singh,
Assistant Manager Projects
North Karanpura Transco Ltd,
Ranchi.

विषय:-

Regarding details of wildlife spotting data.

प्रसंग :-

आपका पत्रांक Ref. No. NKTL/NKG/2022-23/237 दिनांक
16.05.2023

महाशय,

उपर्युक्त विषय के संदर्भ में सूचित करना है कि आपके द्वारा इस प्रमंडल के अंतर्गत सिमरिया एवं चतरा प्रक्षेत्र अंतर्गत कुल 29 गाँवों में हुई Loss of life/property Crop damage due to movement of elephant, Nilgai & any mega animal से संबंधित सूचना की मांग की गई थी। मांग की गई सूचना प्राप्त विहित प्रपत्र में तैयार कर इस पत्र के साथ संलग्न कर भेजी जा रही है।

अनु०-यथोक्त।

विश्वासभाजन,

Ran
Raghuvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

वन प्रमंडल पदाधिकारी,
चतरा दक्षिणी वन प्रमंडल।

07.06.2023



DETAIL OF WILDLIFE SPOTTING AND IMPACT IN THE BUFFER ZONE OF 400 KV D/C NORTH KARAIKUPURA-GAYA TRANSMISSION LINE (BARRHANGH PORTION) OF NKTL														
No	Forest Division/Village Name	Thana no.	Forest Block	Forest Beat	Forest Range	Forest Area in Ha.	Plant Forest in Ha.	Movement of Elephant (Y/N)	If Yes, Date/Time of Life/Property/ Crop Damage etc.	Movement of Wild/Habitat	If Yes, Date/Time of Life/Property/ Crop Damage etc.	Movement of any other animal noticed	If Yes, Date/Time of Life/Property/ Crop Damage etc.	Remarks
Chitra South Division														
		106			Sandhya	11.293	4.4217	Y	Crop- 3.31 ha (05.12.2020, 12.09.2020, 22.12.2020)	No.		No.		
	KASARI	108			Sandhya	2.476	1.2767	Y	Crop- 0.6 ha, House- 5 (12.09.2020, 05.08.2021)	No.		No.		
	HAHADA	107			Sandhya	0	4.6442	Y	Crop- 1.88 ha (12.09.2020, 30.01.2023, 02.02.2024)	No.		No.		
4	KENDU	119			Sandhya	4.231	8.0822	Y	Crop- 4.4 ha, Grain- 5.7 % House- 5	No.		No.		
5	DURDOLA	111			Sandhya	2.211	3.1556		Nil	No.		No.		
6	BAGDA	112			Sandhya	1.627	8.4325		Nil	No.		No.		
7	BELGARA	135			Sandhya	0.529	0.003	Y	Crop- 0.78 ha House- 1 (20.01.2018, 20.01.2019)	No.		No.		
8	KUTMAN	116			Sandhya	8.620	1.5651	Y	Nil	No.		No.		
9	BAKSI	118			Sandhya	8.252	1.809	Y	Nil	No.		No.		
10	LAATA	119			Sandhya	1.536	7.72	Y	Nil	No.		No.		
11	JOGADH	84			Sandhya	6.846	0.015	Y	Nil	No.		No.		
12	SHAGADH	220			Sandhya	5.777	0.104	Y	Nil	No.		No.		
13	MANATU	221			Sandhya	1.67	1.586			No.		No.		
14	BARRHANGH	218			Chitra	0.245	2.24	Y	Crop- 1 ha Grain- 40 % (05.02.2021)	No.		No.		
15	PHERENDIA	219			Chitra	0	1.4851	Y	Nil	No.		No.		
16	BHANG	217			Chitra	4.661	4.007	Y	Nil	No.		No.		
17	KORCHA	215			Chitra	1.462	0.004	Y	Nil	No.		No.		
18	GULHUTI	215			Chitra	2.04	0.004	Y	Nil	No.		No.		
19	PARBAT ALIAS BARRHANGH	219			Chitra	9.79	2.022	Y	Nil	No.		No.		
20	ANSHADH	212			Chitra	1.099	0	Y	Nil	No.		No.		

Prashantendra Kumar
Head-Projects (Site) NKTL
Hazaribagh

DETAIL OF WILDLIFE SPOTTING AND IMPACT IN THE BUFFER ZONE OF 400 KV D/C NORTH KARANPURA-GAYA TRANSMISSION LINE (HARKHAND PORTION) OF NKTL

S No	Forest Division/Vill. Name	Thana in	Forest Block	Forest Beat	Forest Range	Forest Area in Ha.	Non Forest in Ha.	Movement of Elephant noticed (Y/N)	If Yes, Date/Loss of Life/Property/Crop Damage etc.	Movement of Nilgai Horkand	If Yes, Date/Loss of Life/Property/Crop Damage etc.	Movement of any other animal noticed	If Yes, Date/Loss of Life/Property/Crop Damage etc.	Remark
21	GERA	209			Chitra	3.5526	3.91	N	No	No	No	No	No	
22	Chandrasahi	210			Chitra	1.161	0.059	N	No	No	No	No	No	
23	NARAYANA	206			Chitra	1.012	0.042	N	No	No	No	No	No	
24	KANARA	185			Chitra	2.806	1.407	N	No	No	No	No	No	
25	WORLD	184			Chitra	4.596	0.981	N	No	No	No	No	No	
26	LAKSHMI	233			Chitra	5.873	0.013	N	No	No	No	No	No	
27	LAKSHMI	371			Chitra	11.057	1.437	N	No	No	No	No	No	
28	LAKSHMI	357			Chitra	9.605	0.071	N	No	No	No	No	No	
29	WORLD	380			Chitra	7.207	0.511	N	No	No	No	No	No	
					Sub total	119.8804	61.1881							

Raghu

Raghuendra Kumar
Head-projects (Site) TL
NKTL - Hazaribagh

Divisional Engineer
Chitra South Division
11/06/2023
11/6/23

कार्यालय :- वन प्रमण्डल पदाधिकारी, चतरा उत्तरी वन प्रमण्डल।
वन भवन - चतरा (झारखण्ड) - 825401

फोन नं. 06541 296022, मोबाईल नं. 8987790214, Email : (1) dfo-chatranorth@gov.in (2) dfochatranorth@gmail.com

पत्रांक :- 1173 / दिनांक :- 15.05/2023

सेवा में,

श्री नन्दशेखर मिश्रा
सहायक प्रकाशक
नॉर्थ कर्णपुरा टारको लिमिटेड,
रांची।

विषय - Regarding Elephant Movement data समर्पित करने के संबंध में।

प्रसंग - आपका पत्रांक Ref. No.- NKTL/NKG/2022-23/235 दिनांक 21.03.2023

महोदय,

उपर्युक्त विषय के सम्बन्ध में सूचित करना है कि आपके द्वारा विगत पांच वर्षों में इस प्रमण्डल अंतर्गत हाथियों के आयागमन से संबंधित सूचना की मांग की गई है। विगत पांच वर्षों तक इस प्रमण्डल अंतर्गत हाथियों द्वारा प्रभावित मौजों की सूची निम्नवत् है -

क्रम सं०	प्रक्षेत्र का नाम	मौजा का नाम	प्रभुत्व
1	हटरगंज	अऊना, गेरुआ, कुशमाही, जबड़ा, बदोली, लुटा, कोलया, सोनपुर विगहा, बलनिया, भागैवार उर्फ रवैया।	
2	राजपुर	गडिया, आमकुंदर, करमौनी, हमराजुटा, विरलुटुदाग।	
3	प्रतापपुर	- शून्य -	
4	कुन्दा	शून्य -	

सूचनाथ प्रेषित।

100
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

विश्वप्रसाद
वन प्रमण्डल पदाधिकारी
चतरा उत्तरी वन प्रमण्डल
18/05/2023



कार्यालय :- वन प्रमण्डल पदाधिकारी, चतरा उत्तरी वन प्रमण्डल।

वन भवन - चतरा, जिला - चतरा, (झारखण्ड) - 825401

फोन नं०- 06543-296022, मोबाइल नं०- 8987790214, Email : (1) dfo-chatranorth@gov.in (2) dfochatranorth@gmail.com

पत्रांक :- 1437/ दिनांक :- 16.05/2023

सेवा में

श्री चन्द्रशेखर सिंह,
सहायक प्रबंधक,
नॉर्थ कर्णपुरा ट्रांसको लिमिटेड,
रांची।

विषय :- Regarding details of Wildlife Spotting Data के संबंध में।

प्रसंग :- आपका पत्रांक Ref No.- NKTL/NKG/2022-23/236 दिनांक 16.05.2023

महोदय,

उपर्युक्त विषयक प्रासंगिक पत्र के सम्बंध में सूचित करना है कि आपके द्वारा मागी गयी Loss of Life/Property Crops Damage due to movement of Elephant, Nilgai and any Mega Animals से संबंधित विवरणी इस पत्र के साथ संलग्न कर भेजी जा रही है।

सूचनार्थ पंक्षित।

अनु०:- यथोक्त।


Raghvendra Kumar
Head-Projects (Site) TL
Hazaribagh


वन प्रमण्डल पदाधिकारी,
चतरा उत्तरी वन प्रमण्डल
16/05/2023

Sl. No.	Year	Location	Area	Crop	Yield	Quality	Remarks	10	11	12	13	14	15
37	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
38	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
39	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
40	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
41	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
42	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
43	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
44	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
45	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
46	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
47	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
48	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
49	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
50	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
51	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
52	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
53	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
54	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
55	2016	Thiruvananthapuram	100.00	Coconut	10.00	Good		Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram

Grand Division
Divisional Forest Officer,
Chakra North Forest Division.
Soy

ANNEXURE - 6.D.2

REASONS OF HUMAN ELEPHANT CONFLICT AND PROTECTION MEASURES TO BE ADOPTED FOR MINIMIZING THE HUMAN – ELEPHANT CONFLICT AS SUGGESTED BY JHARKHAND FOREST DEPARTMENT

हाथी और मनुष्य का टकराव कारण एवं बचने के उपाय



हाथी एवं मनुष्य के बीच टकराव के कारण

1. मनुष्य की जनसंख्या में वृद्धि।
2. वन्यजीव पर्यावास का खण्डन।
3. हाथी द्वारा हानि पहुँचाए जाने के विरुद्ध प्रतिक्रिया।
4. नये आवास, रेलवे लाईन, बिजली की लाईन के कारण।
5. जल-भोजन एवं सुरक्षित पर्यावास का अभाव।



झारखण्ड सरकार

वन, पर्यावरण एवं जलवायु परिवर्तन विभाग

Raghuendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribag

प्रचार एवं प्रसार प्रमंडल, राँची

वन भवन, डोरण्डा, राँची-834002, झारखण्ड

टेलीफोन : 0651-2481674, E-mail : dfo-publicity@gov.in

हाथी एवं मनुष्य के बीच टकराव के कारण

हाथी का जीवन

हाथी जमीन पर रहने वाला सबसे बड़ा जानवर है। साधारणतः नर हाथी के दो बड़े दांत होते हैं, जबकि हथनी (मादा) के दांत बहुत ही छोटे होते हैं। हाथी के बड़े दांत को अंग्रेजी में "ट्रंक" कहते हैं। ट्रंक वाले हाथी को "ट्रंक" कहते हैं एवं बिना ट्रंक वाले नर हाथी को "मखना" कहा जाता है।

हाथी आमतौर पर 20 से 30 या इससे अधिक की संख्या में एक साथ रहते हैं। इनकी उम्र 80 वर्ष की होती है। इनकी देखने की क्षमता कम होती है लेकिन सुनने और सूंघने की क्षमता अति विकसित होती है।

हाथी भोजन एवं पानी की तलाश में एक जगह से दूसरे जगह विचरते रहते हैं। इनका मुख्य भोजन घास, पत्ते, जालियाँ, जड़ आदि हैं। एक हाथी एक दिन में करीब 270-320 कि.ग्रा. तक भोजन कर सकता है। झारखण्ड में हाथी दुमका, दलगा, पलामू, सारण्डा आदि के बने जंगलों में हमेशा देखे जाते हैं एवं प्रमण के दौरान राज्य के अनेक जिलों में देखा जा सकता है। विगत कई वर्षों से हाथी दुमका या बंगाल के क्षेत्र से निकलकर जामताड़ा, पिरबिता, धनबाद, बोकारो, टाकरीबाग एवं रामगढ़ जिलों को प्रभावित कर रहा है। साथ ही झारखण्ड के राँची, झुँडी, सिपडंगा, गुमला, लोहरादगा एवं लातेहार जिले भी इससे प्रभावित हैं। हाथी के शरीर में पत्तों की छन्नी नहीं होने के कारण शरीर को तापमान को विधिवत रखने के लिए गर्मी में ज्यादातर समय पानी में रहना पसन्द करते हैं एवं शरीर पर मिट्टी छिड़कते हैं। इसी कारण हाथी दिन में विश्राम करते हैं और रात में विचरण करते हैं।

जब तक हाथियों को रंग नहीं किया जाता है तो साधारणतः अपने रास्ते पर खाते-पीते हुए बढ़ते रहते हैं। साधारणतः यह सबरे या शाम में ही भोजन की तलाश में निकलते हैं और गर्मी पड़ने पर दिन में आराम करते हैं। नर हाथी प्रजनन (सहवास) के समय उत्तेजित हो जाता है। इस अवस्था को हाथी का "मस्त" होना कहते हैं। इस अवस्था में हाथी काफी उत्तेजित होता है, रंग करने एवं छेड़ने पर आक्रामक हो जाता है।

हाथियों की संख्या में कमी आने की मुख्य वजह सदियों से हाथी दाँत के लिए इनका शिकार एवं दाँत के दिनों में इनके पर्यावास की क्षति होना है।

हाथी एवं मनुष्य के बीच टकराव

जनसंख्या वृद्धि के कारण इनके प्राकृतिक आवास में कमी आई है। नये घर, गाँव एवं शहरों का फैलना हुआ है। रेलवे लाइन, बिजली लाइन, माइन एवं नई पक्के रास्ते बनने के कारण इनके पर्यावास का छण्डन (Habitat Fragmentation) हुआ है। इसके कारण जल, भोजन एवं सुरक्षित पर्यावास का ह्रास हुआ है। इसी के कारण हाथी प्रमण के दौरान झारखण्ड के कई शहरों एवं गाँवों में घुस आते हैं जिसके कारण इनका टकराव मनुष्यों से हो रहा है और जान-माल की क्षति हो रही है।

हाथियों से डरने के लिए क्या करें?

1. हाथी आने की सूचना तत्काल निकटवर्ती वन विभाग के कर्मचारियों को दें।
2. यदि हाथी से सामना हो जाय तो दूरतः उससे लिए रास्ता छोड़ें। पहाड़ी स्थानों में सामना होने पर डाला की ओर दौड़ें, ऊपर की ओर नहीं। सोपे न दौड़कर भाड़ें-तिरछे दौड़ें, कुछ दूर दौड़ने पर गमछा, पगड़ी, टोपी अथवा कोई वस्त्र फेंक दें, ताकि कुछ समय तक हाथी उसमें उलझा रहे और आपको सुरक्षित स्थान पर पहुँचने का मौका मिल जाय।
3. लाल मिर्च के पाउडर को जले हुए मोलिन अथवा घास में अच्छी तरह मिलाकर उसे मोटी रस्सी में लपेटें। रस्सी को धोखाड़ आवाज वाले घर के चारों ओर लपेट कर अथवा हाथी के गाँव में प्रवेश की दिशा में बाँधें। रस्सी के साथ दवेंत या क्षाम कापड़ की पट्टी भी बाँधकर लटका दें, क्योंकि हाथी इन रंगों को मासपर करते हैं। इस प्रक्रिया के 25 से 30 दिनों के अन्दर पुनः इसी रंग चढ़ाएं।
4. मिर्च लपेटे गई रस्सी को साथ-साथ घर एवं खलिहान के चारों ओर गोदवा, लकड़ी आदि का अलाव जलाकर उसमें लाल मिर्च जलावें। मिर्च की गंध से हाथी निकट नहीं आया। गोबर में भी मिर्च पाउडर डालकर उसे अच्छी तरह मिलाकर सुलाकर रखें। हाथी को आने की सूचना प्राप्त होने पर घर में आग या बाहर रात्रि में उसे जला देने से भी हाथी द्वारा नुकसान से बचा जा सकता है।
5. अगर हाथी रात में आ जाय तो प्रहारा के साथ कम से कम आठ दस लोग मिलकर दल-दल होकर डाल या लोखोटकर उसे भगाने का प्रयास करें। इस प्रक्रिया में भी हाथी को डाला नजदीक न जाएँ। हाथी प्रभावित क्षेत्रों के गाँवों में रात्रि में दल-दल कर रात को साथ पहर दें।
6. अक्षय मसाले वगैरह रंग की राखवाली करनी हो, तो पकान लोख बनाएँ, विशेषकर उर्वर क्षेत्र, जलवायु पैदा के उपर बनायें और उसके नीचे जमीन पर लकड़ी से आग लगा दें।

7. हाथी जिस जंगल में दिखे उस क्षेत्र में चारा, जलवन एकत्र करने नहीं जायें। हाथी जिन क्षेत्रों में हो उसके आस-पास के गाँवों में हाथी से घातः फाल तक अवगमन से बचें।
8. हाथी द्वारा कान खड़े कर, सूँघ ऊपर कर अवगमन देना, इस बात का संकेत है कि वह आप पर हमला करने आ रहा है। अतः तत्काल सुरक्षित स्थान पर चले जाएँ।
9. हाथियों को सूँघने की शक्ति अत्यधिक प्रबल होती है। अतः हाथी को भगाने के क्रम में हवा को दिला का ध्यान रखें।
10. वैज्ञानिक प्रयोग के आधार पर पाया गया है कि मधुमक्खियों के गुनगुनाने की आवाज हाथियों को भगाने में सहायक साबित होती है।

हाथियों से डरने के लिए क्या न करें?

1. हाथी को चारों ओर कौतुहलवश घोंड़ न लगायें। हाथियों को चलने-दौड़ने की गति 30 से 40 किलोमीटर प्रति घंटे हो सकती है। अतः हाथी से कम से कम 200 मीटर की दूरी बनाये रखें। बच्चों, स्त्रियों एवं बुढ़ों को कभी भी हाथी के समक्ष नहीं जाने दें।
2. हाथियों को छेड़ें नहीं, विशेषकर उन पर पत्थर, डोर, जलता हुआ तयार या मसाला आदि फेंककर प्रहार न करें। पटाखों आदि के प्रयोग से हाथियों को गुस्सा आ सकता है एवं इससे क्षति की संभावना बढ़ सकती है अतः इसके प्रयोग से बचें।
3. हाथियों को अनाज अथवा अन्य कोई खाद्य सामग्री न दें, क्योंकि इससे उनकी खाद्य सामग्री के प्रति रुचि बढ़ेगी एवं इस कारण वे मकानों को तोड़कर खाद्य सामग्री प्राप्त करने का प्रयास कर सकते हैं। हाथी प्रभावित क्षेत्र में जिस कमरे में अनाज का भण्डारण हो उसमें न सोयें एवं कुछ दिनों के लिए किसी सुरक्षित जगह पर अनाज को रख दें।
4. क्षेत्र में जबतक हाथी रहे, तबतक हड़िया या देशी शराब (महुआ) नहीं बनायें। इसका पट्टारण भी न करें। हाथी शराब की ओर आकर्षित होते हैं और प्राप्त करने के उद्देश्य से ये घरों को क्षति पहुँचाते हैं।
5. गर्भवती हथनी अथवा नवजात शिशु के साथ होने पर हथनी या उसके जूँट को भगाने का प्रयास न करें, उसे धोड़ा समय दें।
6. हाथियों को भगाने के क्रम में श्वेत वस्त्र या लाल वस्त्र का प्रयोग नहीं करना चाहिए। यह रंग उन्हें चिढ़ा-बिढ़ा करता है।
7. हाथी को देखकर पूजा या प्रणाम करने के उद्देश्य से उनके नजदीक न जायें।

संरक्षण

वन्यप्राणी (संरक्षण) अधिनियम, 1972 के तहत अनुसूची-1 में हाथी को संरक्षण प्राप्त है। इसे किसी तरह का नुकसान पहुँचाना कानून बुरा है। झारखण्ड में राजकीय पशु के रूप में सम्मान प्राप्त है। इनकी रक्षा एवं संरक्षण करना हमारा कर्तव्य है। हाथियों में भी भावना होती है एवं काफी संवेदनशील होते हैं। हाथी मनुष्य द्वारा उत्तेजित करने पर चिढ़-चिढ़ा एवं क्रोधित हो उठते हैं एवं आक्रमण कर बैठते हैं। अतः हमें इनकी भावनाओं का ध्यान रखकर इनके संरक्षण में सहयोग करना है। हाथियों के टकराव से बचने के लिए हमें क्या करना और क्या नहीं करना चाहिए, की जानकारी अतिआवश्यक है। सावधानीपूर्वक इन बातों का पालन करने से हाथियों से टकराव की संभावना घटायी जा सकती है।

हाथियों को जीने एवं रहने का अधिकार है। यदि गाँव में हाथी आने की सूचना हो तो तत्काल वन विभाग को सूचित करें, घरों की बत्ती जला दें, घर में रहे अथवा सुरक्षित जगहों पर चले जाएँ एवं हाथियों को खाने से गुजरने की प्रतीक्षा करें, शांत रहें, छोड़-शरका न करें।

हाथियों एवं मनुष्य के टकराव की स्थिति घटने जनि है। उनका संस्ते के जंगल और पर्यावास को हमने कम किया है, इससे टकराव की स्थिति उत्पन्न हो रही है। हाथी झारखण्ड का राजकीय पशु है। उनका पर्यावास सौजन्य और संरक्षण देना हमारा पुनर् कर्तव्य है। हाथियों को भी जीने और रहने का अधिकार प्राप्त है, अतः हाथियों को संरक्षण देने में आपका सहयोग अपेक्षित है।

हाथियों से जान-माल की नुकसान की भरपाई वन एवं पर्यावरण विभाग, झारखण्ड सरकार द्वारा करने का प्रावधान है। किसी भी तरह के नुकसान की भरपाई के लिए नजदीकी वन विभाग के अधिकारी से संपर्क करें।

वन, पर्यावरण एवं जलवायु परिवर्तन विभाग

प्रचार एवं प्रसार प्रमंडल, राँची

ANNEXURE - 6.E.1

LIST OF FLORAL & FAUNAL SPECIES FOUND IN LATEHAR FOREST DIVISION.

LIST OF PLANT SPECIES IN NEPALI HAZAR DIVISION

SYNOPSIS OF SPECIES

S.N.	Name of Species Botanical Name	Name of Family	Vernacular Name	Flowering & Fruit Time
1	<i>Acacia arabica</i>	Mimosaceae	Babul	June-July
2	<i>Acacia catechu</i>	Mimosaceae	Khar	Sept-Jan
3	<i>Adina cordifolia</i>	Rubiaceae	Katam	June-July
4	<i>Azadirachta indica</i>	Melastomaceae	Neem	Mar-July
5	<i>Albizia excelsa</i>	Mimosaceae	Bel	May-June
6	<i>Albizia leucodermis</i>	Mimosaceae	Ghorakser	Jan-May
7	<i>Albizia lebbekii</i>	Mimosaceae	Akela Dhele	March-July
8	<i>Albizia procera</i>	Mimosaceae	Sun	March-July
9	<i>Amorpha reticulata</i>	Amorphaeae	Safed Sun	Apr-May
10	<i>Amorpha waimosa</i>	Amorphaeae	Vanta	Sept-Jan
11	<i>Amorpha latifolia</i>	Amorphaeae	Sarila	March-May
12	<i>Anthocephalus cadamba</i>	Rubiaceae	Dhamu	Jan-March
13	<i>Artocarpus lakucha</i>	Moraceae	Kadamba	May-July
14	<i>Azadirachta indica</i>	Melastomaceae	Barhan Dahan	Jan-May
15	<i>Bauhinia purpuria</i>	Leguminosaeae	Neem	Mar-July
16	<i>Bauhinia retusa</i>	Leguminosaeae	Kumar	Sept-Jan
17	<i>Bauhinia variegata</i>	Leguminosaeae	Kashmiri	Sept-May
18	<i>Bombax ceiba</i>	Moraceae	Serai	Jan-May
19	<i>Bougainvillea serrata</i>	Perseaaceae	Sala	Jan-May
20	<i>Bridellia montana</i>	Euphorbiaceae	Khar	Apr-May
21	<i>Bridellia retusa</i>	Euphorbiaceae	Kaj	Apr-May & July
22	<i>Broussonetia papyrifera</i>	Moraceae	Jamun (Sahun)	March-July
23	<i>Clusia indica</i>	Anacardiaceae	Pir	Jan-May
24	<i>Ficus moneima</i>	Leguminosaeae	Palas	Jan-April
25	<i>Ficus religiosa</i>	Leguminosaeae	Kumbhi	March-July
26	<i>Gossypium hirsutum</i>	Leguminosaeae	Amaltas	10 May-Aug
27	<i>Gliricidia sepium</i>	Leguminosaeae	Bharat	March-July
28	<i>Cochlospermum</i>	Cochlospermaceae	Gadad	Jan-May
29	<i>Cordia alliodora</i>	Simarubaceae	Laser	Mar-July
30	<i>Cordia alliodora</i>	Simarubaceae	Simsam	Mar-July
31	<i>Cordia alliodora</i>	Simarubaceae	Kend	Apr-July
32	<i>Cordia alliodora</i>	Simarubaceae	Amala	Mar-July
33	<i>Cordia alliodora</i>	Simarubaceae	Farhad	Mar-July
34	<i>Cordia alliodora</i>	Simarubaceae	Barad	Dec-March
35	<i>Cordia alliodora</i>	Simarubaceae	Pakar	Dec-April
36	<i>Cordia alliodora</i>	Simarubaceae	Gulm	Mar-July
37	<i>Cordia alliodora</i>	Simarubaceae	Prepal	Mar-July
38	<i>Cordia alliodora</i>	Simarubaceae	Kekar	Mar-Aug
39	<i>Cordia alliodora</i>	Simarubaceae	Gambur	Mar-June
40	<i>Cordia alliodora</i>	Simarubaceae	Chubila	Apr-May
41	<i>Cordia alliodora</i>	Simarubaceae	Charkund	Aug-Sep
42	<i>Cordia alliodora</i>	Simarubaceae	Gizan	Mar-June
43	<i>Cordia alliodora</i>	Simarubaceae	Mahua	Mar-May

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14	<i>Albizia phillyrifolia</i>	Leguminosae	Ragi	Mar
15	<i>Mangifera indica</i>	Anacardiaceae	Aam	Feb-Mar
16	<i>Melia azadirachta</i>	Meliaceae	Bakain	Mar-Apr
17	<i>Shorea robusta</i>	Rubiaceae	Chai Katam	Mar-Jun
18	<i>Chloranthus arboreus</i>	Oleaceae	Haronghar	Mar-Apr
19	<i>Apocynum indicum</i>	Apocynaceae	Sotai (Akhali)	Jul-Aug
20	<i>Pyrethra cuneata</i>	Papilionaceae	Sindhan	Mar-Apr
21	<i>Persea indica</i>	Simarubaceae	Kathi	Mar-Apr
22	<i>Pterocarpus indicus</i>	Leguminosae	Paran	Mar-Apr
23	<i>Schleichera oleosa</i>	Sapotaceae	Man-Mun	Mar-Apr
24	<i>Persea indica</i>	Anacardiaceae	Kumam	Mar-Apr
25	<i>Khaya robusta</i>	Dioscoreaceae	Bhelwa	Mar-Apr
26	<i>Solanum elaeagnifolium</i>	Meliaceae	Ridhan	Mar-Apr
27	<i>Stemodia indica</i>	Stemodiaceae	Kumbhi	Mar-Apr
28	<i>Sesuvium portulacastrum</i>	Myrtaceae	Jamun	Apr-May
29	<i>Tamarindus indica</i>	Caesalpiniaceae	Imli	Apr-May
30	<i>Terminalia</i>	Combretaceae	Ayam	Apr-May
31	<i>Terminalia alata</i>	Combretaceae	Argun	Apr-May
32	<i>Terminalia bellerica</i>	Combretaceae	Bahera	Apr-May
33	<i>Terminalia chebula</i>	Combretaceae	Harre	Apr-May
34	<i>Ziziphus maurandia</i>	Rhamnaceae	Ber	Apr-May

HERBACEOUS PLANTS

S.N.	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Flowering Time
1	2	1	4	
1	<i>Adiantum indicum</i>	Malvaceae	Kanzu	Mar-Apr
2	<i>Adiantum versicolor</i>	Acanthaceae	Vataka	Mar-Apr
3	<i>Barleria pruriens</i>	Avicenniaceae	Kassa	Mar-Apr
4	<i>Calotropis paniculata</i>	Asclepiadaceae	Malkajiri	Apr-Jun
5	<i>Calotropis gigantea</i>	Verbenaceae	Arusha	Apr-Jun
6	<i>Calotropis gigantea</i>	Asclepiadaceae	Madaraka	Apr-Jun
7	<i>Calotropis</i>	Asclepiadaceae	Alawan	Apr-Jun
8	<i>Centropogon</i>	Asclepiadaceae	Kanambha	Apr-Jun
9	<i>Centropogon</i>	Asclepiadaceae	Churhu	Apr-Jun
10	<i>Centropogon</i>	Asclepiadaceae	Kasambha	Apr-Jun
11	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
12	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
13	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
14	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
15	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
16	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
17	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
18	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
19	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
20	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
21	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
22	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
23	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
24	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
25	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
26	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
27	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
28	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
29	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun
30	<i>Centropogon</i>	Verbenaceae	Bhambha	Apr-Jun

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25	<i>Lantana multiflora</i>	Oleaceae	Morva	Whole Year
26	<i>Lantana camara</i>	Verbenaceae	Potus	Whole Year
27	<i>Mimosa pudica</i>	Leguminosae	Tarvanti	Whole Year
28	<i>Rancho distictum</i>	Rubiaceae	Mainphal	
29	<i>Ravichinia serpentina</i>	Apocynaceae	Sarimandha	June-Dec
30	<i>Sida acuta</i>	Malvaceae	Kunzi/Baryari	July
31	<i>Sida cordifolia</i>	Malvaceae	Kunzi/Baryari	June-July
32	<i>Sida excoecoides</i>	Lythraceae	Prasadhari	June-July
33	<i>Siphocampylus aurea</i>	Labiatae	Sarphosaka	Whole Year
34	<i>Chenopodium lampas</i>	Malvaceae	Ingli Bhadi	Aug-Dec
			Van Kary	
35	<i>Vitex amara</i>	Verbenaceae	Sindhi	Jan-July
36	<i>Vitex pedunculata</i>	Verbenaceae	Nagbel	May-Sept
37	<i>Williamia sompita</i>	Solanaceae	Ashwamandha	June-July
38	<i>Wrothmannia fructuosa</i>	Lythraceae	Dhavar	January

DESCRIPTION OF SPECIES Herbs

S.N	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Flowering & Fruit Time
1	1	2	3	4
1	<i>Achyranthes bederata</i>	Amaranthaceae	Bankhal	Sept-Dec
2	<i>Achyranthes aspera</i>	Amaranthaceae	Chuchiri	Jan-Lan
3	<i>Azadirachta indica</i>	Asteraceae	Uchuanti	March-June
4	<i>Amaranthus arvensis</i>	Peromylaceae	Jankari	Dec-March
5	<i>Ambrosia artemisiifolia</i>	Asteraceae	Kalmegh	May-Me
6	<i>Artemisia mexicana</i>	Parvaceae	Bharband	Jan-June
7	<i>Arisaema tortuosum</i>	Araceae	Tara-Jodra	June-Nov
8	<i>Arisaema latifolia</i>	Asteraceae		Oct-Feb
9	<i>Bacopa monnieri</i>	Scrophulariaceae	Brainli	June-Dec
10	<i>Banisteria herbacea</i>	Sterculiaceae	Kambra	June-Dec
11	<i>Cassia tora</i>	Cesalpiniaceae	Chakora	Sept-Dec
12	<i>Commelina astata</i>	Lythraceae	Ben-sol	Whole Year
13	<i>Centraia herbacea</i>	Compositae	Sourav	Jan-March
14	<i>Centraia herbacea</i>			
15	<i>Chlorophytum</i>	Liliaceae	Safed Mirdi	Nov-Feb
16	<i>Chlorophytum</i>			
17	<i>Chlorophytum</i>	Clemnaceae	Sweet harturt	July-Dec
18	<i>Chlorophytum</i>	Clemnaceae	Harhara	Jan-June
19	<i>Chlorophytum</i>	Liliaceae	Litapat	Nov-Dec
20	<i>Cochlosanthus aestivum</i>	Liliaceae	Koskumbari	Aug-Oct
21	<i>Cochlosanthus capsularis</i>	Liliaceae	Ken	Aug-Dec
22	<i>Cordia alliodora</i>	Umbelliferae	Mushali	May-Aug
23	<i>Cordia alliodora</i>	Umbelliferae	Amabaldi	July-Sept
24	<i>Cordia alliodora</i>	Umbelliferae	Tikar	
25	<i>Datura stramonium</i>	Solanaceae	Datura(Back)	Sept-Dec
26	<i>Datura stramonium</i>	Umbelliferae	Kanadhar	Feb-July
27	<i>Datura stramonium</i>	Asteraceae	Gokto	May-Nov
28	<i>Datura stramonium</i>	Asteraceae	Bhindi	Aug-Jan
29	<i>Datura stramonium</i>	Asteraceae	Babri	Aug-Jan
30	<i>Datura stramonium</i>	Compositae	Samdulan	Sept-Dec
31	<i>Datura stramonium</i>	Umbelliferae	Dandi	Whole Year

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1	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
2	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
3	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
4	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
5	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
6	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
7	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
8	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
9	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
10	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
11	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
12	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
13	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
14	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
15	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
16	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
17	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
18	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
19	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
20	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
21	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
22	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
23	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
24	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
25	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
26	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
27	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
28	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
29	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
30	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
31	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
32	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	
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100	<i>Convolvulaceae</i>	<i>Convolvulaceae</i>	<i>Prasanna</i>	

(ii) NATURE OF SPECIES

1	2	3	4	5
Name of Species	Name of Family	Vernacular Name	Flowering & Fading Time	
(Botanical Name)				
<i>Adiantum species</i>	Mimosaceae	Ara	June-Dec.	
<i>Ampelocera species</i>	Vitaceae	Pambel	Jul.-Nov.	
<i>Ampelocera species</i>	Vitaceae	Gheralidi	July-Nov.	
<i>Ampelocera species</i>	Vitaceae	Satawat	Aug-Jan.	
<i>Bauhinia species</i>	Leguminosae	Mahinai	April-June	
<i>Cassia species</i>	Vitaceae	Hariet	Aug-Dec.	
<i>Cassia species</i>	Mimospermiaceae	Jamitkibel	Nov-April	
<i>Cassia species</i>	Dioscoreaceae	Rulali	Aug-Sept.	
<i>Cassia species</i>	Dioscoreaceae	Hanyang	Sept-March	
<i>Cassia species</i>	Dioscoreaceae	Yamichinespotatol	Aug-March	
<i>Cassia species</i>	Dioscoreaceae	Hhisai, Kang-Ahi	Sept-Dec.	
<i>Cassia species</i>	Vitaceae	Karihar	July-Nov.	
<i>Cassia species</i>	Rhamnaceae	Minion	Jan-May	
<i>Cassia species</i>	Asclepiadaceae	Omnia	Aug-March	
<i>Cassia species</i>	Rubiaceae	Gandhibel	Aug-Dec.	
<i>Cassia species</i>	Convolvulaceae	Panditnari	Oct-Jan.	
<i>Cassia species</i>	Verbenaceae	Bharani	May-July	
<i>Cassia species</i>	Leguminosae	Siali	Feb-May	
<i>Cassia species</i>	Vitaceae	Ramdanai	May-June	
<i>Cassia species</i>	Vitaceae	Kamarka	Nov-April	
<i>Cassia species</i>	Asclepiadaceae	Akandi	May-June	
<i>Cassia species</i>	Asclepiadaceae	Kengul	July-Nov.	
<i>Cassia species</i>	Rhamnaceae	Bongasapoti	Feb-April	

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LIST OF SYNOVAI (OR) TAMIL ANIMALS

CO-MAMMALS

No.	Name of animal	Zoological name
1	Antelope, long horned	<i>Tetracerus quadricornis</i>
2	Bab. or Hares or Wild	<i>Lepus or capensis</i>
3	Bat, Long-eared	<i>Rhinopterus leschenaulti</i>
4	Bat, Indian Flying	<i>Pteropus giganteus</i>
5	Bat, Short-nosed Long	<i>C. neohyem. long.</i>
6	Bear, Sloth	<i>Melursus ursina</i>
7	Bear, Indian out cast	<i>Ursus</i>
8	Beaver, Indian Wild	<i>Sus scrofa</i>
9	Cat, Jungle	<i>Felis chaus</i>
10	Civet, Common Pale	<i>Paradoxurus hermaphrodite</i>
11	Civet, Small India	<i>Viverricula indica</i>
12	Deer, Barasing or Sambar	<i>Motilans Motilans</i>
13	Deer, Mosaic or Indian Chrysomel	<i>Tragulus membra</i>
14	Deer, Spotted or Chital	<i>Axis axis</i>
15	Elephant	<i>Elephas Maximus</i>
16	Fox, Indian	<i>Vulpes bengalensis</i>
17	Gerbil, India	<i>Latera indica</i>
18	Hare, Indian	<i>Lepus nilgiriensis</i>
19	Hog, Striped	<i>Hyena bengalensis</i>
20	Jackal	<i>Canis aureus</i>
21	Jackal, common	<i>Presbytis entellus</i>
22	Leopard or Panther	<i>Panther pardus</i>
23	Macaque, Rhesus	<i>Macaca mulatta</i>
24	Man, House, Common	<i>Homo sapiens</i>
25	Man, House Small Indian	<i>Homo sapiens</i>
26	Mouse, Indian Field	<i>Mus mus</i>
27	Mouse, Long-tailed Grey	<i>Uromys</i>
28	Nat, or Blue Bull	<i>Bos indicus</i>
29	Panther, Indian	<i>Manis crassicaudata</i>
30	Porcupine, Indian	<i>Hystrix indica</i>
31	Rat, Bandicoot	<i>Randicota indica</i>
32	Rat, Indian Bush	<i>Cochindia</i>
33	Rat, Indian	<i>Cervus unicolor</i>
34	Sambar, Three-striped Palm	<i>Sambar</i>
35	Sambar, Three-striped Palm	<i>Sambar</i>

REPTILES

SNAKES

No.	Name of animal	Zoological name
1	Snake, Red sand	<i>Eryx johnii</i>
2	Snake, Indian	<i>Naja naja</i>
3	Snake, Common	<i>Ophiophagus Huttoni</i>
4	Snake, Indian	<i>Rumiculus caudatus</i>
5	Snake, Indian	<i>Rumiculus caudatus</i>

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2	P. Bhon (Bhag)	P. Bhon (Bhag)
3	Nagda (Bhag)	Nagda (Bhag)
4	Nagda (Bhag)	Nagda (Bhag)

Part 1/2/3/4/5

S.N.	Name of animal	Name of animal
1	Chambers	Chambers
2	Chambers	Chambers
3	Chambers	Chambers
4	Chambers	Chambers

Part 1/2/3/4/5

S.N.	Name of animal	Name of animal
1	Chambers	Chambers
2	Chambers	Chambers
3	Chambers	Chambers
4	Chambers	Chambers
5	Chambers	Chambers
6	Chambers	Chambers

Part 1/2/3/4/5

S.N.	Name of animal	Name of animal
1	Chambers	Chambers
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ANNEXURE - 6.E.2

LIST OF FLORAL & FAUNAL SPECIES FOUND IN CHATRA SOUTH FOREST DIVISION.

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Government of Jharkhand

GLOSSARY OF BOTNICAL
AND LOCAL NAME OF PLANTS FOUND IN CHATRA SOUTH FOREST DIVISION

Sl. No.	BOTNICAL NAME	LOCAL NAME
1	TREES:	
1	<i>Acacia arabica</i>	Babul
2	<i>Acacia catechu</i>	Khair
3	<i>Adina cordifolia</i>	Karam
4	<i>Aegle marmelos</i>	Bel
5	<i>Ailanthus excelsa</i>	Ghorkarani Ghorkaram
6	<i>Alangium Lamarckii</i>	Dheila
7	<i>Albizzia lebbek</i>	Siris
8	<i>Albizzia odoratissima</i>	Jang Siris
9	<i>Albizzia procera</i>	Safed Siris
10	<i>Alstonia scholaris</i>	Chatni
11	<i>Anogeissus latifolia</i>	Dhauina
12	<i>Antidesma chaesebilla</i>	Bhabirani
13	<i>Arotocarpus integrifolia</i>	Kathal
14	<i>Azadirachta indica</i>	Neem
15	<i>Bauhinia retusa</i>	Kathul
16	<i>Bauhinia purpurea</i>	Koenar
17	<i>Bauhinia racemosa</i>	Katmauli
18	<i>Bauhinia variegata</i>	Kachnar
19	<i>Bombax ceiba</i>	Semal
20	<i>Boswellia serrata</i>	Selai
21	<i>Bridelia retusa</i>	Kaj
22	<i>Buchanania lanzan</i>	Piyar
23	<i>Butea frondosa</i>	Palas
24	<i>Careya arborea</i>	Kumbhi
25	<i>Casuarina tomentosa</i>	Churchu
26	<i>Cassia fistula</i>	Dhanra, Amaltas
27	<i>Chloroxylon swietenia</i>	Bharhul


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36	<i>Cordia allamanda</i>	Bahar
37	<i>Cordia allamanda</i>	Cashal
38	<i>Cordia allamanda</i>	Harib
39	<i>Cordia allamanda</i>	Kala Shesham
40	<i>Cordia allamanda</i>	Shisham
41	<i>Cordia allamanda</i>	Madariendu
42	<i>Cordia allamanda</i>	Tend Kund (10)
43	<i>Cordia allamanda</i>	Rai
44	<i>Cordia allamanda</i>	Ratanpur
45	<i>Cordia allamanda</i>	Bhair
46	<i>Cordia allamanda</i>	Amli
47	<i>Cordia allamanda</i>	Katjamun
48	<i>Cordia allamanda</i>	Jamun
49	<i>Cordia allamanda</i>	Barad
50	<i>Cordia allamanda</i>	Parho
51	<i>Cordia allamanda</i>	Dumar
52	<i>Cordia allamanda</i>	Pipal
53	<i>Cordia allamanda</i>	Barun
54	<i>Cordia allamanda</i>	Papra
55	<i>Cordia allamanda</i>	Gambhar
56	<i>Cordia allamanda</i>	Patthaman
57	<i>Cordia allamanda</i>	Korega
58	<i>Cordia allamanda</i>	Chilbi
59	<i>Cordia allamanda</i>	Bhurkur
60	<i>Cordia allamanda</i>	Lohajangin
61	<i>Cordia allamanda</i>	Pula
62	<i>Cordia allamanda</i>	Sidha
63	<i>Cordia allamanda</i>	Doka
64	<i>Cordia allamanda</i>	Mahua
65	<i>Cordia allamanda</i>	Rohan
66	<i>Cordia allamanda</i>	Manco
67	<i>Cordia allamanda</i>	Bakam
68	<i>Cordia allamanda</i>	Gur Gurkaran
69	<i>Cordia allamanda</i>	Lut
70	<i>Cordia allamanda</i>	Sandam
71	<i>Cordia allamanda</i>	Kudm

66	<i>Pongamia glabra</i>	Karam
67	<i>Pterocarpus marsupium</i>	Hija/Paisat
68	<i>Rubia cordifolia</i>	Jotsingh
69	<i>Saccolobium tomentosum</i> (<i>S. milhusa velutina</i>)	Kari
70	<i>Schleichera oleosa</i>	Kusum
71	<i>Schreberia swienoides</i>	Ghau
72	<i>Semecarpus anacardium</i>	Bhelwa
73	<i>Shorea robusta</i>	Sal/Sakhua
74	<i>Sosmida febrifuga</i>	Rohena
75	<i>Spondias mangifera</i>	Amra
76	<i>Sterculia urens</i>	Keonhi
77	<i>Stereospermum suaveolens</i>	Pader
78	<i>Tamarindus indica</i>	Imli/Jojo
79	<i>Tectona grandis</i>	Sagwan/Teak
80	<i>Terminalia arjuna</i>	Arjun
81	<i>Terminalia belerica</i>	Bahera
82	<i>Terminalia chebula</i>	Harra
83	<i>Terminalia tomentosa</i>	Asan
84	<i>Vangueria pubescens</i>	Katai
85	<i>Wendlandia exerta</i>	Tilia/Tiri
86	<i>Zizyphus mauritiana</i>	Ber
87	<i>Zizyphus xylopyra</i>	Katber

B. SHRUBS AND HERBS

1	<i>Achyranthus aspera</i>	Chirchiri
2	<i>Andropogon paniculata</i>	Kalmegh
3	<i>Anjidesma diandrum</i>	Amti
4	<i>Asparagus racemosa</i>	Satawar
5	<i>Berberis aristata</i>	Kashmoli
6	<i>Calotropis gigantea</i>	Akaon
7	<i>Carisa carandas</i>	Kanwar
8	<i>Carisa spinarum</i>	Jangli Karonda
9	<i>Cassia tora</i>	Chakor
10	<i>Cleistanthus collinus</i>	Kargali
11	<i>Croton oblongifolius</i>	Putri

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1	<i>Emblica coccinea</i>	Babbar
2	<i>Emblicia hirta</i>	Dudhi
3	<i>Clavortia flavomela</i>	Kafai
4	<i>Demissa chajon</i>	Calphata
5	<i>Gardenia turrida</i>	Karhar-Dhanuk
6	<i>Helicteres isora</i>	Anhua-Ahann
7	<i>Hampeum latu</i>	Gaiti
8	<i>Indigofera pulchella</i>	Jirhul
9	<i>Lantana camara</i>	Putus
10	<i>Mimosa pudica</i>	Lajwanti
11	<i>Nectanthes arborescens</i>	Samshihar/Harsin-ur
12	<i>Phoenix acaulis</i>	Khejur
13	<i>Randia dumetorum</i>	Mowar
14	<i>Rauwolfia serp.</i>	Chandra
15	<i>Solanum nigrum</i>	Makoi
16	<i>Solanum xanthocarpum</i>	Renger
17	<i>Sesuvium bakeri</i>	Bira/Bara Jirhul
18	<i>Sterobanthus auriculatus</i>	Gond/Mahmaridara
19	<i>Sweria pulchella</i>	Chiretta
20	<i>Syntherisma racemosa</i>	Dodh
21	<i>Tephrosia purpurea</i>	Sonuka
22	<i>Thespesia lampas</i>	Ban/Kapasi
23	<i>Uraria indica</i>	Jangal Piai
24	<i>Ventilago maderaspatana</i>	Keonti
25	<i>Vitex negundo</i>	Sindwar
26	<i>Wrightia tinctoria</i>	Kapur Adhkarar
27	<i>Woodfordia fruticosa</i>	Dheva
28	<i>Zizyphus oenoplia</i>	Dharbora

CLIMBERS, PARASITES, SEMI-PARASITES, ORCHIDS

1	<i>Acacia acuminata</i>	Arar
2	<i>Bauhinia vahlii</i>	Mahulen
3	<i>Butea parviflora</i>	Gihul
4	<i>Butea superba</i>	Dorani
5	<i>Centropogon Buchananii</i>	Dudhi Jag

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6	<i>Cuscuta reflexa</i>	Alaj-joti/Pargata
7	<i>Habenaria susannae</i>	Orchid
8	<i>Ichneopodus frutescens</i>	Saon lu
9	<i>Loranthus</i> spp.	Banda
10	<i>Mucuna pruri</i>	Alkosi
11	<i>Polypodium</i> spp.	Orchid
12	<i>Persea maniculata</i>	Bhidra lai
13	<i>Pueraria tuberosa</i>	Patal Konhra
14	<i>Smilax macrophylla</i>	Ram datwan
15	<i>Smilax prolifera</i>	Ram datwan
16	<i>Vanda</i> spp.	Orchid
17	<i>Viscum</i> spp.	Banda
18	<i>Vitis rotunda</i>	Harjorwa

D. GRASSES, BAMBOO, AGAVE

	<i>Agave</i> spp.	Moraba
1	<i>Apluda varia</i>	Dudhja sauri
2	<i>Arundinella setosa</i>	Jharu/Motaminijhar
3	<i>Bambusa arundinacea</i>	Bars bans
4	<i>Chrysopogon aciculatus</i>	Chor kania
5	<i>Cymbopogon martini</i>	Nanha dudhe grass
6	<i>Cynodon dactylon</i>	Doob
7	<i>Dendrocalamus strictus</i>	Bans/Bamboo
8	<i>Eulaliopsis binata</i>	Sabai
9	<i>Imperata arundinacea</i>	Cherogras
10	<i>Imperata cylindrica</i>	Ulu
11	<i>Heteropogon contortus</i>	Kher/Sauri grass
12	<i>Panicum montanum</i>	Khrj
13	<i>Saccharum munja</i>	Munj
14	<i>Thysanolaena agrostis</i>	Jharu/Broom grass
15	<i>Vetiveria zizanioides</i>	Khus-khus

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**GLOSSARY OF COMMON
AND SCIENTIFIC NAME OF ANIMALS FOUND IN CHATRA SOUTH FOREST**

Sl. No.	COMMON NAME / ENGLISH NAME	SCIENTIFIC NAME
MAMMALS		
1	Wild pig, Four Horned	<i>Tetracerus quadricornis</i>
2	Common Civet or Badger	<i>Mellivora indica</i>
3	Bat, Brown Fruit	<i>Rousettus leachmani</i>
4	Asian Golden Eagle	<i>Pteropus giganteus</i>
5	Asian Short-tailed Oryx	<i>Sambaria sambar</i>
6	Asian Elephant	<i>Elephas asiaticus</i>
7	Bison, Indian or Gaur	<i>Bos gaurus</i>
8	Asian Indian Wild	<i>Sus scrofa</i>
9	Asian Tiger	<i>Felis tigris</i>
10	Civet, Common Palm	<i>Paradoxurus hermaphroditus</i>
11	Civet, Small India	<i>Viverricula indica</i>
12	Deer, Barking or Muntjac	<i>Muntiacus muntjak</i>
13	Deer, Mouse or Indian Chevrotain	<i>Tragulus mermiana</i>
14	Deer, Spotted or Chital	<i>Axis axis</i>
15	Dog, Indian or Wolf	<i>Canis lupus</i>
16	Elephant	<i>Elephas maximus</i>
17	Fox, Indian	<i>Vulpes caninus</i>
18	Goat	<i>Capra hircus</i>
19	Hyena, Striped	<i>Hyaena hyaena</i>
20	Jackal	<i>Canis aureus</i>
21	Leopard or Panther	<i>Panthera pardus</i>
22	Macaque Rhesus	<i>Macaca mulatta</i>
23	Manbear, Common	<i>Herpestes edwardsi</i>

- 12 Mangrove, Small Indian
- 13 Mouse, Indian Field
- 14 Shrew, Long snout Tree
- 15 Hilga, or Blue Hill
- 16 Pangolin, Indian
- 17 Porcupine, Indian
- 18 Rat, Mandarin
- 19 Rat, Indian Rat
- 20 Rat, Indian Rat
- 21 Shrew, Grey Musk
- 22 Squirrel, Indian Giant
- 23 Squirrel, Three striped Palm
- 24 Tiger
- 25 Wolf

- Mus boerhaage*
- Viverricula zibethica*
- Baselaphus tragomela*
- Manis crassicaudata*
- Hystrix indica*
- Bombax indicus*
- Golunda ellioti*
- Cervus immodicus*
- Suncus murinus*
- Rattus indica*
- Funambulus palmarum*
- Panthera tigris*
- Canis lupus*

REPTILES

SNAKES

- 1 Boa, Red Sand
- 2 Cobra, Indian
- 3 Cobra, King
- 4 Krait, Banded
- 5 Krait, Common
- 6 Snake, Rat
- 7 Snake, Russell

- Eryx johnii*
- Naja naja*
- Ophiophagus hannah*
- Bungarus fasciatus*
- Bungarus caeruleus*
- Ptyas carinata*
- Ptyas mucosus*

LIZARDS

- 1 Chameleon
- 2 Gecko, Indian House
- 3 Lizard, Rock
- 4 Lizard, Monitor

- Chameleon calcaratus*
- Hemidactylus flaviviridis*
- Agama buberculatus*
- Varanus monitor*

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INSECTS

1	Pschridae	Achorutes armatus
2	Hymenoptera	Blatta arachnoides
3	Hymenoptera	Mantis religiosa
4	Hymenoptera	Nozaris viridula
5	Pschridae	Dysdercus emyzinus
6	Pschridae	Compocetus compressus
7	Pschridae	Somaphys spp
8	Pschridae	Monocentrus spp
9	Amidae	Apis dorsalis
10	Amidae	Apis indica
11	Amidae	Apis spp
12	Andrenidae	Andrena spp
13	Bombidae	Bombus spp
14	Vespidae	Polistis spp
15	Ichneumonidae	Tchneumon spp
16	Carabidae	Arithia Spp
17	Buprestidae	Chrysocrea spp
18	Coccinellidae	Coccipella septempunctata
19	Coccinellidae	Cylindrasca variabilis
20	Colidae	Mylabris pectorator
21	Hydrophilidae	Hydrophilus

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BIRDS FOUND IN CHATRA SOUTH FOREST DIVISION

Sl No	English Name	Latin Name
1	Babbler, Common	<i>Turdoides caudatus</i>
	Barbet, Crimson breasted or	<i>Megalaima haemacephala</i>
2	Coppersmith	
3	Bird, Black	<i>Turdus merula</i>
4	Bird, Tailor	<i>Orthotomus sutorius</i>
	Batman, Chestnut	<i>Ixobrychus cinnamomeus</i>
5		
6	Bulbul, Red-vented	<i>Pycnonotus cafer</i>
7	Crow, House	<i>Corvus splendens</i>
8	Crow, Jungle	<i>Corvus macrorhynchos</i>
9	Curlew	<i>Numenius arquata</i>
	Dove, Little Brown	<i>Streptopelia senegalensis</i>
10		
11	Duck, Pintail	<i>Anas acuta</i>
12	Eagle, Crested Hawk	<i>Spizaetus cirrhatulus</i>
	Eagle, Crested	<i>Spilornis cheela</i>
13	Serpent	
14	Eagle, Short-toed	<i>Circus gallicus</i>
15	Eagle, Tawny	<i>Aquila rapax</i>
16	Fowl, Red Jungle	<i>Gallus gallus</i>
17	Heron, Grey	<i>Ardea cinerea</i>
18	Hoopoe	<i>Upupa epops</i>
	Hornbill, Common	<i>Tockus bitorquatus</i>
19	Grey	
20	Peacock	<i>Pavo cristatus</i>
21	Ibis, Black	<i>Pseudibis papillosa</i>
	Kingfisher, White-breasted	<i>Halcyon smyrnensis</i>
22		
23	Kite, Brahminy	<i>Haliastur indus</i>
24	Koel	<i>Eudynamis scolopacea</i>
25	Lapwing, Redwattled	<i>Vanellus indicus</i>

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1	Laughing Gull	<i>Vanellus malabaricus</i>
2	Wallied	
3	Little Red-winged	<i>Mniotilta cinerea</i>
4	Parula	
5	Little Red-tailed	<i>Ammodramus</i>
6	Red	<i>phoeniceus</i>
7	Parula	<i>Lonicera vernalis</i>
8	Mouvet, Scarlet	<i>Pericrocotus flammeus</i>
9	Myna, Black-headed	<i>Lonchura malabarica</i>
10	Myna, Grey	<i>Eurilla curvirostris</i>
11	Myna, Red or	<i>Eurilla amandava</i>
12	Waxbill	
13	Munia, Spotted	<i>Lonchura punctulata</i>
14	Munia, White-backed	<i>Lonchura striata</i>
15	Munia, White	<i>Lonchura malabarica</i>
16	throated	
17	Myna, Bank	<i>Acridotheres</i>
18		<i>ginginianus</i>
19	Myna, Grey-headed	<i>Sturnus malabaricus</i>
20	Myna, Indian	<i>Acridotheres tristis</i>
21	Myna, Jungle	<i>Acridotheres fuscus</i>
22	Myna, Pied	<i>Sturnus contra</i>
23	Myna, Brahmany or	<i>Sturnus pagodarum</i>
24	Black-headed	
25	Myna, Common	<i>Cappimulius usus</i>
26	Parula	
27	Parula, Chestnut	<i>Sitta castanea</i>
28	belied	
29	Oriole, Black-headed	<i>Oriolus xanthornus</i>
30	Oriole, Golden	<i>Oriolus oriolus</i>
31	Owl, Barn or Screech	<i>Tyto alba</i>
32	Owl, Brown Fish	<i>Bubo zeylonensis</i>
33	Parakeet, Alexandrine	<i>Psittacula eupatria</i>
34	or Large Indian	
35	Parakeet, Blossom	<i>Psittacula cyanocephala</i>
36	headed	

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51	Pigeon, Common	<i>Treron phoenicoptera</i>
52	Pipit, Indian	<i>Anthus novaeseelandiae</i>
53	Pitta, Indian	<i>Pitta brachyura</i>
54	Plover, Little Ringed	<i>Charadrius dubius</i>
55	Redshank	<i>Tringa totanus</i>
56	Robin, Indian	<i>Saxicoloides fulvata</i>
57	Robin, Magpie	<i>Copsychus saularis</i>
58	Roller or Blue Jay	<i>Coracias benghalensis</i>
	Sandgrouse, Common	<i>Pterocles exilis</i>
60	Sandgrouse, Painted	<i>Pterocles indicus</i>
	Shrike, Large Cuckoo	<i>Coracina novaehollandiae</i>
61	Shrike, Rufous backed	<i>Lanius schach</i>
62	Skylark, Indian Small	<i>Alauda guagula</i>
63	Sparrow, House	<i>Passer domesticus</i>
64	Sparrow, Yellow-throated	<i>Petronia xanthocollis</i>
65	Spurfowl, Red	<i>Gallus padana</i>
66	Silt, Blackwinged	<i>Himantopus himantopus</i>
67	Sun, Little	<i>Calidris minutus</i>
68	Stork, White	<i>Ciconia ciconia</i>
69	Stork, White-necked	<i>Ciconia episcopus</i>
70	Stork, Black-necked	<i>Ephippiochelys asiaticus</i>
71	Sunbird, Purple	<i>Nectarinia asiatica</i>
72	Sunbird, Purple-rumped	<i>Nectarinia zeylonica</i>
73	Swallow, Redrumped or Striated	<i>Hirundo</i>
74	Swallow, Common	<i>Hirundo rustica</i>
75	Swallow, Wire-tailed	<i>Hirundo smithii</i>
76	Swift, Crested Tree	<i>Hemiprocne longipennis</i>
77	Swift, House	<i>Apus affinis</i>

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7	Swift, Palm	<i>Cypselurus parvus</i>
80	Teal, Common	<i>Anas crecca</i>
	Tern, Indian	<i>Chlidonias hybrid</i>
	Black-headed	
81	Tern, River	<i>Sterna aurantia</i>
82	Tin, Grey	<i>Parus major</i>
	White	<i>Neophoca perinopartha</i>
	Scavenger or	
83	pharaoh's chicken	
	White	<i>Gyps himalayensis</i>
84	backed or Bengal	
85	Wagtail, Grey	<i>Motacilla caspia</i>
	Wagtail, Large Pied	<i>Motacilla</i>
87		<i>maderaspatisis</i>
88	Wagtail, White	<i>Motacilla alba</i>
89	Wagtail, Yellow	<i>Motacilla flava</i>
	Wagtail, Yellow-	<i>Motacilla citreola</i>
90	headed	
91	Warbler, Ashy Wren	<i>Prinia socialis</i>
92	Warbler, Indian Wren	<i>Prinia subflava</i>
	Warbler, Streaked	<i>Cisticola juncidis</i>
93	Fantail	
	Warbler, White-	<i>Amaurantia</i>
	Black-headed	<i>phoenicurus</i>
94	Whiskered Bird, Baya	<i>Ploceus philippinus</i>
	Black-headed	<i>Ploceus philippinus</i>
95	Whiskered	


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ANNEXURE - 6.E.3

LIST OF FLORAL & FAUNAL SPECIES FOUND IN CHATRA NORTH FOREST DIVISION.

TABLE 3 List of Common Tree in Chatra North Forest Division

S. No.	Botanical Name	Common Name
1	<i>Acacia catechu</i>	Amroli
2	<i>Acacia egyptiaca</i>	Amroli
3	<i>Albizia julibrissin</i>	Amroli
4	<i>Albizia leucodermis</i>	Amroli (Kamru)
5	<i>Albizia leucodermis</i>	Amroli
6	<i>Spontelias umbellata</i> Syn. <i>S. umbellata</i>	Amroli
7	<i>Albizia leucodermis</i>	Amroli
8	<i>Albizia julibrissin</i>	Bel
9	<i>Albizia julibrissin</i>	Bakam
10	<i>Ficus religiosa</i>	Bargad
11	<i>Chloroxylon munda</i>	Bhasil (Pachira)
12	<i>Terminalia chebula</i>	Bahara
13	<i>Hemlockia indica</i>	Blackwood
14	<i>Schleichia umbellata</i>	Bhulwa
15	<i>Albizia julibrissin</i>	Chokandi
16	<i>Holoptelea integrifolia</i>	Chidli
17	<i>Platanus indica</i>	Chirpota
18	<i>Amoglossia latifolia</i>	Dhaudha (Dhaudasa)
19	<i>Ficus glomerata</i>	Dumra
20	<i>Albizia julibrissin</i>	Ghoruwa
21	<i>Gmelina arborea</i>	Gambha
22	<i>Schlotheimia religiosa</i>	Galgol
23	<i>Albizia julibrissin</i>	Gurukam
24	<i>Lannea coromandelica</i>	Junga (Nanana)
25	<i>Terminalia chebula</i>	Harre (Badsa)
26	<i>Lannea coromandelica</i>	Jundi
27	<i>Albizia julibrissin</i>	Jamun
28	<i>Amoglossia integrifolia</i>	Kathol

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39	<i>Croton tiglium</i>	Karam
40	<i>Mitrasacme indica</i>	Kari
41	<i>Croton tiglium</i>	Khar
42	<i>Boerhaavia procumbens</i>	Khat
43	<i>Opuntia leucostachya</i>	Kalyan
44	<i>Bambusa variegata</i>	Kachnar
45	<i>Bambusa retusa</i>	Kachnar
46	<i>Bambusa retusa</i>	Kachnar
47	<i>Boerhaavia procumbens</i>	Kachnar
48	<i>Boerhaavia procumbens</i>	Kachnar
49	<i>Boerhaavia procumbens</i>	Kachnar
50	<i>Boerhaavia procumbens</i>	Kachnar
51	<i>Boerhaavia procumbens</i>	Kachnar
52	<i>Boerhaavia procumbens</i>	Kachnar
53	<i>Boerhaavia procumbens</i>	Kachnar
54	<i>Boerhaavia procumbens</i>	Kachnar
55	<i>Boerhaavia procumbens</i>	Kachnar
56	<i>Boerhaavia procumbens</i>	Kachnar
57	<i>Boerhaavia procumbens</i>	Kachnar
58	<i>Boerhaavia procumbens</i>	Kachnar
59	<i>Boerhaavia procumbens</i>	Kachnar


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61	<i>Albizia lebbekii</i>	Sidra
62	<i>Albizia lebbekii</i>	Sidra
63	<i>Albizia lebbekii</i>	Sidra
64	<i>Albizia lebbekii</i>	Sidra
65	<i>Albizia lebbekii</i>	Sidra
66	<i>Albizia lebbekii</i>	Sidra
67	<i>Albizia lebbekii</i>	Sidra
68	<i>Albizia lebbekii</i>	Sidra
69	<i>Albizia lebbekii</i>	Sidra
70	<i>Albizia lebbekii</i>	Sidra
71	<i>Albizia lebbekii</i>	Sidra

4. List of Chimer in Chatra North Forest Division

S No	Botanical Name	Common Name
1	<i>Albizia lebbekii</i>	Sidra
2	<i>Albizia lebbekii</i>	Sidra
3	<i>Albizia lebbekii</i>	Sidra
4	<i>Albizia lebbekii</i>	Sidra
5	<i>Albizia lebbekii</i>	Sidra
6	<i>Albizia lebbekii</i>	Sidra
7	<i>Albizia lebbekii</i>	Sidra
8	<i>Albizia lebbekii</i>	Sidra

5. Shrubs in Chatra North Forest Division

S No	Botanical Name	Common Name
1	<i>Albizia lebbekii</i>	Sidra
2	<i>Albizia lebbekii</i>	Sidra
3	<i>Albizia lebbekii</i>	Sidra
4	<i>Albizia lebbekii</i>	Sidra
5	<i>Albizia lebbekii</i>	Sidra
6	<i>Albizia lebbekii</i>	Sidra
7	<i>Albizia lebbekii</i>	Sidra
8	<i>Albizia lebbekii</i>	Sidra


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does not come in search of water and food to village. Elephants, Deer, Barking Deer, langur, sloth bear, etc. comes head towards villages in search of food and water and get killed by hunters. Natural death among elephants, members of 6-10 and deer families usually results from malnutrition and scarcity of food. *Antelope*

Diseases:

Wild animals are also prone to many diseases which are viral, bacterial, protozoan or mycotic in origin. Epidemic of deadly diseases like foot and mouth disease (FMD), Border disease (BD), Flukes disease, Haemorrhagic Septicemia and anthrax are mainly responsible for causing deaths of wild animals. Chronic diseases including that of Trypanosomiasis (animal) known as Sutra mainly spread by domestic and resident cattle in forests. Wild animals like tiger, leopard etc. come in contact either feeding on infected carcasses or through fly. The cross mutuality transferable between wild animal and livestock. It is therefore necessary to immunize village cattle on annual basis to prevent harm to both domestic and wild animals and comprehensive plan of wild life management and development is necessary.

List of Birds found in Chatra North Forest Division

Sl. No.	Habit Birds	Zoological name	Common name	Local name
1	Omnivore	<i>Pavo cristatus</i>	Peacock	More
2	Carnivore	<i>Pseudogyps</i>	Vulture	Gul
		<i>Hygaleotis</i>		
			Fishing kite	
3			Kite	Chasi
4	Herbivore	<i>Edynamis</i>	Koel	Koel
		<i>scelopageous</i>		
5		<i>Francolinus</i>	Partridge	Pashu
		<i>pouderianus</i>		
		<i>Acridotheres tristis</i>	Indian myna	Indian myna

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<i>Pinnocula krameri</i>	Parrot	Tata
<i>Dryopates</i> <i>malabar-</i> <i>gallus</i>	Wood pecker	Wood pecker
<i>Gallus gallus</i>	Jungle fowl	Han murgi
	Canary or golden oriole	Pealah
	Cuckoo	Sarus
	Duck	Darak
	Cross pheasant	Mahakul
	Barbet	
	Drongo	Koyen
	Blue Jay	Nalkanth
	Red vented bulbul	Bulbul

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ANNEXURE - 6.F

LIST OF VILLAGES FALLING WITHIN STUDY AREA FOR PROPOSED 400 KV (D/C) NKG TRANSMISSION LINE (JHARKHAND PORTION)

**LIST OF VILLAGES FALLING UNDER PROJECT AREA OF NKG (JHARKHAND)
400 kV D/C TRANSMISSION LINE**

Sl. No.	District	Block	Villages
1	Latehar	Bariyatu	Phulbasia Alias Amarwadih
2			Charra
3			Rahea
4			Barwadih
5			Besra
6			Bhatchatra
7			Kusamha
8			Marka
9			Sibla
10	Chatra	Chatra	Pharenda
11			Barhgaon
12			Bhang
13			Gulhutu
14			Parbat Alias Barahmana
15			Korcha
16			Ambadih
17			Geri
18			Ghumadih
19			Nartama
20			Karma
21			Suraj
22			Larkua
23			Darha
24			Sanghri
25			Sikid
26		Huntermunj	Postia
27			Bandatanr
28			Demdem
29			Paini Kalan
30			Paini Khurd
31			Ketaribar
32			Jhagartari
33			Baniadish
34			Chitua
35			Raharbar
36			Hatwaria
37			Baljnathpur
38			Kasdabar
39			Gaighat
40			Bedauli
41			Kolwa
42		Lawalung	Bacsi
43			Lamta
44			Bhagnadih

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45		Jogiadih
46		Kasiatu
47		Kasari
48		Nawada
49		Kendu
50	Simaria	Dundua
51		Bagra
52		Belgara
53		Bagra
54		Kuthan

**LIST OF VILLAGES FALLING UNDER BUFFER AREA (UPTO 5KM FORM ROW) OF
NKG (JHARKHAND) 400 kV D/C TRANSMISSION LINE**

Sl. No.	District	Block	Villages	Distance (Km) From TL
1	Latehar	Bariyatu	Bamwar	2.5
2			Manatu	3.25
3			Jhirmatkuma	4.25
4			Tundahutu	3
5			Pipradih Alias Kutse	4.25
6			Itke	4.75
7			Toti	2.5
8			Bara	4.75
9			Bishrampur	4
10			Rajgurua	3.75
11	Chatra	Chatra	Garwadih	3.25
12			Hansbo	4.5
13			Kasiadih	2.5
14			Haphua	1.75
15			Bara	0.5
16			Salaia	1.75
17			Badhar	1.75
18			Bhagmaria	1.5
19			Basaria	2
20			Pharendi	2.5
21			Khap	3
22			Kamat	1
23			Girwan	1.75
24			Kasiadih	3
25			Gorhai	3.25
26			Madankhap	4.75
27			Bela	5
28			Semaria	3.25
29			Malia	0.75
30			Paradih	3
31			Sared	0.5
32			Koladih	3.25
33			Jalpur	3.25
34			Kathautia	3.25

Rex
Raghvendra Kumar Singh
Head-Projects (S&D) TL
NKTCL - Hazratnagar

35		Amauna	2.5
36		Sajna	1.5
37		Chaudharia	3.5
38		Bamhne	3
39		Pakaria	4.75
40		Sehada	5
41		Gumhartari	4.25
42		Pabo	5.75
43		Nawadih	3
44		Baraini	1.75
45		Nawada	4.75
46		Mael Alias Saul	4.25
47		Kargu	1.75
48		Pater	3.5
49		Jaled	3
50		Chetma	3.5
51		Dudhauri	2.25
52		Sherpur	2.75
53		Sendvari	2
54		Kuba	1
55		Raharbar	0.75
56		Bansaram	3.25
57		Kathaun	2.75
58		Rajgurua	2.5
59		Kadle	2
60		Tilaia	4.5
61		Gorre	0.75
62		Naraina Tari	1
63		Dhobey	1.75
64		Kasiadih	3.25
65		Majhgawan	1.75
66		Erabonga	1.25
67		Burhigaro	2.25
68		Nawadih	1
69		Edla	3.25
70		Belwadih	3.75
71		Bhuinadih	4.25
72		Dantar	2.25
73		Pumanagar	3.25
74		Gara	0.75
75		Palha	1.75
76		Ambadohar	3.25
77		Mansachak	3
78		Parmachak	0.5
79		Kadwa	3
80		Baniabandh	4
81		Lolwa	4.75
82		Kusmaha	3.5
83		Lerhho	3
84		Jutha	2.25

Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

85	Kolua Pahar	1.25
86	Khawahar	5
87	Luta	3.75
88	Pandarkola	4
89	Pachamba	1.25
90	Jori Khurd	2.75
91	Kewal	4
92	Bakhardih	3.5
93	Kursel	2.5
94	Kurid	5
95	Karailibar	5
96	Karidi Alias Mada	5
97	Paharpur	2.75
98	Dhangiri	2.25
99	Salaiya	1.75
100	Tisarjori	3.75
101	Pekha	3.25
102	Kanchanpur	2.5
103	Pach Mahal	1.25
104	Chandar Kali	1.25
105	Lohsingna Alias Sondiha	3
106	Lohsingna Khurd	3.75
107	Ghanghri	3.25
108	Kataia	2.5
109	Parsia	3.5
110	Kandabar	1.5
111	Murar	3.5
112	Tetaria	3.5
113	Daha	1.5
114	Tarwagana	0.75
115	Sokha	2.5
116	Kobna	3.25
117	Naunia Chuan	1.25
118	Nawadih	2.5
119	Chaklapur	3.75
120	Bailgara	4
121	Dhamni	3
122	Kalyanpur	2.5
123	Gidhaur	1.5
124	Partappur	5
125	Karea	4
126	Satgharwa	4.25
127	Nain Chak	3
128	Dhardhera	5
129	Tilhet	2.75
130	Silwar	1.5
131	Ektara	2.5
132	Kuba	3.75
133	Pandri Kalan	4
134	Lawalung	Aminia

Ravi
 Raghvendra Kumar
 Head-Projects (S&T)
 NKTL - Hazaribagh

135		Majuria	2.5
136		Jiraun	4
137		Lotwa	1.5
138		Ambatarr	2
139		Tilra	4.5
140		Ichha Ahar	2.5
141		Chandadih	1.5
142		Darha	2
143		Atampur	3.5
144		Shivrajpur	4
145		Chatar	2.5
146		Thakurdih	4
147		Chandanpur	3.5
148		Rakhed	4
149		Bhandia	3
150		Barwadih	3.5
151		Soha Alias Koeta	4.75
152		Paseri	3.25
153		Bara	3.25
154		Sabona	4.5
155		Bakhtaur Khap Alias Kodwari	1.75
156		Ara-Atu	1.75
157		Simarai Kalan	5.5
158		Goa Kalan	3.75
159		Ichak Kalan	2.75
160		Goa Khurd	5.25
161	Simaria	Jarhi	5.5
162		Pathak Khap	1.5
163		Tatej	1
164		Kaljirua Alias Lutidih	2.5
165		Serandag	2.5
166		Jabra	4.25
167		Hankarkhap	4.25
168		Kuti Rangania	5
169		Sandli	5
170		Gothai	4.25
171		Haphua	5


 Raghuendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

**LIST OF VILLAGES FALLING UNDER BUFFER AREA (5-10KM FORM ROW) OF
NKG (JHARKHAND) 400 kV D/C TRANSMISSION LINE**

Sl. No.	District	Block	Villages	Distance (Km) From TL
1	Latehar	Bariyatu	Banalat	8.75
2			Renchi	4.75
3			Gurusalwe	7.75
4			Salwe	8.5
5			Chetuag	10
6			Bami	10
7			Bari Khap	9.75
8			Bariaty	8.25
9			Jabra	7.5
10			Gonea	7.75
11			Nawadih	7.5
12	Chatra	Chatra	Banasam	7.25
13			Siwan	6.25
14			Kanrlaga	10
15			Damdoia	10
16			Belhar	8.5
17			Rangwana	7.5
18			Nawadih	5.25
19			Donra	5.75
20			Nauakhap	6.5
21			Chataria	8
22			Jalubigha	5.75
23			Rampur	5.5
24			Sonpur	6.25
25			Sustra	7.5
26			Lare	7.5
27			Pundri	7.75
28			Chainpur	8.5
29			Kaltikar	10
30			Tikar	10
31			Bhade	9.75
32			Changer	8.75
33			Dewaria	8.75
34			Lipda	6
35			Sesang	10
36			Tapej	9.25
37			Mohanadih	8
38			Tunrag	7.5
39			Ramna	5.5
40			Ahuri	6.25
41			Lare	7.5
42			Sehada	7.75
43			Bario	10
44			Sijua	8

Raghu
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Head-Projects (S&T)
NKT - Hazaribagh

45		Lutu	7.25
46		Khuter	6
47		Rajguru	5.25
48		Pahasbar	7.25
49		Kurkhetz	8.75
50		Karamo	10
51		Salat	9.5
52		Ambar	7.5
53		Gue	9.75
54		Jaldiha	9
55		Kenrimoh	6.25
56		Bergwatari	9.25
57		Mana Math	10
58		Gidhatar	8.75
59		Sajni	9.5
60		Ghatdhan	5.75
61		Kolhua	8.5
62	Huntergunj	Pachatari	8.5
63		Aunrawa	9
64		Tanpu	10
65		Phulwaria	10
66		Bhojpur	7.5
67		Kanchanpur	7
68		Mongwadaha	5.5
69		Nijra	10
70		Jhikatia	6.75
71		Hosil	8.75
72		Chatania	8.5
73		Majhgawan	7.5
74		Kutiya	6.25
75		Saldaha	6.5
76		Lichri	6
77		Gobardih	5.5
78		Kon	5.5
79		Bara	5.25
80		Gobindpur	5.25
81		Basaria	6
82		Kendra	7.25
83		Kathaun	6.5
84		Bhogtadih	7.25
85		Karma	9
86		Dandal	8.5
87		Kolwa	9.5
88		Madanpur	9.25
89		Kanguruwa	6
90		Bandu	5.25
91		Arjun Khurd	7.5
92		Bonra	5.25
93		Kodlaiya	10
94		Chakla	10

Raghyendra Kumar
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NKTL - Hazaribagh

95		Bishunpur	9.75
96		Rano	10
97		Bela	9.75
98		Jorakaram	8.75
99		Arjun Kalan	5.25
100		Gorwali	7.5
101		Closaindih Alian Basariatari	6.25
102		Kanaudi	5.25
103		Dewaria	5.25
104		Bela	5.75
105		Dumri Kalan	6.75
106		Dumri Khurd	7.25
107		Hiring	8.25
108		Gopalpur	10
109		Sikatiya	10
110		Godabar	8.75
111		Bhondal	7.5
112		Kedli Kalan	7
113		Gokhna	5.5
114		Kobri	5.25
115		Garhkedli	6.25
116		Kedli Khurd	6
117		Panti	6.25
118		Larsar	6.5
119		Behara	5.25
120		Dewaria	7
121		Pondri Khurd	6.5
122		Pinrri Kalan	7.25
123		Sugi	6.25
124		Uraili	6
125		Chhechhi Manjhar	8.5
126		Nagar	7.5
127		Niranjari Chak	8
128		Bariarchak	7.75
129		Sobhi Chak	9.75
130		Khuti Kewal Kalan	7.5
131		Dewanbar	8.75
132		Khutikewal Khurd	7.75
133		Akona	7.5
134		Potam	8
135		Banchatra	6
136		Karma	5.5
137		Mali	7
138		Angara	6.75
139		Sarhachia	7.5
140		Rotnag	7
141		Katia	9
142		Tungun	8
143		Khangara	8.5
144		Bandaru	9

Lawalung


 Jagbendra Kumar
 Head-Projects (S&P)
 MKTL - Hazaribagh

145		Jojbari	8.5
146		Shons	8
147		Dilho	6.5
148		Sarma	5.5
149		Sohar Kalan	5
150		Murue	8.75
151		Katia	10
152		Pagar	5.75
153		Bakchoma	6.75
154		Patna	8.25
155		Edla	10
156		Pundra	9.25
157		Dari	9
158		Rol	10
159	Simaria	Lipda	9.25
160		Banasandi	8.25
161		Banhe	6.25
162		Lobga	10
163		Chandram	9.5
164		Kori	8.25
165		Jangi	6
166		Chalki	6.5
167		Eregara Alias Kasiadih	8.25
168		Arsel	6.75
169		Tundag	8.75
170		Salgi	10
171		Jirua Khurd	9.75
172		Kurumdari	10

Ragh
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

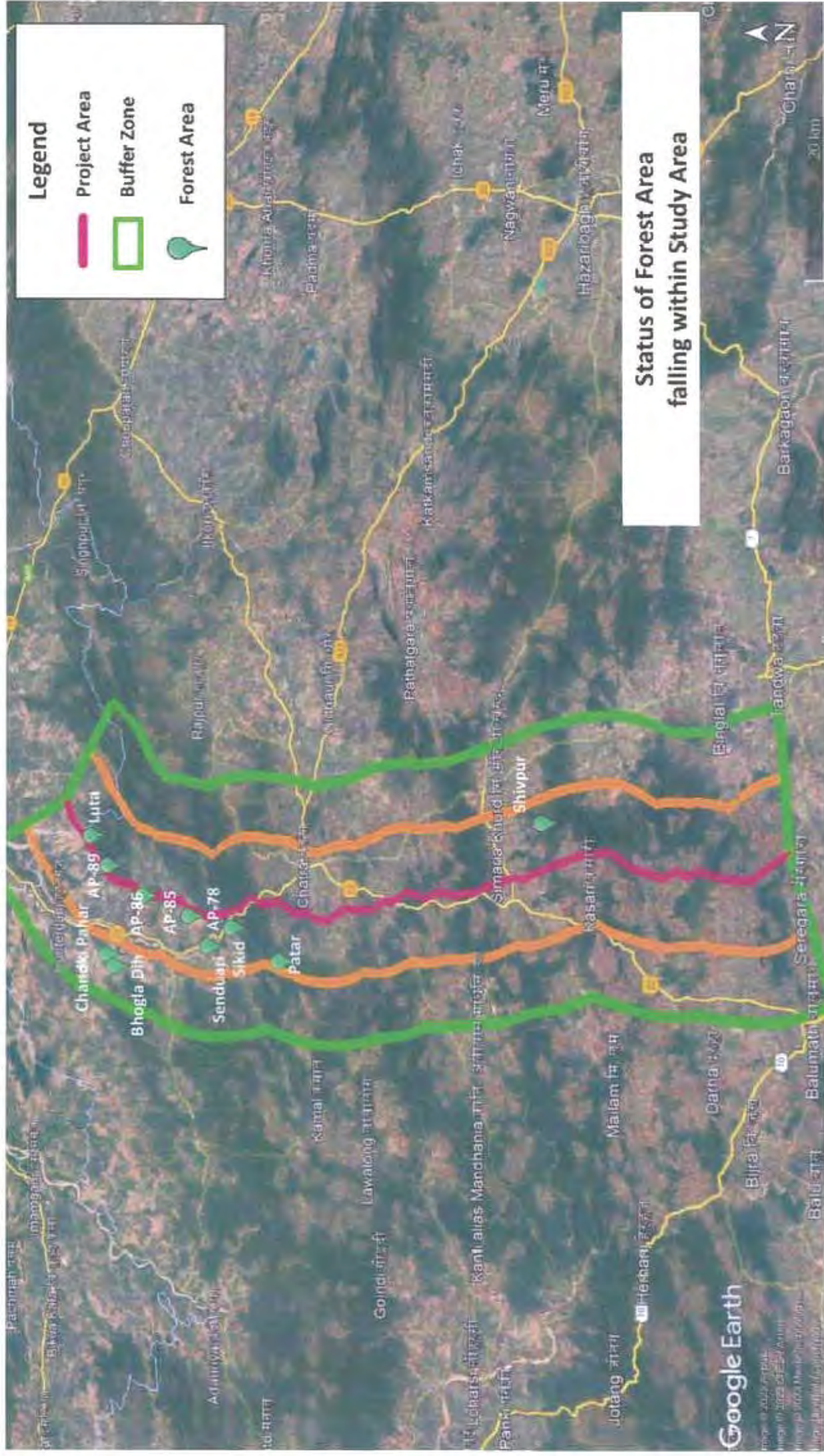
ANNEXURE - 6.G

MAP SHOWING **ENVIRONMENTAL SENSITIVE** **RECEPTORS - FOREST TYPE** **FALLING UNDER STUDY AREA** **OF PROPOSED 400 KV (D/C) NKG** **TRANSMISSION LINE** **(JHARKHAND PORTION)**

DETAIL OF FORESTS AREA FALLING WITHIN STUDY AREA

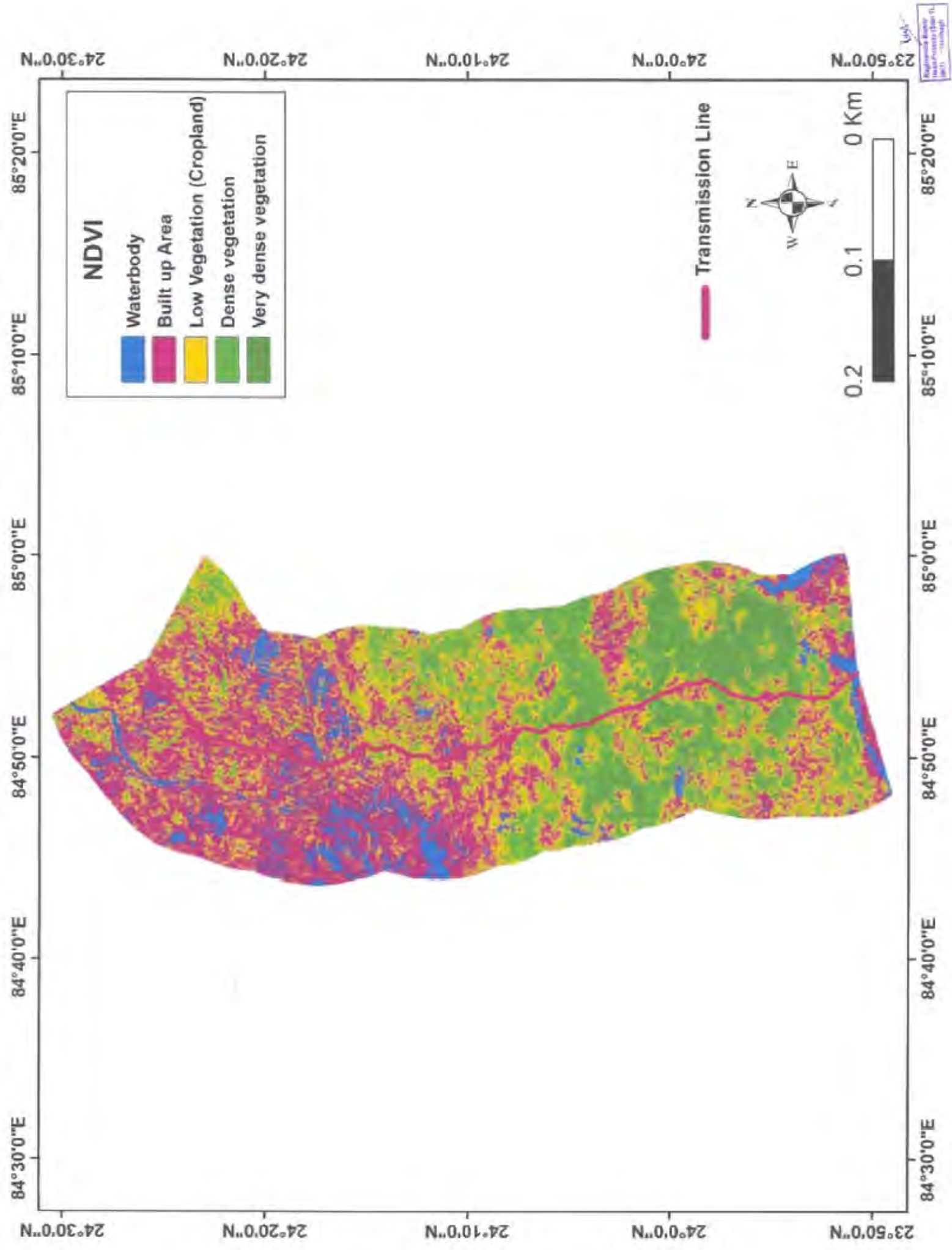
Sl. No.	Forest Type	X-coordinate (E)	Y-coordinate (N)
1	Dense mixed jungle near Luta village	84.8863	24.386
2	Open mixed jungle near AP-89 tower	84.8622	24.3686
3	Open mixed jungle between AP-85 and AP-86	84.8393	24.3347
4	Dense mixed jungle dominated by Bamboo near AP-78	84.8256	24.291
5	Fairly Dense mixed jungle near Bhogta Dih	84.7776	24.3604
6	Protected Forest near AP-89	84.7868	24.3685
7	Dense mixed bamboo near Senduari	84.802	24.273
8	Dense bamboo jungle between AP-65 AP-70	84.8193	24.2519
9	Dense mixed jungle near Patar	84.8193	24.2519


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 NKTL - Hazaribagh



ANNEXURE 6.H

NORMALIZED DIFFERENCE VEGETATION INDEX (NDVI) MAP OF STUDY AREA FOR PROPOSED 400 KV (D/C) NKG TRANSMISSION LINE (JHARKHAND PORTION)



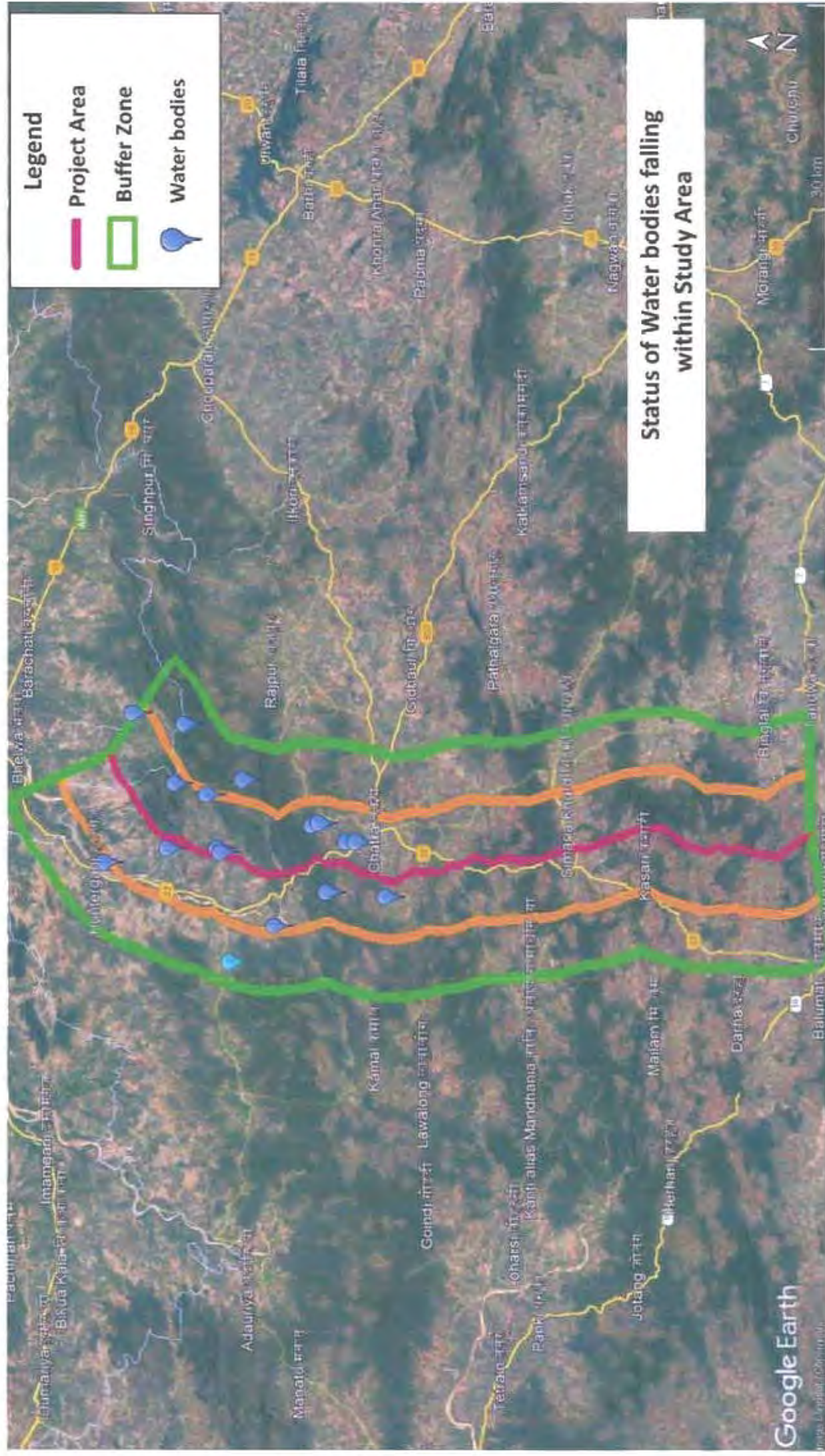
ANNEXURE - 6.1

MAP SHOWING ENVIRONMENTAL SENSITIVE RECEPTORS - WATER BODIES UNDER STUDY AREA OF PROPOSED 400 KV (D/C) NKG TRANSMISSION LINE (JHARKHAND PORTION)

DETAIL OF WATER BODIES FALLING WITHIN STUDY AREA

Sl. No.	Water Body	Elevation (m)	Elevation (m)	Approx. Distance from Main Project (km)
1	Lilajan river near Sherpur village	84.7842	24.2663	4.85
2	Jharna river near Nawa Dih	84.9527	24.3972	7.03
3	Gular Nala	84.9476	24.3543	10.00
4	Sudhan Nala	84.8902	24.3306	5.19
5	Ambar Nala	84.8967	24.358	5.18
6	Berio Nala	84.9053	24.3023	7.88
7	Canal near Banki village	84.8243	24.4107	0.49
8	Golgi Nadi near AP-88	84.8414	24.3598	0.32
9	Pond near AP-82	84.8424	24.3155	0.59
10	Pond near Dhobe village	84.8455	24.3185	0.93
11	Pond near Darha village	84.8749	24.2364	3.52
12	Pond near Sehada village	84.8724	24.2417	3.36
13	Pond near Barain village	84.8182	24.177	1.92
14	Malu Nadi near Jaled village	84.8176	24.2254	2.36
15	Pond near PTO	84.8614	24.2126	2.80
16	Pond in elephant zone	84.8623	24.2051	2.82


 Raghendra Kumar
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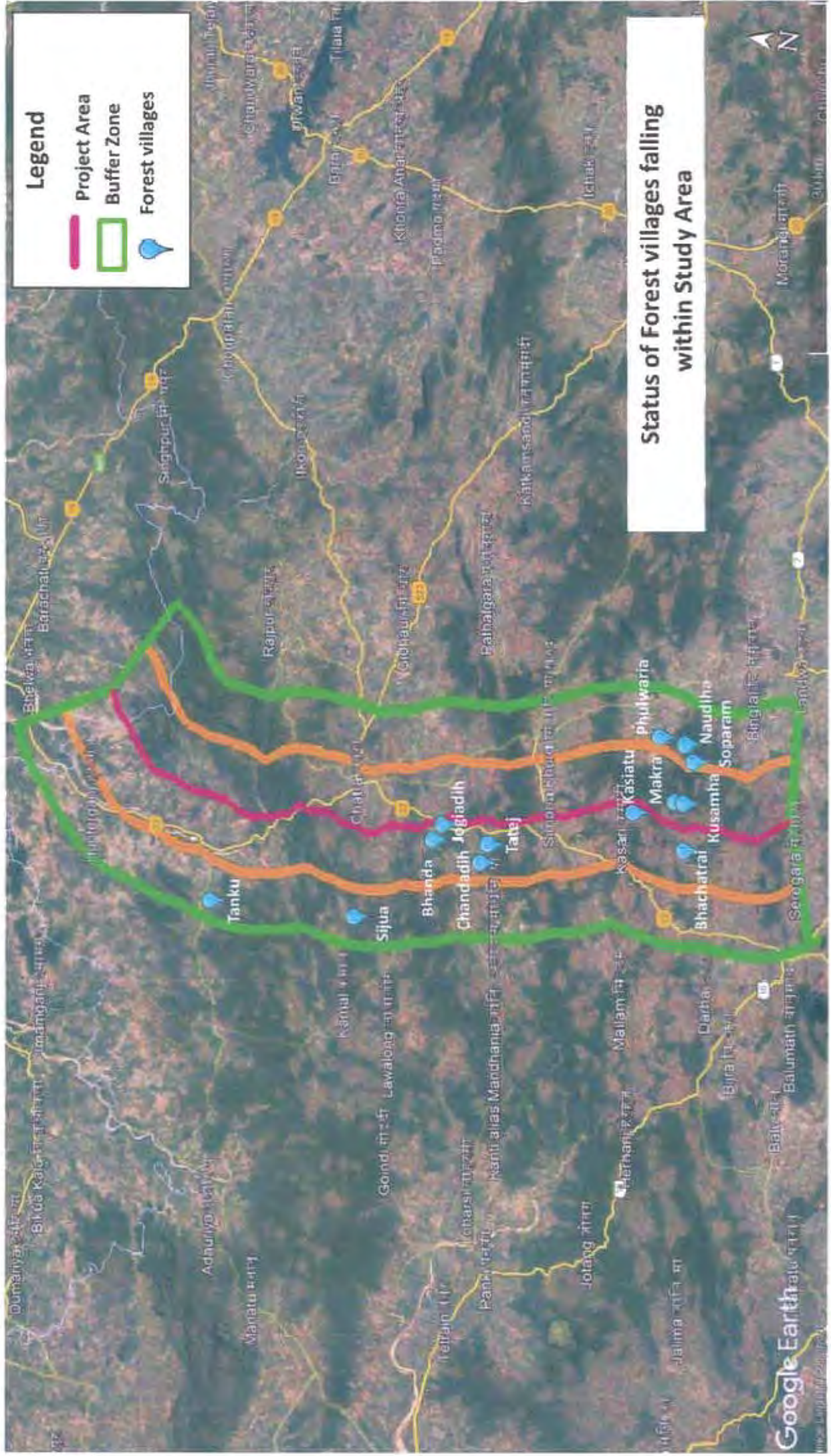
ANNEXURE - 6.J

MAP SHOWING ENVIRONMENTAL SENSITIVE RECEPTORS - FOREST VILLAGES UNDER STUDY AREA OF PROPOSED 400 KV (D/C) NKG TRANSMISSION LINE (JHARKHAND PORTION)

DETAIL OF FORESTS VILLAGES FALLING WITHIN STUDY AREA

Sl. No.	Village	X-coordinate	Y-coordinate
1	Kasiatu	84°53'25.81"E	23°57'26.87"N
2	Makra	84°54'19.71"E	23°55'31.71"N
3	Kusamha	84°54'19.65"E	23°55'5.48"N
4	Phulwaria	84°57'25.39"E	23°56'42.98"N
5	Bhatchara	84°51'59.54"E	23°54'44.53"N
6	Soparam	84°56'28.54"E	23°54'54.49"N
7	Naudina	84°57'17.05"E	23°55'27.18"N
8	Tatej	84°50'32.56"E	24° 4'18.34"N
9	Chandadih	84°49'32.62"E	24° 4'32.71"N
10	Bhanda	84°50'15.00"E	24° 7'8.12"N
11	Jogiadih	84°51'6.18"E	24° 6'44.18"N
12	Sijua	84°45'34.27"E	24°10'32.27"N
13	Tanku	84°45'0.31"E	24°18'2.26"N


Raghuwendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh



OFFICE COPY

North Karanpura Transco Limited

(Program Under Government of India)
Jayprabha Nagar, Behind Celebration Marriage Hall
Near Markham College Hazaribagh 825301
Email Id: northkaranpuratransco@gmail.com

Ref No: NKTL/NKG/2024-25/F311

Date: 06.03.2025

To,

The Divisional Forest Officer,
Chatra South Forest Division,
Chatra, Jharkhand.

The Divisional Forest Officer,
Chatra North Forest Division,
Chatra, Jharkhand.

The Divisional Forest Officer,
Latehar Forest Division,
Latehar, Jharkhand.

Sub: Diversion of 197.0115 Ha. (Chatra South – 119.8806 ha., Chatra North – 61.772 ha., & Latehar – 15.3589 ha.) forest land in favour of North Karanpura Transco Limited for construction of 400 KV D/C Transmission Line from North Karanpura (Tandwa) to Gaya Transmission Line under Chatra North, Chatra South & Latehar Forest Division in Chatra and Latehar Districts of Jharkhand – **Submission of Bank receipt against the balance amount towards the implementation of the Site-Specific Wildlife Management Plan.**

(Proposal No: FP/JH/TRANS/41236/2019)

- Ref:**
1. NKTL Office letter no. NKTL/NKG/2022-23/F263 dated 07.11.2023.
 2. PCCF, Wildlife & CWLW Jharkhand order no. 26 dated 22.03.2024.
 3. DFO Chatra South Demand note letter no. 716 dated 31.03.2024.
 4. DFO Chatra North Demand note letter no. 341 dated 07.02.2025.
 5. DFO Latehar Demand note letter no. 309 dated 11.02.2025.
 6. Ministry of Environment, Forest and Climate Change, Govt. of Jharkhand letter no. Van Bhumi-31/2022-3783 Dated: 25th September 2024.

Dear Sir,

With reference to the above, we would like to inform you that PCCF, Wildlife & CWLW Jharkhand sanctioned Order of the Specific Wildlife Management Plan vide office



North Karanpura Transco Limited

(Program Under Government of India)
Jayprabha Nagar, Behind Celebration Marriage Hall
Near Markham College Hazaribagh 825301
Email Id: northkaranpuratransco@gmail.com

order no. 26 dated 22.03.2024. NKTL has already deposited an amount of **Rs. 4,17,50,499/- (Four Crore Seventeen Lakh Fifty Thousand Four Hundred Ninety-Nine Only)** as per the demand note raised towards 2.5% of project cost as part payment for implementation of Wildlife Management Plan and Soil & Moisture Conservation measures in line with MoEF&CC guideline No. FC 11/43/ 2021-FC dated 7th June 2022 to Jharkhand CAMPA account vides RTGS UTR No. **UTIBR52023110600359191** on dated **06.11.2023**. Following is the summary—

Summary of Lump sum amount deposited by NKTL					
Sl. No	Particulars	Chatra North Forest Division	Chatra South Forest Division	Latehar Forest Division	Total
1	Project Cost	₹ 52,43,80,000	₹ 101,53,60,000	₹ 13,02,60,000	₹ 167,00,00,000
2	Wildlife Management Plan (2% of Project Cost)	₹ 1,04,90,000	₹ 2,03,07,200	₹ 26,05,200	₹ 3,34,02,400
3	Soil & Moisture Conservation Plan (0.5% of Project Cost)	₹ 26,20,000	₹ 50,76,800	₹ 6,51,299	₹ 83,48,099
Total		₹ 1,31,10,000	₹ 2,53,84,000	₹ 32,56,499	₹ 4,17,50,499

Here we are submitting bank confirmation receipt of an amount of **Rs. 15,75,86,600/- (Fifteen Crore Seventy-Five Lakh Eighty Six Thousand Six Hundred Only)** as per the demand note raised towards the balance payment for implementation of Wildlife Management Plan has been deposited and transferred to Jharkhand CAMPA account vides RTGS UTR No. **UTIBR52025030400358796** on dated **04.03.2025**(Copy enclosed as Annexure A). Following is the summary--

Balance amount towards Wildlife Management Plan Summary					
Sl. No	Particulars	Chatra North Forest Division	Chatra South Forest Division	Latehar Forest Division	Total
1	Sanctioned Amount by PCCF, Wildlife & CWLW Jharkhand vide office order no. 26 dated 22.03.2024	₹ 7,17,78,000	₹ 7,22,11,000	₹ 4,70,00,000	₹ 19,09,89,00

Registered Office: Adani House, Nr. Mithakhali Six Roads, Navrangpura, Ahmedabad, Gujarat, India 380009
CIN: U41103GJ2015GOI094910



North Karanpura Transco Limited

(Program Under Government of India)

Jayprabha Nagar, Behind Celebration Marriage Hall

Near Markham College Hazaribagh 825301

Email Id: northkaranpuratransco@gmail.com

2	Lump-sum amount deposited by NKTL (2% of Project Cost) towards Wildlife Management Plan	₹ 1,04,90,000	₹ 2,03,07,200	₹ 26,05,200	₹ 3,34,02,400
3	Balance amount deposited by NKTL towards Wildlife Management Plan	₹ 6,12,88,000	₹ 5,19,03,800	₹ 4,43,94,800	₹ 15,75,86,600

This is for your kind information.

Thank you.

Yours faithfully,

For, North Karanpura Transco Limited



AGENCY COPY


यूनियन बैंक ऑफ इंडिया Union Bank of India
 भारत सरकार का वाहन A Government of India Undertaking



NEFT / RTGS CHALLAN for CAMPA Funds

Date : 03-03-2025

Agency Name.	NORTH KARANPURA TRANSCO LIMITED
Application No.	6441236718
MoEF/SG File No.	FP/JH/TRANS/41236/2019
Location.	JHARKHAND
Address.	Sunita Sadan 1st Floor Ashram Marg Bariatu Near Military Firing Range Ranchi
Amount(in Rs)	157586600/-

Amount in Words :Fifteen Crore Seventy-Five Lakh Eighty-Six Thousand Six Hundred Rupees Only

NEFT/RTGS to be made as per following details;

Beneficiary Name:	JHARKHAND CAMPA
IFSC Code:	UBIN0996335
Pay to Account No.	150726441236718 Valid only for this challan amount.
Bank Name & Address:	Union Bank Of India FCS Centre, 21/1, III Floor, Jelitta Towers, Mission Road, Bengaluru-560027

• This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

BANK COPY


यूनियन बैंक ऑफ इंडिया Union Bank of India
 भारत सरकार का वाहन A Government of India Undertaking



NEFT / RTGS CHALLAN for CAMPA Funds

Date : 03-03-2025

Agency Name.	NORTH KARANPURA TRANSCO LIMITED
Application No.	6441236718
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Amount in Words :Fifteen Crore Seventy-Five Lakh Eighty-Six Thousand Six Hundred Rupees Only

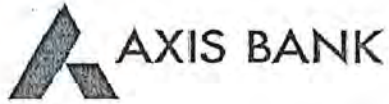
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Pay to Account No.	150726441236718 Valid only for this challan amount.
Bank Name & Address:	Union Bank Of India FCS Centre, 21/1, III Floor, Jelitta Towers, Mission Road, Bengaluru-560027

• This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

Note:After making the required payment through challan, if the payment status has not been updated even after 7 working days, then kindly mail a copy of your challan with transaction date and reference id to Email: fcsblr@unionbankofindia.bank , epurse@unionbankofindia.bank, ubin0903710@unionbankofindia.bank





AXIS BANK LIMITED

Date : 04-MAR-25

To

North Karanpura Transco Limited

REMITTANCE ADVICE

UTR /REFERENCE NUMBER : UTIBR52025030400358796

Processed at SOL : 3414 - SHANTIGRAM TOWN SHIP, ADALAJ

We confirm having received your request for outward payment on 04-MAR-25, as per below details.

Payment Mode	RTGS	Beneficiary Bank Details	
Debit Account	916020044459475	Bank name	UNION BANK OF INDIA
Debit account name	North Karanpura Transco Limited	Bank IFS code	UBIN0996335
Remittance Details		Beneficiary Details	
Remittance Amount	157586600	Beneficiary Name	Jharkhand Campa
Processing Date	04-MAR-25	Beneficiary Account Number	150726441236718

Please note that all payment are processed subject to Bank's terms and conditions.

This is a system generated advice and does not require signature.



AGENCY COPY

यूनियन बैंक Union Bank of India



NEFT / RTGS CHALLAN for CAMPA Funds

Date : 03-11-2023

Agency Name.	NORTH KARANPURA TRANSCO LIMITED
Application No.	6441236504
MoEF/SG File No.	FP/JH/TRANS/41236/2019
Location.	JHARKHAND
Address.	Sunita Sadan 1st Floor Ashram Marg Bariatu Near Military Firing Range Ranchi
Amount(in Rs)	41750499/-

Amount in Words :Four Crore Seventeen Lakh Fifty Thousand
Four Hundred and Ninety-Nine Rupees - Only

NEFT/RTGS to be made as per following
details;

Beneficiary Name:	JHARKHAND CAMPA
IFSC Code:	UBIN0996335
Pay to Account No.	150726441236504 Valid only for this challan amount.
Bank Name & Address:	Union Bank Of India FCS Centre, 21/1, III Floor, Jelitta Towers, Mission Road, Bengaluru-560027

- This Challan is strictly to be used for making
payment to CAMPA by NEFT/RTGS only

BANK COPY

यूनियन बैंक Union Bank of India



NEFT / RTGS CHALLAN for CAMPA Funds

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Agency Name:	NORTH KARANPURA TRANSCO LIMITED
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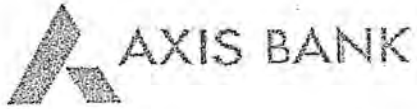
NEFT/RTGS to be made as per following
details;

Beneficiary Name:	JHARKHAND CAMPA
IFSC Code:	UBIN0996335
Pay to Account No.	150726441236504 Valid only for this challan amount.
Bank Name & Address:	Union Bank Of India FCS Centre, 21/1, III Floor, Jelitta Towers, Mission Road, Bengaluru-560027

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Raghyendra Kumar
Head-Projects (Site) TL
VTL Hazaribagh



AXIS BANK LIMITED

Date : 06-NOV-23

To

North Karanpura Transco Limited

REMITTANCE ADVICE

UTR /REFERENCE NUMBER : UTIBR52023110600359191

Processed at SOL : 3414 - SHANTIGRAM TOWN SHIP, ADALAJ

We confirm having received your request for outward payment on 06-NOV-23, as per below details.

Payment Mode	RTGS	Beneficiary Bank Details	
Debit Account	916020044459475	Bank name	UNION BANK OF INDIA
Debit account name	North Karanpura Transco Limited	Bank IFS code	UBIN0996335
Remittance Details		Beneficiary Details	
Remittance Amount	41750499	Beneficiary Name	Jharkhand Campa
Processing Date	06-NOV-23	Beneficiary Account Number	150726441236504

Please note that all payment are processed subject to Bank's terms and conditions.

This is a system generated advice and does not require signature.

Divisional Forest Officer
Catchment Forest Division



Ragendra Kumar
Head-Projects (Site) TL
NKTL Hazaribagh



Office of the Principal Chief Conservator of Forests

Van Bhawan, Doranda, Ranchi - 834 002
Email: pccf-jhk@gov.in, Phone No. 0651-2481909

File no. - 22 पी०-3(3)-01/2024

Office Order No. 142 dated 12.09.2025

Sanction Order of the Site-Specific Soil and Moisture Conservation Plan with reference to Diversion of 197.0115 Ha. (Chatra North – 61.772 Ha. , Chatra South – 119.8806 Ha. and Latehar – 15.3589 Ha.) of forest land towards "Construction of 400 KV D/C North Karanpura - Gaya Transmission Line (Jharkhand Portion)" in the State of Jharkhand in favour of M/s North Karanpura Transco Limited.

The Instant Soil and Moisture Conservation Plan has been submitted by M/s North Karanpura Transco Limited (referred to as "the Use Agency") in pursuance of the following conditions laid by Regional Office, MoEF&CC, under Section 2 of Forest (Conservation) Act, 1980, condition no. A (4) "In-Principle" Stage-I approvals vide letter no. FP/JH/TRANS/41236/2019/1154 dated 06.06.2023 for Diversion of 197.0115 Ha. (Chatra North – 61.772 Ha., Chatra South – 119.8806 Ha. and Latehar – 15.3589 Ha.) of forest land for construction of 400 KV D/C North Karanpura - Gaya Transmission Line in the State of Jharkhand in favour of M/s North Karanpura Transco Limited.

The aforesaid Terms of Reference laid by the Central Government reads as follows:

A: Conditions which need to be complied prior to handing over of forest land by the State Forest Department.

Condition No. A(4) : "As recommended by the Regional Empowered Committee, a Wildlife Management Plan and Soil & Moisture Conservation Plan should be prepared by concerned DFO/Project PropONENT and approved by the PCCF (Wildlife) & Chief Wildlife Warden, Jharkhand for getting implemented at project cost. The duly approved plan should be submitted in IRD, MoEF&CC, Ranchi before issuance of Final approval. If the finalization of these plans is delayed for any reason not attributable to State/User agency, ministry's guideline File No. FC-11/43/2021-FC dated 7th June 2022 can be followed."

2. It was informed by the User Agency that in compliance of the above-mentioned conditions, the integrated Soil & Moisture Conservation Plan has been prepared in consultation with the forest officials including DFO, Chatra North Forest Division, DFO, Chatra South Forest Division, Conservator of Forest (CF) Territorial Circle, Chatra, Regional Chief Conservator of Forest, Hazaribagh and DFO, Latehar Forest Division, Conservator of Forest (CF) Territorial Circle, Medininagar, Regional Chief Conservator of Forest, Palamau (Medininagar).
3. The Regional Chief Conservator of Forests, Hazaribagh has first submitted the Soil & Moisture Conservation Plan vide his office letter no. 1371 dated 31.07.2024 to the office of PCCF & HoFF for the undersigned for consideration and sanction.
4. The Plan was discussed in detail on dated 04.09.2024 in the presence of concerned officers and the representative of User Agency. After discussion the following observation are made -



- (i) The Plan has been submitted by the user agency as Soil Erosion Mitigation Plan which should be correctly named as Soil & Moisture Conservation Plan, as required in the stage-1 FC clearance.
- (ii) It was discussed and decided that the impact area of the mining project falling in the villages of Chatra South, Chatra North and Latehar Forest Divisions within an impact zone of around 10 km need to be included.
- (iii) The Plan lacks in site-specific technical parameters and locational details of all the proposed interventions. In view of the detailed discussions, it was decided to incorporate site-specific technical details in the Plan document.
- (iv) Awareness Development Programme need to be further elaborated and duly modified.
- (v) The User Agency has agreed to submit the revised plan.

5. The User Agency North Karanpura Transco Limited has submitted the Soil & Moisture Conservation Plan to the office of undersigned vide his office letter no. NKTL/NKG/2024-25/F318 dated 02.04.2025,

6. In order to examine the plan prescriptions once again, a communication was issued to the Regional Chief Conservator of Forests (RCCF), Hazaribagh, Conservator of Forest (CF), Territorial Circle, Medininagar, Conservator of Forest (CF), Territorial Circle, Chatra, DFO, Chatra North Forest Division, DFO, Chatra South Forest Division and DFO, Latehar Forest Division and User Agency, vide this office letter no. 1052 dated 24.04.2025 to make a presentation discuss the plan in the meeting scheduled on 28.04.2025 in the conference hall of the

undersigned. The presentation was made by the Project proponent in the presence of Regional Chief Conservator of Forests, Hazaribagh, Chief Conservator of Forests (CF), Territorial Circle, Medininagar (Palamua), Chief Conservator of Forests (CF), Territorial Circle, Chatra, DFO, Chatra North Forests Division, DFO, Chatra South Forests Division and DFO, Latehar Forest Division, Managing Director, North Karanpura Transco Limited and Sri. Raghvendra Kumar were also present during the presentation.

7. It was decided in the meeting that the present plan should be revised as per the direction given in the letter no. 2405, dated 06.09.2024 and should be submitted through the Concerned RCCFs.
8. The Regional Chief Conservator of Forests, (RCCF), Palamau, (Medininagar), vide his office letter no. 1260 dated 01.09.2025 and Regional Chief Conservator of Forest, (RCCF), Hazaribagh, vide his office letter no. 1775 dated 02.09.2025 have submitted revised Plans as per the direction given through letter no. 2405, dated 06.09.2024 to the office of the undersigned for consideration and subsequent sanction.
9. After the deliberations on various provisions of the proposed Plan, it was observed:
 - i) The Transmission line passes through the three Forest Divisions, Chatra South Forest Division, Chatra North Forest Division and Latehar Forest Division. The total number of 206 towers are proposed to be erected for the transmission line in the jurisdiction of

Jharkhand State. Out of these 206 towers, 52 towers will be erected in Chatra North Forest Division, 117 towers in Chatra South Forest Division and 37 towers in Latehar Forest division. The total impact area would be 87550 square meters along the transmission line.

- ii. In the project impact area, Buffer zone is considered as the geographical area within 500 meters from center line on both sides of the transmission line to the limit of administrative jurisdiction of Chatra South, Chatra North and Latehar the Forest Division area. The impact area comprises of total 87 villages. The Chatra North division has 29 Villages, Chatra South Division has 47 villages and Latehar Division has 11 villages within the impact zone of 500 meters on either side of transmission line.

10. The cost of the proposed 10 years Soil & Moisture Conservation Plan with respect to the activities to be carried out by DFO, Chatra North Forest Division, DFO, Chatra South Forest Division and DFO, Latehar Forest Division have been estimated to be Rs. 1453.755 lakh. The summary of the proposed interventions (component wise activities) under the Plan is as follows:-

1

Financial Forecast of the Activities to be implemented by Forest Department
under Soil & Moisture Conservation Plan of 400 KV/DC North Karanpura -
Gaya Transmission line Under Chatra North and Chatra South Forest Division
and Latehar Forest Division.

Sl No	Activity Head	Chatra North Forest Division (Rs. In Lakh)	Chatra South Forest Division (Rs. In Lakh)	Latehar Forest Division (Rs. In Lakh)	Total (Rs. In Lakh)
1.	Potential Soil & Moisture Conservation through vegetative Measures	181.322	217.51	100.956	499.788
2.	Improving Water Regime	266.657	203.00	48.820	518.477
3.	Awareness, Capacity Building & Documentation	49.500	76.12	10.500	136.12
4.	Programme Cost for SMC	24.000	25.00	5.00	54.00
	Sub Total	521.479	521.63	165.276	1,208.385
	Cost Escalation (20%) (Cost Added)	104.2958	104.33	33.0552	241.681
	Contingency @ 2.0%	-	-	3.692	3.692
	Grand Total	625.775	625.96	202.02	1,453.755

Cost to the User Agency towards implementation of the SMC Plan is Rs. 1,453.755 Lakh.

11. The Plan with a total financial outlay of Rs. 1,453.755 Lakh extends over a period of 10 years and shall be utilized by the Forest Department through the DFO, Chatra North Forest Division, DFO, Chatra South Forest Division and DFO, Latehar Forest Division in accordance with the Plan prescriptions.

12. Considering the proposals under the plan submitted by the User Agency and recommendation of the concerned forest officers, sanction is hereby accorded to the instant Plan subject to the following conditions:



- (i) That the User Agency shall ensure that its officials/contractors and the work force engaged into mining and allied operations under the Project shall not commit or abet any forest/wildlife offence in their area of operation. They will also promptly report any forest/wildlife offence in the area to the nearest forest office/official. Further, they will extend their full cooperation to the forest officials in control/mitigation of any incident, natural or man-made, determined to forest and wildlife in their area of operation.
- (ii) That the total amount of Rs. 1,453.755 Lakh (Fourteen Crore fifty three lakhs seventy five thousand and five hundred only) shall be deposited by the User Agency into CAMPA account under the relevant head/sub-head and shall be utilized by the State Forest Department through the DFO, Chatra North Forest Division, DFO, Chatra South Forest Division and DFO, Latehar Forest Division as delineated under the Plan, strictly in accordance with the prevailing norms under the Jharkhand Forest Department.
- (iii) That as regards the funds earmarked against activities to be undertaken by the State Forest Department, the DFO, Chatra North Forest Division, DFO, Chatra South Forest Division and DFO, Latehar Forest Division shall prepare a detailed Annual Plan of Operations (APO) in the beginning of every financial year in respect of the instant Plan following all the rules, regulations, Schedule of Rates etc. issued from time to time by the State Government/Forest Department. Regional Chief Conservator of Forests, Palamua (Medininagar) and Regional Chief Conservator of Forest,



Hazaribagh shall supervise & closely monitor the progress of the activities undertaken by DFO, Chatra North Forest Division, DFO, Chatra South Forest Division and DFO, Latehar Forest Division as per the approved APO & funds released under CAMPA.

- (iv) That the Conservator of Forests (CF), Territorial Circle, Palamua (Medininagar) and Conservator of Forests (CF), Territorial Circle, Chatra shall supervise all the activities as per directions issued by the Forest Department from time to time.
- (v) That the DFO, Chatra North Forest Division, DFO, Chatra South Forest Division and DFO, Latehar Forest Division shall carry out the activities under the Plan strictly as per the duly sanctioned APO.
- (vi) That above the DFO, Chatra North Forest Division, DFO, Chatra South Forest Division and DFO, Latehar Forest Division shall ensure that no violation of duly sanctioned Management Working Plans of their Forest Divisions takes place during implementation of any of the activities involved in this plan over notified and demarcated forest land.
- (vii) That the instant Plan is dynamic and should be revisited after 5 year to assess its compatibility with mining and its concurrent reclamation activities and a revised Plan be formulated as per requirement.
- (viii) That though adequate provisions have been made towards cost escalation in the plan viz. increase in wage rate/material cost etc., yet the User Agency shall submit an undertaking to the Divisional

Forest Officer, DFO, Chatra North Forest Division, DFO, Chatra South Forest Division and DFO, Latehar Forest Division to the effect that they will deposit extra cost of the plan beyond the cost escalation provision owing to increase in wage rate etc. in due course of time as well as consequent upon revision in the plan, if any, as and when given effect to by the competent authority.

Sd/-
Principal Chief Conservator of Forests,
Jharkhand, Ranchi

File no.- 22 षी०-3(3)-01/2024/ Memo No. dated

Copy forwarded to Deputy Director General of Forests (Central), Ministry of Environment, Forest & Climate Change, Integrated Regional Office, Ranchi, Harmu Housing Colony, Ranchi [email: ro.ranchi-mef@gov.in] / Principal Chief Conservator of Forest-cum-Executive Director, Waste Land Development Board, Jharkhand, Ranchi / Additional PCCF, CAMPA along with a copy of the Plan, for information and necessary action.

Sd/-
Principal Chief Conservator of Forests,
Jharkhand, Ranchi

File no.- - 22 षी०-3(3)-01/2024/ Memo No. dated

Copy forwarded to Regional Chief Conservator of Forest, Palamua (Medininagar)/ Regional Chief Conservator of Forest, Hazaribagh/Conservator of Forest, Territorial Circle, Medininagar/Conservator of Forest, Territorial Circle, Chatra/ DFO, Chatra North Forest Division/DFO, Chatra South Forest Division/DFO, Latehar Forest Division for information and necessary action.

Sd/-
Principal Chief Conservator of Forests,
Jharkhand, Ranchi

File no.- - 22 षी०-3(3)-01/2024/ Memo No. 2229 dated 12-09-2025
Copy forwarded to Managing Director, North Karanpura Transco Limited, Hazaribagh for information and necessary action.


Principal Chief Conservator of Forests,
Jharkhand, Ranchi



SOIL & MOISTURE CONSERVATION PLAN

FOR 400 kV (D/C) TRANSMISSION LINE FROM NORTH
KARPURA THERMAL POWER PLANT (3x660 MW)
TO GAYA (JHARKHAND PORTION)



Social Initiative through Development &
Humanitarian Action (SIDHA)

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Rail

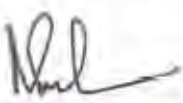
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

Executive Summary

Energy has been a vital force for development to take place. Jharkhand despite of being rich in many resources has been underdeveloped due to lack of rail and energy transmission networks. To make it happen Jharkhand Government is trying to develop transmission network across Jharkhand with the support from Government of India. North Karanpura Transco Limited (NKTL) is a subsidiary of Adani Energy Solutions Limited (AESL) which has been formed to establish the Transmission System for "Immediate Evacuation for North Karanpura (3x660MW) generation project of NTPC along with creation of 400/220kV Substation at Dhanbad (ERSS-XIX)". Accordingly, NKTL has proposed to construct 400 kV (D/C) transmission line with quad moose conductor from North Karanpura Thermal Power Plant (3x660MW) to PGCIL 765/400/220 KV Substation at Gaya.

The proposed soil conservation plan is being prepared in compliance of the condition number-4 of the stage-I clearance for the proposed transmission line.

"As recommended by the Regional Empowered Committee, a Wildlife Management Plan and Soil & Moisture Conservation Plan should be prepared by concerned DFO/Project Proponent and approved by the PCCF (Wildlife) & Chief Wildlife Warden, Jharkhand for getting implemented at project cost. The duly approved plan should be submitted in IRO, MoEF&CC, and Ranchi before issuance of Final approval. If the finalization of these plans is delayed for any reason not attributable to State/User agency, ministry's guideline File No. FC-11/43/2021-FC dated 7th June 2022 can be followed."


DFO-Chatra South
Mukesh Kumar I.F.S.
Divisional Forest Officer
Chatra South Forest Division


CF-Chatra
Conservator of Forests
Territorial Circle Chatra


DFO-Chatra North
Rahul Kumar, I.F.S.
Divisional Forest Officer
Chatra North Forest Division


RCCF-Hazaribagh
Regional Chief Conservator Of Forests
• Hazaribagh


Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

The transmission line passes through the three forest divisions Chatra South Forest Division, Chatra north Forest Division and Latehar Forest Division. The total number of towers that will be erected for the transmission line in the stretch through Jharkhand will be 206 towers in all three divisions. With an average tower area of approximately 425 square meters and the total area that will actually be making an impact will be 87550 square meters.

Sl no	Division	Total towers	Forest Area Tower	Non Forest Area
1	Latehar	37	14	23
2	Chatra South	117	90	63
3	Chatra North	52	43	9
	Total Towers	206	147	59

The total impact area in the three divisions under forest area will be 62475 M² and in the non-forest area the impact area will be 25075 M², making total impact area at 87550 M² for the project.

Project Brief:

Impact area- Impact area of the project will be the 87 villages which are part of the project. Chatra North division has 29, Chatra South Division has 47 and Latehar Division has 11 villages which are in impact zone of 500 mtrs on either side of transmission line.

- Total Project Cost excluding taxes and duties works out to INR 167 crores.
- **Time line for implementation of proposed implementation:** 10 years from the date of first implementation of the activity.

Need for Soil Conservation: Water is the major agent responsible for erosion in the project area. In a hilly area, as in the present case, erosion due to water is a common phenomenon and the same has been put as a part of the Soil Conservation Plan. Soil erosion leads to:

- reduction in infiltration rates
- reduction in water-holding capacity
- increase in operation costs
- reduction in water supply

The plan addresses issues such as prevention of cutting off soil to reducing rate of erosion, increasing soil holding capacity; and arresting sediment flow in flowing waters. The objectives can be depicted as-

- To compensate for the soil and water losses due to change in land use pattern
- To proposed and construct soil and moisture conservation activities for reducing adverse impact on the local micro climate
- To create facilities for reducing discharge of eroded particles in the drains

Raghu
Raghuender Kumar
Head-Projects (GIM) TL
NITL - Hazratnagar

Measures taken for reducing soil erosion

Since the change in land use pattern will lead to soil erosion and it is true for transmission lines as well. Following measures can be taken to reduce and control the soil erosion through –

- Area Treatment activities.
- Drainage line treatment activities
- Creating water storage structures like ponds and check dams.

Impact zone/Buffer zone of the Transmission line:

For the purpose of formulating the Soil and moisture conservation Plan, the Impact Area (IA)/ Buffer zone (BZ) has been considered as the geographical area within 500 m from centre line on both sides of the transmission line to the limit of administrative jurisdiction of Chatra South, Chatra North and Latehar forest division area.

The project impact area for all practical purposes has been taken under the buffer of 500 m along the transmission line. It will have a maximum of 7050.09 ha of land mass. Based on the map created with a buffer of 500 m, villages have been listed out with administrative boundary and data on demography and land use has been collected.

Demography and livelihood in the impact zone: The buffer zone of the transmission line houses 8186 households across 87 buffer zone villages having only 5.63 % ST and 38.84 % SC population. Literacy rate stands at 30.03%. The average working population is close to 40.38 % with rest being non-working population.

Methodology of preparing the report

The methodology adopted for preparing the proposed plan has been based on the watershed approach, which is an acceptable scientific manner of treating areas with undulating terrain having different ridge and valley lines. The processes have been-

- Marking a longitudinal area of 500 m around the proposed transmission line
- Getting demographic details and land use pattern based on census report by government of India

RAG-1
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

- Field visit and discussion with communities and forest officials for taking their concerns
- Blending of people's requirement and technical needs of treatment of the area
- Getting coordinates for the proposed interventions
- Getting estimates and preparing a consolidated plan
- Forecasting impacts of the proposed interventions

Proposed area for treatment and reasons for the same:

There are two types of area under the proposed project. One is the core area where transmission line towers are being constructed and other areas around the transmission line (Commonly called Transmission Line Corridors), which will be affected due to construction of transmission line. Along with the impacts on the soil and water livelihood of forest dependent communities will also be affected and plan has also taken in to consideration of the impact on the livelihood aspects.

Potential impact of the project in the area:

The project will have challenges associated with excavation and resultant erosion due to construction of towers for transmission lines. The usual challenges associated with the project are –

- **Topsoil Disturbance:** Excavation for tower foundations can lead to loss of fertile topsoil, impacting soil health and local vegetation.
- **Soil Erosion and Runoff:** Removal of vegetation and exposure of loose soil increases the risk of erosion, particularly during the rainy season, causing sedimentation in nearby streams and low-lying areas.
- **Slope Destabilization:** Tower construction on sloped or undulating terrain may lead to instability and potential landslides if not properly managed.
- **Interruption of Natural Drainage Patterns:** Foundation works may obstruct or divert natural water flow, resulting in localized flooding or water stagnation.
- **Vegetation Clearance:** Site preparation often involves clearing trees and shrubs, reducing ground cover that protects against erosion.
- **Compaction and Soil Hardening:** Movement of heavy machinery and material during construction may compact the soil, reducing its infiltration capacity and increasing surface runoff.

Raghu

Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

- **Waste Disposal Issues:** Improper disposal of excavated material and construction debris may create uneven terrain and hinder future land use or restoration efforts.

Quantification of the potential run off and eroded soil:

Potential water loss from the area: The loss of water as run off depends on the type of land use, rainfall intensity and the total area of the catchment. As depicted above the land use pattern will result in the loss of a maximum of 0.3416 lakh cum of runoff.

Potential loss of soil due to erosion: The different studies suggest that average soil loss from a forested landscape is approximately 4.64 tons/ha/year. The total soil loss from the project area per year will be approximately 406 tons/year based on the area of 87504 Sq Meter.

Soil Conservation plan proposed for mitigating impacts:

Based on the topography, slope and soil the treatment measures has been designed for arresting runoff, reducing erosion and sediments, improving ground water recharge for improving flow in the rivulets and also for storing water for use by dependent communities.

The Soil Conservation involves

- Understanding of the erosion characteristics of the terrain and,
- Suggesting remedial measures to reduce the erosion rate

The conservation plan that has been proposed are-

- Bio engineering measures like avenue plantations, riverside plantations
- Engineering measures like contour trenches, check dams, ponds and loose boulder structures

Apart from the general activities of complying with the soil and water loss, capacity building and awareness initiatives have also been proposed. The transmission lines will create livelihoods in from of wage earning during the construction phase of the transmission line.

- Awareness and Capacity building
- Documentation and

Following activities has been designed for reducing erosion and its impact in the catchment area of the proposed project-

- **Potential Soil and Moisture conservation through vegetative measures**

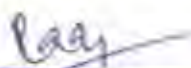
This is the most needed activity to compensate the losses incurred due to the disturbance created due to diversion of forest land for the proposed transmission line. Under this head activity like contour trenches, riverside plantations, avenue plantations, silvicultural operations and distribution of free planting materials has been planned across the three forest divisions. The activities are specific to the three divisions has been put in the proposed physical financial plan for the three divisions, which is attached with the report.

- **Improving water regime**

Apart from the area treatment an activity that has been mentioned above, drainage line treatment activities have also been part of the plan to make it a complete plan for soil and moisture conservation. Activities like loose boulder check dams, masonry check dams, construction of new ponds, renovations of ponds and silt detention dams based on the need of the area has proposed and planned. These activities will help in storage of runoff and also for improving soil moisture regime in the forest area.

- **Awareness, capacity building & Documentation**

Intervening through physical interventions will help in area treatment and drainage line treatment but to keep activities intact it requires to build capacities and train people for the same. The plan has proposed different activities like organising awareness camps in the impact zone villages, involving schools and educational institutions in the process of creating awareness, documentation of the activities along with printing and distributing IEC materials has also been planned in the proposed activities.


Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

Monitoring cost:

Monitoring costs cover periodic field assessments and evaluation of implemented soil and moisture conservation measures. This will be done by the DFOs of the respective divisions and other higher officers on a quarterly basis or based on the need of the field. This will help in better implementation of the plan and doing course correction if needed.

Escalation @ 20 percent:

A 20% escalation cost is provisioned to account for inflation, price fluctuations in materials, and unforeseen expenses over the implementation period. This ensures financial flexibility and smooth execution of project activities without compromising quality.

Impact area- Impact area of the project will be the 76 villages covering an area of 5706 ha including all areas which are part of the project.

Cost of the project:

- Chatra South Forest Division having 47 villages and a project cost of Rs. 625.96 lakhs
- Chatra North Forest Division having 29 villages and a project cost of Rs. 625.77 lakhs

Timeline of the project: Ten years from the date of first implementation of the activity.

Raghu
Raghvendra Kumar
Head Projects (Site) TL
NKTL - Hazaribagh

Mukesh
DFO-Chatra South
Mukesh Kumar I.F.S.
Divisional Forest Officer
Chatra South Forest Division

Sanjay
CF-Chatra
Conservator of Forests
Territorial Circle Chatra

Rahul
DFO-Chatra North
Rahul Meena, I.F.S.
Divisional Forest Officer
Chatra North Forest Division

[Signature]
RCCB-Hazaribagh
Regional Chief Conservator Of Forest
• Hazaribagh

**FINANCIAL FORECAST OF THE ACTIVITIES TO BE IMPLEMENTED BY FOREST DEPARTMENT UNDER SOIL & MOISTURE CONSERVATION PLAN OF
400 KV D/C NORTH KARANPURA THERMAL POWER PLANT TO GAYA UNDER CHATRA NORTH FOREST DIVISION**

Year wise Financial plan in Lakh INR												
Sl No.	Activity	Cost	1st Yr	2nd Yr	3rd Yr	4th Yr	5th Yr	6th Yr	7thyr	8th Yr	9th Yr	10th Yr
Potential Soil and Moisture Conservation through Vegetative Measures												
1	River Side Plantation in 2.0 Kilometres (along Lhanjan River/ other rivers as per SoR of PCCF Development)	47.768	23.759	5.619	5.536	5.397	2.833	2.059	2.065	0.000	0.000	0.000
2	Silvicultural plantations in 50 ha	60.130	41.490	9.563	4.322	4.955	0.000	0.000	0.000	0.000	0.000	0.000
3	Avenue Plantation with bamboo gabion (1000 Gabions)	54.209	15.797	14.683	11.172	12.647	0.000	0.000	0.000	0.000	0.000	0.000
4	Distribution of free planting material	19.125	1.200	1.320	1.452	1.597	1.757	1.933	2.126	2.338	2.572	2.830
		181.322	82.246	30.985	22.482	25.096	4.590	3.992	4.191	2.338	2.572	2.830
Improving Water Regime												
5	Soil and Moisture Conservation Work: e.g., Gully plugging, Silt Detention Dam, Contour Trenches, Retaining Wall, Nala Treatment, Spurs, other correne control structures, within/nearby impact zone for improvement in Water Regime in total 180 Ha (1st year -120 ha. and 2nd Year-60 ha)@ 100 MD per ha	81.837	51.960	29.877	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	Construction of Check dams of various sizes	107.000	45.000	22.000	32.000	0.000	0.000	0.000	0.000	3.000	2.000	3.000
7	Creation of 6 new ponds with hydraulic machine and its de-siltation from 8th year onwards	21.660	10.340	5.220	0.000	0.000	0.000	0.000	0.000	3.000	2.000	1.000
8	Renovation of the earthen check dam at Gaighat (150 Ft X 10 Ft)	6.250	6.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	Renovation of Pond of various sizes	21.910	7.400	5.550	8.960	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	Construction of Loose Boulder Check Dam and Repair	28.000	12.500	12.500	0.000	0.000	0.000	1.500	0.000	0.000	0.000	1.500
		266.657	133.550	75.147	40.960	0.000	0.000	1.500	0.000	6.000	4.000	5.500

**FINANCIAL FORECAST OF THE ACTIVITIES TO BE IMPLEMENTED BY FOREST DEPARTMENT UNDER SOIL & MOISTURE CONSERVATION PLAN OF
400 KV D/C NORTH KARANPURA THERMAL POWER PLANT TO GAYA UNDER CHATRA NORTH FOREST DIVISION**

Sl No.	Activity	Cost	Year wise Financial plan in Lakh INR									
			1st Yr	2nd Yr	3rd Yr	4th Yr	5th Yr	6th Yr	7thyr	8th Yr	9th Yr	10th Yr
			Fin	Fin	Fin	Fin	Fin	Fin	Fin	Fin	Fin	Fin
Awareness, Capacity Building & Documentation												
I	Organizing Awareness Camps/ celebration of important days in local villages/School/Colleges/ Distribution of booklets, pamphlets & banners regarding Forest, Soil & Moisture Conservation/ Filing of Soil & Water Conservation Awareness Signages, Hoardings at Vulnerable locations, and General Awareness generation about Climate Change, etc	42.000	7.000	8.000	3.000	3.000	5.000	3.000	3.000	5.000	3.000	5.000
II	Documentary Preparation/Film Making/ Brochures/Comics, etc. for awareness generation/ Photography & documentation of activities to be undertaken under the Soil & Moisture Conservation plan	7.500	1.500	0.750	0.500	0.500		1.000	0.500	0.500		1.000
	Programme Cost for SMC	49.500	8.500	8.750	3.500	3.500	5.500	4.000	3.500	5.500	3.750	6.000
I)	Monitoring Cost	492.479	224.296	111.882	66.942	28.596	10.090	9.492	7.691	13.838	10.322	14.330
	Total Cost	541.979	240.000	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400
II	Escalation @ 20 percent (incl. Contingency)	104.296	45.339	22.856	13.868	6.199	2.498	2.378	2.018	3.248	2.544	3.346
	Grand Total	646.275	285.339	137.138	83.210	37.195	14.988	14.270	12.109	19.486	15.267	20.075

Pagel
User Name

Raghvendra Kumar
Head-Projects (Site) TL
NKTl Hazaribagh

Rajul
Rajul Meena, I.F.S.
Divisional Forest Officer
Chatra North Forest Division

CP Chatra
Conservator of Forests
Territorial Circle Chatra

RCCP Hazaribagh
Regional Chief Conservator Of Forest
Hazaribagh

FINANCIAL FORECAST OF THE ACTIVITIES TO BE IMPLEMENTED BY FOREST DEPARTMENT UNDER SOIL & MOISTURE CONSERVATION PLAN OF 400 KV D/C NORTH KARANPURA THERMAL POWER PLANT TO GAYA UNDER CHATRA SOUTH FOREST DIVISION

Year wise Financial plan in Lakh INR													
Sl no	Activity	Cost	1st Yr Fin	2nd Yr Fin	3rd Yr Fin	4th Yr Fin	5th Yr Fin	6th Yr Fin	7thyr Fin	8th Yr Fin	9th Yr Fin	10th Yr Fin	
Potential Soil and Moisture conservation through vegetative measures													
1	Contour trench@ 430 ha across 14 villages with slope 10% to 20%	99.80	30.17	41.78	27.85								
2	Silvicultural plantations in 100 ha	117.70	40.662	9.143	4.215	4.832	40.662	9.143	4.215	4.832			
		217.51	70.84	50.92	32.07	4.83	40.66	9.14	4.22	4.83	0.00	0.00	
Improving water regime													
3	Construction of Pucca Checkdams-12 Mtr X 1.2 Mtr @10 L and Desiltation	55.00	30.00	20.00									
4	Construction of Pucca Checkdams-14 Mtr X 1.2 Mtr @15L and Desiltation	49.00	30.00	15.00						3.00	2.00		
5	Creation of new ponds (100 x 100 x 12) feet @8 lakhs and Desiltation	46.00	24.00	16.00						3.00	1.00		
6	Construction of Loose Boulder Structures (5 Mtr x 1 Mtr) @ 1348/Cum and repair	53.00	12.50	12.50	12.50	12.50				3.00	2.00	1.00	
		203.00	96.50	63.50	12.50	12.50	0.00	0.00	0.00	10.00	6.00	2.00	
Awareness Capacity building and Documentation													
7	Awareness regarding climate change and adaptation	50.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	
8	Distribution of Seedlings to public	39.12	1.20	1.32	1.45	1.60	1.76	1.93	2.13	2.34	2.57	2.83	
9	Documentation	7.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	1.00	1.00	
		76.12	7.20	7.32	6.95	7.10	7.26	7.43	7.63	7.84	8.57	8.83	
	Programme cost for SMC	496.63	174.54	121.74	51.52	24.43	47.92	16.58	11.84	22.67	14.57	10.83	
10	Monitoring cost	25.00	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	
	Total cost	521.63	177.04	124.24	54.02	26.93	50.42	19.08	14.34	25.17	17.07	13.33	
11	Escalation @ 20 percent	104.33	35.41	24.85	10.80	5.39	10.08	3.82	2.87	5.03	3.41	2.67	
	Grand Total	625.96	212.44	149.09	64.82	32.32	60.50	22.89	17.21	30.20	20.49	16.00	

User Agency

Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

Mukesh Kumar I.F.S
Divisional Forest Officer
Chatra South Forest Division

CF Chatra
-Conservator of Forests
Terrestrial Circle Chatra

RCCG - Hazaribagh
Regional Chief Conservator Of Forest
Hazaribagh

Executive Summary

Energy has been a vital force for development to take place. Jharkhand, despite of being rich in many resources has been underdeveloped due to lack of rail and energy transmission networks. To make it happen Jharkhand Government is trying to develop transmission network across Jharkhand with the support from Government of India. North Karanpura Transco Limited (NKTL) is a subsidiary of Adani Energy Solutions Limited (AESL) which has been formed to establish the Transmission System for "Immediate Evacuation for North Karanpura (3X660MW) generation project of NTPC along with creation of 400/220kV Substation at Dhanbad (ERSS-XIX)". Accordingly, NKTL has proposed to construct 400 kV (D/C) transmission line with quad moose conductor from North Karanpura Thermal Power Plant (3x660MW) to PGCIL 765/400/220 KV Substation at Gaya.

The proposed soil conservation plan is being prepared in compliance of condition number-4 of the stage-I clearance for the proposed transmission line.

"As recommended by the Regional Empowered Committee, a Wildlife Management Plan and Soil & Moisture Conservation Plan should be prepared by concerned DFO/Project Proponent and approved by the PCCF (Wildlife) & Chief Wildlife Warden, Jharkhand for getting implemented at project cost. The duly approved plan should be submitted in IRO, MoEF&CC, and Ranchi before issuance of Final approval. If the finalization of these plans is delayed for any reason not attributable to State/User agency, ministry's guideline File No. FC-11/43/2021-FC dated 7th June 2022 can be followed."

The transmission line passes through the three forest divisions Chatra South Forest Division, Chatra North Forest Division and Latehar Forest Division. The total number of towers that will be erected for the transmission line in the stretch through Jharkhand in all three divisions will be 206 towers out of which 37 towers will be erected in Latehar Forest Division. With an average tower area of approximately 425 square meters and the total number of towers is 37 nos, the total area that will be making an impact will be 15725 square meters in Latehar Forest Division.

User Agency

Raghendra Kumar
Road-Projects (Site) TL
NKTL - Hazariuagh

DFO Latehar

CF MediniNagar
Conservator of Forests
Territorial Circle, MediniNagar

Regional Chief Conservator of Forests
RCCF MediniNagar

The transmission line passes through the three forest divisions Chatra South Forest Division, Chatra north Forest Division and Latehar Forest Division. The total number of towers that will be erected for the transmission line in the stretch through Jharkhand will be 206 towers in all three divisions. With an average tower area of approximately 425 square meters and the total area that will actually be making an impact will be 87550 square meters.

Sl no	Division	Total towers	Forest Area Tower	Non Forest Area
1	Latehar	37	14	23
2	Chatra South	117	90	63
3	Chatra North	52	43	9
	Total Towers	206	147	59

The total impact area in the three divisions under forest area will be 62475 M² and in the non-forest area the impact area will be 25075 M², making total impact area at 87550 M² for the project.

Project Brief:

Impact area- Impact area of the project will be the 87 villages which are part of the project. Chatra North division has 29, Chatra South Division has 47 and Latehar Division has 11 villages which are in impact zone of 500 mtrs on either side of transmission line.

- Total Project Cost excluding taxes and duties works out to INR 167 crores.
- **Time line for implementation of proposed implementation:** 10 years from the date of first implementation of the activity.

Need for Soil Conservation: Water is the major agent responsible for erosion in the project area. In a hilly area, as in the present case, erosion due to water is a common phenomenon and the same has been put as a part of the Soil Conservation Plan. Soil erosion leads to:

- reduction in infiltration rates
- reduction in water-holding capacity
- increase in operation costs
- reduction in water supply

The plan addresses issues such as prevention of cutting off soil to reducing rate of erosion, increasing soil holding capacity; and arresting sediment flow in flowing waters. The objectives can be depicted as-

- To compensate for the soil and water losses due to change in land use pattern
- To proposed and construct soil and moisture conservation activities for reducing adverse impact on the local micro climate
- To create facilities for reducing discharge of eroded particles in the drains

Raj
Rajivendra Kumar
Head-Projects (Site) TL
NMTL Hazaribagh

Measures taken for reducing soil erosion

Since the change in land use pattern will lead to soil erosion and it is true for transmission lines as well. Following measures can be taken to reduce and control the soil erosion through –

- Area Treatment activities.
- Drainage line treatment activities
- Creating water storage structures like ponds and check dams.

Impact zone/Buffer zone of the Transmission line:

For the purpose of formulating the Soil and moisture conservation Plan, the Impact Area (IA)/ Buffer zone (BZ) has been considered as the geographical area within 500 m from centre line on both sides of the transmission line to the limit of administrative jurisdiction of Chatra South, Chatra North and Latehar forest division area.

The project impact area for all practical purposes has been taken under the buffer of 500 m along the transmission line. It will have a maximum of 7050.09 ha of land mass. Based on the map created with a buffer of 500 m, villages have been listed out with administrative boundary and data on demography and land use has been collected.

Demography and livelihood in the impact zone: The buffer zone of the transmission line houses 8186 households across 87 buffer zone villages having only 5.63 % ST and 38.84 % SC population. Literacy rate stands at 30.03%. The average working population is close to 40.38 % with rest being non-working population.

Methodology of preparing the report

The methodology adopted for preparing the proposed plan has been based on the watershed approach, which is an acceptable scientific manner of treating areas with undulating terrain having different ridge and valley lines. The processes have been-

- Marking a longitudinal area of 500 m around the proposed transmission line
- Getting demographic details and land use pattern based on census report by government of India

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Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

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- Field visit and discussion with communities and forest officials for taking their concerns
- Blending of people's requirement and technical needs of treatment of the area
- Getting coordinates for the proposed interventions
- Getting estimates and preparing a consolidated plan
- Forecasting impacts of the proposed interventions

Proposed area for treatment and reasons for the same:

There are two types of area under the proposed project. One is the core area where transmission line towers are being constructed and other areas around the transmission line (Commonly called Transmission Line Corridors), which will be affected due to construction of transmission line. Along with the impacts on the soil and water livelihood of forest dependent communities will also be affected and plan has also taken in to consideration of the impact on the livelihood aspects.

Potential impact of the project in the area:

The project will have challenges associated with excavation and resultant erosion due to construction of towers for transmission lines. The usual challenges associated with the project are –

- **Topsoil Disturbance:** Excavation for tower foundations can lead to loss of fertile topsoil, impacting soil health and local vegetation.
- **Soil Erosion and Runoff:** Removal of vegetation and exposure of loose soil increases the risk of erosion, particularly during the rainy season, causing sedimentation in nearby streams and low-lying areas.
- **Slope Destabilization:** Tower construction on sloped or undulating terrain may lead to instability and potential landslides if not properly managed.
- **Interruption of Natural Drainage Patterns:** Foundation works may obstruct or divert natural water flow, resulting in localized flooding or water stagnation.
- **Vegetation Clearance:** Site preparation often involves clearing trees and shrubs, reducing ground cover that protects against erosion.
- **Compaction and Soil Hardening:** Movement of heavy machinery and material during construction may compact the soil, reducing its infiltration capacity and increasing surface runoff.

Raghu

Raghvendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

- **Waste Disposal Issues:** Improper disposal of excavated material and construction debris may create uneven terrain and hinder future land use or restoration efforts.

Quantification of the potential run off and eroded soil:

Potential water loss from the area: The loss of water as run off depends on the type of land use, rainfall intensity and the total area of the catchment. As depicted above the land use pattern will result in the loss of a maximum of 0.3416 lakh cum of runoff.

Potential loss of soil due to erosion: The different studies suggest that average soil loss from a forested landscape is approximately 4.64 tons/ha/year. The total soil loss from the project area per year will be approximately 406 tons/year based on the area of 87504 Sq Meter.

Soil Conservation plan proposed for mitigating impacts:

Based on the topography, slope and soil the treatment measures has been designed for arresting runoff, reducing erosion and sediments, improving ground water recharge for improving flow in the rivulets and also for storing water for use by dependent communities.

The Soil Conservation involves

- Understanding of the erosion characteristics of the terrain and,
- Suggesting remedial measures to reduce the erosion rate

The conservation plan that has been proposed are-

- Bio engineering measures like avenue plantations, riverside plantations
- Engineering measures like contour trenches, check dams, ponds and loose boulder structures

Apart from the general activities of complying with the soil and water loss, capacity building and awareness initiatives have also been proposed. The transmission lines will create livelihoods in from of wage earning during the construction phase of the transmission line.

Raghu
Ragbendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

Cost of the project:

- Chatra South Forest Division having 47 villages and a project cost of Rs. 625.96 lakhs
- Chatra North Forest Division having 29 villages and a project cost of Rs. 562.97 lakhs
- Latehar Forest Division having 11 villages and a project cost of Rs. 199.53 lakhs

Following activities has been designed for reducing erosion and its impact in the catchment area of the proposed project-

- **Potential Soil and Moisture conservation through vegetative measures:** This is the most needed activity to compensate the losses incurred due to the disturbance created due to diversion of forest land for the proposed transmission line. Under this head activity like contour trenches, riverside plantations, avenue plantations, silvicultural operations and distribution of free planting materials has been planned across the three forest divisions. The activities are specific to the three divisions has been put in the proposed physical financial plan for the three divisions, which is attached with the report.
- **Improving water regime:** Apart from the area treatment an activity that has been mentioned above, drainage line treatment activities have also been part of the plan to make it a complete plan for soil and moisture conservation. Activities like loose boulder check dams, masonry check dams, construction of new ponds, renovations of ponds and silt detention dams based on the need of the area has proposed and planned. These activities will help in storage of runoff and also for improving soil moisture regime in the forest area.
- **Awareness, capacity building & Documentation:** Intervening through physical interventions will help in area treatment and drainage line treatment but to keep activities intact it requires to build capacities and train people for the same. The plan has proposed different activities like organising awareness camps in the impact zone villages, involving schools and educational institutions in the process of creating awareness, documentation of the activities along with printing and distributing IEC materials has also been planned in the proposed activities.

20/11
Raghendra Kumar 6
Head-Projects (Site) 71
NMTL Hazaribagh

Monitoring cost:

Monitoring costs cover periodic field assessments and evaluation of implemented soil and moisture conservation measures. This will be done by the DFOs of the respective divisions and other higher officers on a quarterly basis or based on the need of the field. This will help in better implementation of the plan and doing course correction if needed.

Escalation @ 20 percent:

A 20% escalation cost is provisioned to account for inflation, price fluctuations in materials, and unforeseen expenses over the implementation period. This ensures financial flexibility and smooth execution of project activities without compromising quality.

Impact area- Impact area of the project will be the 87 villages in all 3 Forest Divisions out of which 11 villages will be in Latehar Forest Division covering an area of 7050.09 ha for all 3 Forest Divisions 1293.87 ha in Latehar Forest Division.

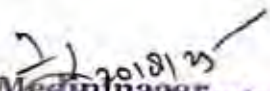
Time line of the project: Ten years from the date of first implementation of the activity.


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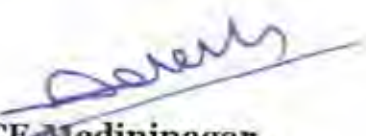
Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

DFO-Latehar


Pawanesh Agrawal


CF-Medininagar
Conservator of Forests

Tentherai Circle, Medininagar


RCCF-Medininagar

Regional Chief Conservator of Forests
Palamau, Medininagar

**FINANCIAL FORECAST OF THE ACTIVITIES TO BE IMPLEMENTED BY FOREST DEPARTMENT UNDER SOIL & MOISTURE CONSERVATION PLAN OF 400 KV D/C NK GAYA
TRANSMISSION LINE UNDER LATEHAR FOREST DIVISION**

Sl. No.	Particulars	Expected expenditure during ten years (Rs. in lakh)										Total
		Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	
		1	2	3	4	5	6	7	8	9	10	
A	Potential Soil and Moisture conservation through vegetative measures											
1	Avenue plantation of drought hardy species with bamboo gabbion (500)	7.784	4.216	3.756	4.24	0.00	0.00	0.00	0.00	0.00	0.00	19.999
2	Contour trench -50 Ha (60.55 x 0.00422 x 50 ha)	11.605	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.605
3	Silvicultural Operation Plantation (50 Ha)	40.662	9.143	4.215	4.832	0.000	0.000	0.000	0.000	0.000	0.000	58.852
4	Distribution of tree planting materials (500 tree/Year)	0.600	0.700	0.800	0.900	1.000	1.100	1.200	1.300	1.400	1.500	10.500
	Sub-Total :-	60.651	14.059	8.771	9.975	1.000	1.100	1.200	1.300	1.400	1.500	100.956
B.	Improvement of water regime and fire control											
5	Construction of Pucca Check dam (12 Mtr x 1.2 Mtr)-2 Nos	8.000	8.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	16.000
6	Construction of Pucca Check dam (14 Mtr x 1.2 Mtr)-2 Nos	12.000	12.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	24.000
7	Creation of new ponds (100 x 100 x 12) feet-2 Nos	4.410	4.410	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	8.820
	Sub-Total :-	24.410	24.410	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	48.820
C.	Awareness, Research & Documentation, Capacity building											
8	Organizing awareness camps in local villages to address soil & water conservation	2.000	2.000	2.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	8.000
9	Printing of booklets, pamphlets & banners regarding Forest, Soil & Moisture conservation	0.500	0.000	0.500	0.000	0.500	0.000	0.500	0.000	0.500	0.000	2.500
	Sub-Total :-	2.500	2.000	2.500	1.000	1.500	0.000	0.500	0.000	0.500	0.000	10.500
11	Monitoring Cost	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	5.000
	Sub-Total :-	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	5.000
	Total	94.661	40.769	11.771	11.475	3.000	3.400	2.700	1.800	2.400	2.000	118.270
12	Escalation cost @ 20 %	17.612	8.194	2.354	2.295	0.600	0.320	0.440	0.360	0.480	0.400	33.055
13	Contingency @ 2.0%	1.761	1.024	0.294	0.287	0.075	0.040	0.055	0.045	0.060	0.050	3.692
	Grand Total Year Wise	114.034	50.087	14.42	14.05	3.675	3.76	3.195	2.21	2.94	2.45	205.01

Raghu Agency
Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

DPO, Latehar

Office of the
Territorial Circle, Latehar

Regional Chief Conservator of Forests
Medinipur
Jharkhand

Chapter-1

Introduction and Background

Introduction:

North Karanpura Transco Limited (NKTL) is a subsidiary of Adani Energy Solutions (AESL) which has been formed to establish the Transmission System for "Immediate Evacuation for North Karanpura (3X660MW) generation project of NTPC along with creation of 400/220kV Substation at Dhanbad (ERSS-XIX)". Accordingly, NKTL has proposed to construct 400 kv (D/C) transmission line with quad moose conductor from North Karanpura Thermal Power Plant (3x660MW) to Gaya (Figure 1.1).

Respective State Forest Officials while recommending the forest proposal for forest clearance has suggested for formulation of Site-Specific Soil Erosion Mitigation Plan for proposed 400 k (D/C) transmission line with quad moose conductor from NTPC North Karanpura Thermal Power Plant to 765/400/220 kv PGCH. Gaya Substation (Jharkhand Portion).

The setting up and operation of the 400 kV (D/C) transmission lines from North Karanpura to Gaya (Jharkhand Portion) may result in changes of ecological setup of the project area. A thorough understanding of issues related to ecological as well as environmental factors are absolutely important for formulating an appropriate site-specific Soil Erosion Mitigation Plan (SEMP).

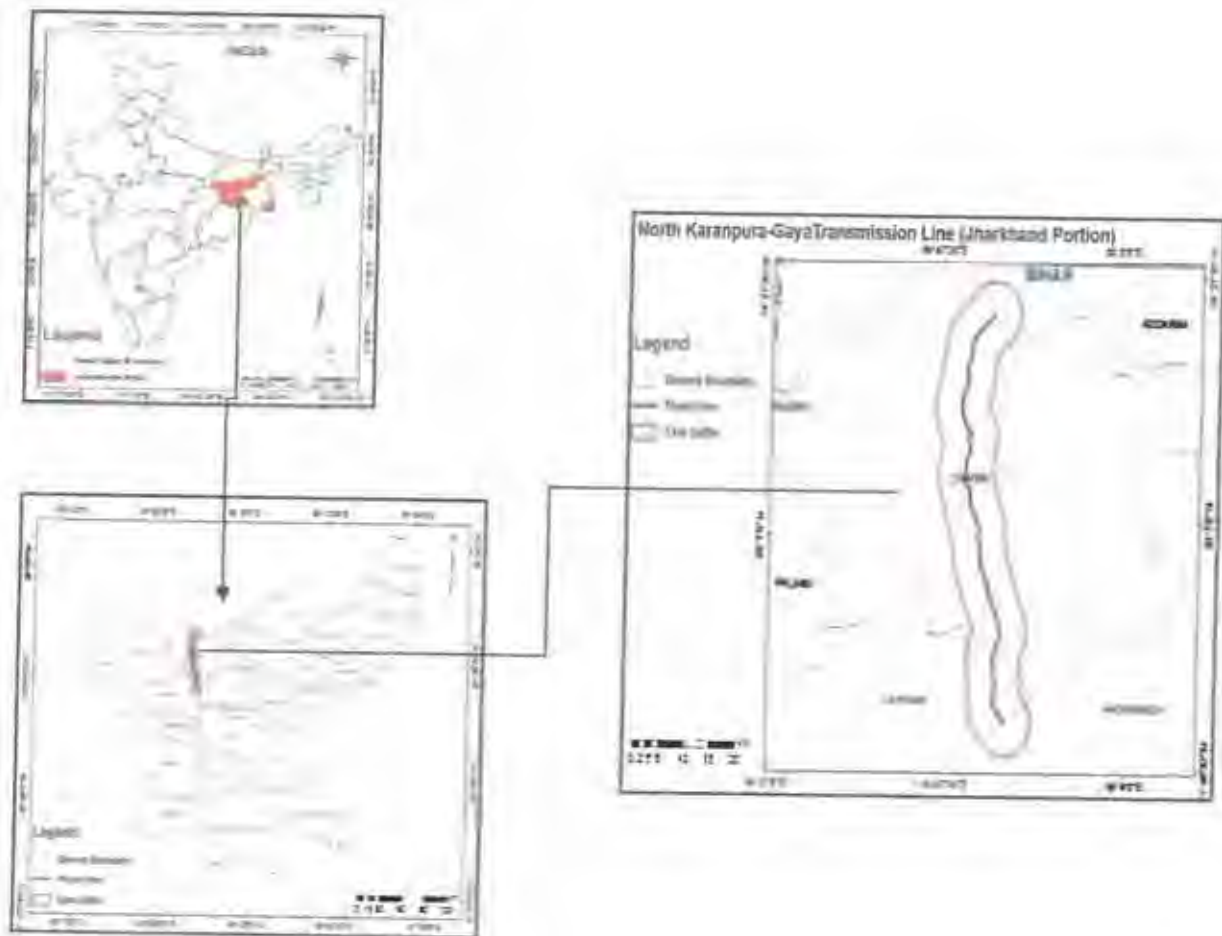
In accordance with its mission of being enviro-socially responsible corporate entity with thrust on sustainable development, NKTL aims to focus on implementing Soil Erosion Mitigation Plan for protection of soil integrity as well as forest cover along its proposed 400 kV D/C transmission lines from North Karanpura to Gaya (Jharkhand Portion). To accomplish this mission, it is imperative to formulate a comprehensive short as well as long-term Soil Erosion Mitigation Plan (SEMP).

Location of the project:

Located across the two districts namely Chatra and Latehar, the proposed transmission line falls under the jurisdiction of three forest divisions namely Chatra North Forest Division, Chatra South Forest Division and Latehar forest division. Impact area of the project covers 87 villages which are part of the project. Chatra North division has 29, Chatra South Division has 47 and Latehar Division has 11 villages which are in impact zone of 500 mtrs on either side of transmission line.

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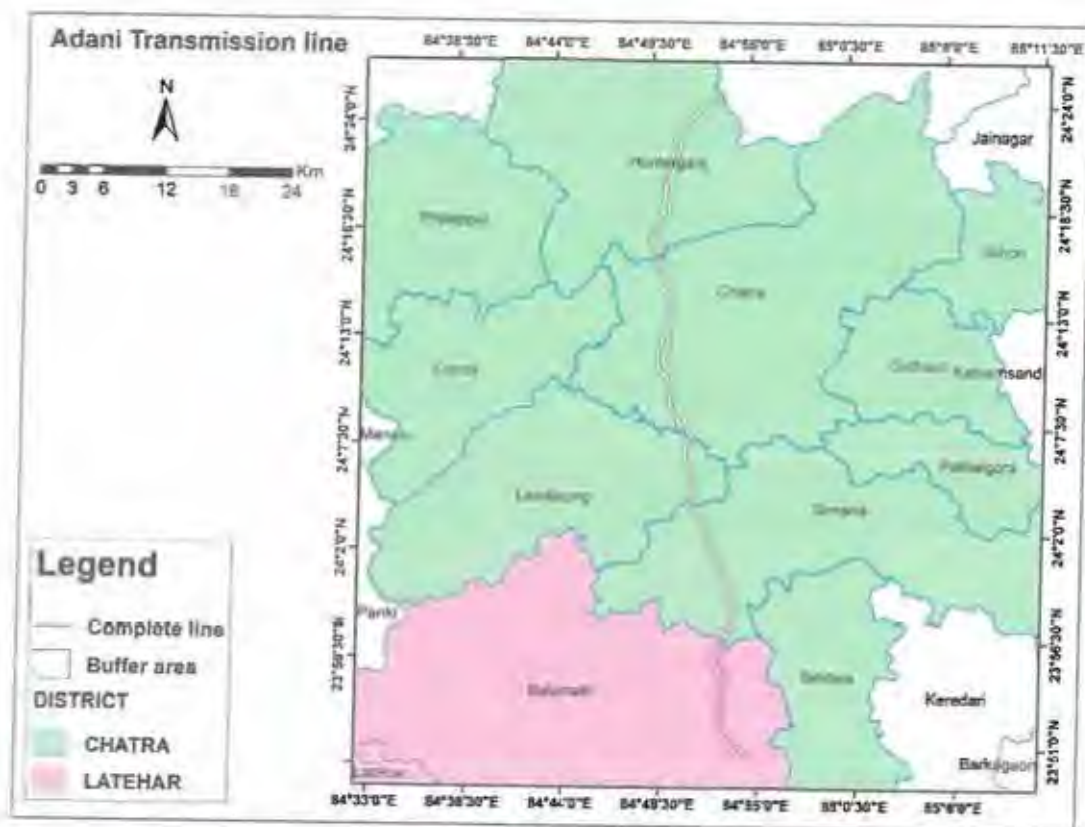
Location of Transmission line



Number of towers across the three divisions:

There will be 206 towers across the three divisions. The distance between each of the towers will depend on the topography of the area and crossing features and usually it will be around 300 to 400 mtrs (Except Crossing Towers,

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Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh



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Head-Projects (Site) TL
NKTL - Hazaribagh

Chapter: 2

The Methodology of Preparing the SMC plan

Methodology of survey:

A catchment is defined as an area that collects precipitation and drains it into a network of water channels. This network often drains into a larger outlet, such as a river, reservoir, or body of water. Catchments are usually open systems and precipitation and other materials flow freely into and out of the system. As the water flows over the landscape, it finds its way into streams and down into the soil, eventually feeding the river. Some of this water stays underground and continues to slowly feed the streams/river in times of low rainfall. Every inch of land on the earth forms part of a catchment.

Each catchment contains a stream network that channels surface water to the catchment outlet. Depending on the size of the catchment, these streams range in number from one or two to tens of thousands. Each catchment has a main stream into which tributaries deposit water and sediment. The smallest tributaries, farthest from the catchment outlet, are called headwater streams. These are the streams where rivers begin. Although they carry smaller volumes of water, they often cover a significant portion of the total length of streams in a catchment, and play important roles in recharging groundwater, containing flood water, improving water quality, and providing fish and wildlife habitat.

Soil and Moisture Conservation Plan

The soil erosion in catchment areas and the subsequent deposition in rivers, lakes and reservoirs are of great concern for two reasons. Firstly, rich fertile soil is eroded from the catchment areas. Secondly, there is a reduction in reservoir capacity as well as degradation of downstream water quality. Soil being one of the potential resources of a catchment demands proper conservation and management to keep the productivity and its utility intact for the communities in the command.

The Soil and Moisture Conservation Plan pertains to preparation of a management plan for treatment of erosion prone area of the catchment through agronomic, biological and mechanical measures. The objective of a well-designed SMC plan should not only to control the sedimentation of the water bodies but also provide a life support system to the local population through their active involvement in soil conservation works. The development of SMC Plan for a catchment essentially comprises the prioritization of erosion prone areas, selection of suitable conservation measures, implementation and impact assessment based on a watershed approach.

Village meetings have been conducted to get the opinion of the villagers to assess potential damage due to construction of transmission lines.


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The SMC Plan will be prepared for the project villages.

- Selection of appropriate GIS maps and field visit
- Correction of the raw data and processing for development of necessary data capturing and map generation
- Development of a GIS with available map information
- Conducting discussion and interaction meeting with the forest officials and community for including the forestry information
- Development of stream orders and extent of drainage interceptions by the anthropogenic activities within the area
- Inclusion of the transmission line maps into the GIS and determination of the buffer zones
- Determination of the nature of intercepts in the catchment areas
- Determining locations requiring soil erosion protection and land degradation controls and proposing adequate and effective soil conservation measures in erosion prone areas (very severe and severe) in the catchment.
- Identification of locations requiring special mitigating measures like water storage structures and also some drinking water structures on demand from community

Data Processing & Field work:

The data available from various sources was collected. The ground maps, contour information, etc. Field survey has been done for the area. First time the lat/long values and elevation of the ground control points have been collected through GPS for the villages through which the transmission line route will pass. During field surveys, the locations for establishing erosion control structures have been identified. Joint field surveys with the forest officials to identify the locations of structures and to identify the other forest development measures were done.

The main deliverables of the project are achieved through the following systematic activities:

- Data Processing
- Preparation of different thematic maps
- Field work
- Data Analysis and Recommendation

Deliverables:

- Land use land cover classification:
- Rehabilitation measures for the degraded forest
- Identifying drainage system needing treatment
- General recommendations for conservation, protection, regeneration and management of existing natural forests
- Best practice for erosion prevention

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Quantification of the potential run off and eroded soil:

Potential water loss from the area: The loss of water as run off depends on the type of land use, rainfall intensity and the total area of the catchment. As depicted above the land use pattern will result in the loss of a maximum of 0.3416 lakh cum of runoff.

Potential loss of soil due to erosion: The different studies suggest that average soil loss from a forested landscape is approximately 4.64 tons/ha/year. The total soil loss from the project area per year will be approximately 406 tons/year.

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Raghvendra Kumar
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Chapter: 3

Profile of the Project Impact/Buffer Area

Impact/Buffer Area

Villages covered along the transmission line under the 500m buffer zone having 87 villages in total. Total impact area is around 7050.09 ha.

Topography

The project regions fall under 2 districts i.e., Latehar and Chatra. Latehar district is located at 23.75°N 84.50°E. It has an average elevation of 387 m (1,270 ft). The topography of Latehar district is characterized by a hilly rugged landscape with green forest all over the area. The elevation of the hill ranges in southern part of the district varies from 300 to 1100 m above msl (Mean Sea Level). The district is characterized by great heterogeneity in soil development. It can be attributed to uneven topography, non-uniform rainfall distribution and variation within composition of the parent material. High relief plateau of Netarhat, Chandwa and Garu are in mature stage, where the soil developments in low relief areas are of recent type.

The forests, covering around 60% of Chatra district, are evenly spread across the district. It is a plateau area with an elevation of about 450 metres (1,476 ft) above mean sea level.

Climate

The climate of the project area is characterized by humid to sub-humid climate. The region has a variety of climatic conditions with higher landforms in the south and plains in the north. The summers are cool and moderate in the southern region. The area experiences temperatures between 16 and 18 °C in the winter and up to 41° C in the summer. The highest southern regions receive up to 2000 mm of rainfall annually. However, northern part remains in rain shadow area and receives less than 1200 mm rainfall.

Land use Land Cover

The study area along the corridor of 400 kV NK transmission line showed a few protected forests and Jungle Jhari (Degraded Scrub Land) intermingled with village settlements and crop fields. However, there are few waterbodies, streams and Rainfed Rivers in the vicinity of the project area. Due to the unique setting of undulated landform, faunal diversity of the landscape is fairly good. In general, the forest area of the project region belongs to two major categories viz., Sal Forest and mixed forest.

However, there are few waterbodies, streams and Rainfed Rivers in the vicinity of the project area. Due to the unique setting of undulated landform, faunal diversity of the landscape is fairly good. In general, the forest area of the project region belongs to two major categories viz., Sal Forest and mixed forest.


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Soil Profile

The soil type of project region includes Entisols, Inceptisols and Alfisols. Alfisols were the dominant soils covering 52.2 % followed by Entisols (33.9 %) and Inceptisols (13.0%). Soil Texture (particle size and gradation)soils containing high percentages of Loam and small percentage of clay. As the clay and organic matter content of these soils increase, the erodibility decreases. Clay acts as a binder for soil particles, thus reducing erodibility.

Demography of Impacted Villages

The analysis of villages falling under the study area i.e., 500 m on both the side of row of proposed transmission line reveals those 87 villages. The villages within the study area primarily fall under Simeriya, Lawaloung, Chatra and Hunterganj Blocks of Chatra District and Bariayatu Block of Latehar District under Jharkhand State. Out of total villages falling under study area maximum villages are under Chatra and Hunterganj Block i.e., 30 and 29 respectively. The analysis of demographic profile of villages falling under the study reveals that total numbers of households in the villages under the study area are 8186 with total population of 47777. 32.78% are scheduled caste and 5.36% are scheduled tribe of total population in the villages under the study area.

Ecosystem and bio diversity status of the project area:

Jharkhand is one of the biodiversity rich states of India because of its origin, diverse physiographic and climatic conditions. It is well known due to its tribal populations, mineral resources, and its vast forest resources. Forest resources are considered as a commodity of high value across the state as most of the locals are partially dependent for their daily subsistence needs mainly for food and fuelwood. Forests play an important role in the economic, cultural and social lives of the people and support rural livelihoods and food security in Jharkhand. Jharkhand is home to tropical moist deciduous and tropical dry deciduous forests and the dominant plant species are *Shorea robusta*, *Diospyros melanoxylon*, *Pterocarpus marsupium*, *Gloriosa superba*, *Butea monosperma*, *Madhuca longifolia*, etc. Commonly extracted forest products are timber, fuel wood, fodder, and a range of Non-Timber Forest Products (NTFPs) such as fruits, nuts, edible fungi, vegetables, fish, animals and medicinal plants, resins, essences, and a range of barks and fibers such as bamboo, rattans, palms and grasses. Over-exploitation of useful plants, lack of knowledge and awareness about the plants' present abundance status, habitat alteration and specificity, narrow range of distribution, over-grazing are some of the severe threats endangering the forests. Additionally, natural enemies such as pathogens, herbivores and seed predators substantially limit the abundance of rare plant species in any given area.

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List of the forest flora in the project impact area:

Sl. No.	Common Name	Botanical Name	Family
1.	Sal	<i>Shorea robusta</i>	Dipterocarpaceae
2.	Asa	<i>Terminalia elliptica</i>	Combretaceae
3.	Teak	<i>Tectona grandis</i>	Verbenaceae
4.	Plar	<i>Buchanania lanzan</i>	Anacardiaceae
5.	Palat	<i>Ehretia laurophylla</i>	Fabaceae
6.	Semal	<i>Bombax ceiba</i>	Bombacaceae
7.	White Kapok	<i>Ceiba insignis</i>	Bombacaceae
8.	Ajyam	<i>Terminalia arjuna</i>	Combretaceae
9.	Barra/Hard	<i>Terminalia chebula</i>	Combretaceae
10.	Bulacu	<i>Terminalia bellirica</i>	Combretaceae
11.	Mahua	<i>Madhuca longifolia</i>	Sapotaceae
12.	Amli	<i>Phyllanthus emblica</i>	Phyllanthaceae
13.	Amli-Bamun	<i>Mangifera indica</i>	Anacardiaceae
14.	Amya	<i>Hardwickia binata</i>	Caesalpiniaceae
15.	Babool/Kinkar	<i>Acacia nilotica</i>	Mimosaceae
16.	Neru	<i>Aspalathra indica</i>	Malvaceae
17.	White Babool	<i>Acacia leucophloea</i>	Mimosaceae
18.	Baobab/Bursera	<i>Ficus bengalensis</i>	Moraceae
19.	Gum Arabic	<i>Acacia senegal</i>	Mimosaceae
20.	Paspal	<i>Ficus religiosa</i>	Moraceae
21.	Jamun	<i>Syzygium cumini</i>	Myrtaceae
22.	Black Shashan	<i>Dalbergia latifolia</i>	Fabaceae
23.	Bel	<i>Aegle marmelos</i>	Rutaceae
24.	Kashim	<i>Schleichera oleosa</i>	Sapotaceae
25.	Goolar-Fig	<i>Ficus racemosa</i>	Moraceae
26.	Gumhar	<i>Garcinia arborea</i>	Verbenaceae
27.	Inli/Tamarind	<i>Tamarindus indica</i>	Leguminosae
28.	Ber	<i>Ziziphus mauritiana</i>	Rhamnaceae
29.	Wattle	<i>Acacia acutifolia</i>	Mimosaceae
30.	Essa/lytus	<i>Eucalyptus spp.</i>	Myrtaceae
31.	Kadamb	<i>Nerium indicum</i>	Rubiaceae
32.	Amalas	<i>Cassia fistula</i>	Caesalpiniaceae
33.	Gulmofur	<i>Delonix regia</i>	Caesalpiniaceae

Forest Fauna

The present status of wildlife in Forest Divisions is not very encouraging. The division is frequented by wild elephants causing loss of life and property. Other common wild animals like deer, hyena, monkey variety of birds, both resident and migratory, are found abundantly in the Division. Some of the important wildlife found in the areas is being listed as follows:

- Elephant
- Striped Hyena
- Macaque
- Langur
- Nilgai
- Sloth Bear
- Leopard
- Indian Peacock
- Indian Eagle-Owl
- Reptiles-Chameleon, Turtle, King Cobra, Python, Russel Viper, Rat Snake, Common Karait etc.

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Depth to Water Level in Jharkhand

Ground Water Year Book, Jharkhand (2021-22) published by the Ministry of Jal Shakti, Govt. of India mentions the status of Depth of Water Level in Jharkhand. In Jharkhand state, ground water levels of 452 Ground Water Monitoring Wells (GWMW) were monitored four times in the year 2021 - 2022 as a part of regime monitoring of phreatic aquifer in different hydrogeological and agro-climatic zones. The water level monitoring was carried out in the months of May'21, August'21, November'21 and January'2022.

Study Report on Groundwater Depletion in Jharkhand (Switch ON Foundation)

Switch ON Foundation, an independent organization registered as Environment Conservation Society, has released a study report very recently on 27th March, 2023 on the eve of World Water Day indicating the distressing situation of groundwater depletion in Jharkhand. The report highlights that groundwater depletion is leading to reduced water availability, in regions that rely on underground reserves as their primary source of freshwater. This is leading to an increase in competition for scarce resources and worsening water scarcity in already dry regions. The highlights of the report are as follows:

- Due to the geographical setup, about 80% of surface water and 74% of ground water go outside the state and cause 38% of the drought in Jharkhand.
- In Jharkhand, groundwater is found under semi-confined to confined aquifers in the fractures situated at a deeper level.
- In the pre monsoon season of 2021, the lowest water table level found was found in Hazaribagh district below 0.03 meters, and the deepest water table level was found at 9.7 meters in Koderma district.
- In the pre-monsoon season of 2022, the groundwater level of the state had declined by two metres. In 2022, the monsoon rainfall received was in deficit by more than 60%, and about 90% of reservoirs were only 40% full.
- Since the introduction of tube wells, the groundwater levels in the state have declined over the last two decades.
- In the districts of Chatra, Giridih, Godda, Gumla, Palamu and Ranchi, the fluoride concentration in groundwater was beyond permissible limit.
- Today the tube well exerts more pressure on groundwaters resources in deep aquifers, especially in the urban areas of Ranchi.
- Most regions of the districts Purbi Singhbhum, Ranchi and Saraikela, the groundwater is declining as revealed by a study of depth to groundwater level (DGWL) conducted over the period 1996-2018.

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Recommendations of Central Ground Water Board

Following are some of the recommendations of the CGWB [Ground Water Information Booklet, Chatra District (2013)] which are relevant to the instant Plan:

- The district's economy is primarily agriculture based and most important requirement is Ground Water Development for sustainable management of agriculture. The cropping pattern should be developed as per the availability of the water. Less water requirement farming practice is required.
- In Damodar sub basin of the district, conjunctive use management of surface and ground water should be taken up.
- In the district, the chemical analysis of water samples should be carried out regularly so that suitable measure could be taken to minimize the bad effect of chemical constituents like Fe, Nitrate and Fluoride which are reported to be beyond permissible limit.
- Artificial recharge structures like Check dam, Gully Plug and percolation tank etc, can be constructed for conservation of Ground Water at favorable sites.

Land Degradation

Several definitions of land degradation have been suggested by different authorities to express the degree of deterioration of land or land potential. In general, it implies temporary or permanent recession from a higher to a lower status of productivity through deterioration of physical, chemical and biological aspects of land. The physical processes which contribute to land degradation are mainly water and wind erosion, compaction, crusting and water logging. The chemical processes include Salinization, alkalization, acidification, pollution and nutrient depletion. The biological processes, on the other hand are related to the reduction of organic matter content in the soil, degradation of vegetation and impairment of activities of micro-flora and fauna. Generally, land degradation is defined as a human-induced or natural process that negatively affects the land to function effectively. It is the temporary or permanent lowering of the productive capacity of land.

Major causes of land degradation are:

- Overgrazing
- Over cultivation of crop land
- Water logging and salinization of irrigated land
- Deforestation
- Pollution and industrial cause


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Class	Year 2004 Area (sq.km.)	Year 2019 Area (sq.km.)	Change (Sq. km.)	Change (%)
Agriculture	1788.74	1747.6	- 41.14	-2.30%
Plantation	156.21	159.42	3.21	2.05%
Wasteland	29.78	31.11	1.33	4.47%
Coal Mine	18.2	23.5	5.3	29.09%
Built-up	195.55	260.01	64.46	32.96%
Water Bodies	61.26	56.61	- 4.65	-7.59%
VDF*	58.9	59.75	0.85	1.44%
MDF**	164.11	150.78	- 13.33	-8.12%
OF***	405.14	389.12	- 16.02	-3.95%

*VDF-Very Dense Forest (canopy density $\geq 70\%$)

**MDF-Moderately Dense Forest (canopy density between 40% and 70%)

***OF- Open Forest (canopy density between 10% and 40%)

Impact of Land Degradation

Land degradation has numerous environmental, economic, social and ecological consequences. Every ecosystem on the Earth is affected by some or other form of land degradation. When land is degraded, the ecology is damaged. There can be rather serious effects in terms of soil erosion, loss of soil fertility and thus reduced plant growth or crop productivity, clogging up of rivers and drainage systems, extensive floods and water shortages.

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Chapter-4

Potential Impact due to the Project and its Quantification

Soil and moisture conservation plan with the objectives of soil and moisture conservation is of utmost importance to farmers since productive and sustainable land management is essential to their livelihood. Good soil conservation practices can minimize soil fertility loss from erosion or chemical pollution. Different fields require distinct land protection strategies due to the wide variety of farm management objectives and environmental factors at play. Modern agricultural monitoring methods, in particular remote sensing, make it easier and cheaper to implement soil conservation strategies in hopes of preserving land fertility for ourselves and many future generations.

The main objective of SMC plan is to minimize the amount of water lost from the soils through evaporation (water loss directly from the soil) and transpiration (water loss occurring through the plants) – or combined, the evapotranspiration. Preserving soil moisture is important means to maintain the necessary water for agricultural production, and also helps minimize irrigation needs of the crops. This is especially important in areas where rainwater and/or groundwater resources for irrigation are scarce or decreasing due to climate change or other causes.

There are a variety of methods that can be used to conserve soil moisture. Most of these soil moisture conservation techniques are relatively low cost and complexity approaches, primarily relying on the presence of required materials and technical capacity locally. Many of the methods rely on providing some kind of cover for the soil to minimize evapotranspiration and direct soil exposure to heat and sun. Generally, most methods used for soil quality improvement and conservation, will also yield benefits to soil moisture conservation.

Soil conservation is a set of farming methods and practices that keep the land from degradation, erosion, and depletion. Soil conservation management targets long-term use with an eye toward the future. By taking proper and timely actions, farmers boost the performance of their field and natural resources especially the soil for years to come.

A major objective of soil conservation is maintaining the biodiversity of the eco-communities that inhabit it and contribute to its fertility in their own ways. They add organic matter, split perishable organisms to release nutrients, and improve water infiltration and aeration. Ensuring proper conditions for living bodies in the earth is vitally important for the vegetation that grows there since microorganisms adjust the organic matter for plant needs.

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Soil conservation farming practices stop the ground from washing away, which keeps water bodies clean from pollution and sedimentation. Conservation also keeps bare surfaces from cracking and eroding because of water, wind, and too much heat.

Soil conservation strategies rely on three basic steps:

- obtaining proper knowledge of the land's resource use;
- monitoring fields and detecting critical zones;
- Controlling and estimating the efficiency of applied soil conservation techniques.

Soil conservation benefits extend well beyond agriculture into all aspects of human life. Conservation agricultural practice contributes to sustainability in a number of ways:

- Boosts the land's quality and productivity. Maintaining the natural environment for earth-dwelling organisms increases soil fertility and reduces the necessity of chemical fertilizing, thus boosting yields and saving money at the same time.
- Mitigates erosion. Farmers profit from soil conservation methods that prevent or halt land erosion and depletion, which otherwise would force them to look for new land.
- Promotes water infiltration and increases its storage. The conservation technique of minimum tillage vs. conventional plowing affects soil moisture by reducing cracking and evaporation as well as raising the infiltration rate.
- Aids air and water purification. Soil conservation mitigates the concentration of pollutants and sediments. In its turn, water is the basic condition for dissolving nutrients for plants. Soil carbon sequestration and reduced chemical applications contribute to air purity, too.
- Provides food and shelter for wildlife. Land with growing vegetation is a living environment for animals; it is not only the source for nourishment but their home as well.

Factors affecting soil and water loss from the project area:

Soil erosion is mainly caused by the erosive forces of water in the proposed project area, besides in varying extents by some other agents, such as wind. Soil erosion by water is the most damaging and widely spread form of land degradation that accounts for 68 percent of the state's degraded land. Soil erosion affects the water quality; increases flood risk due to elevated river beds on account of deposition of silt carried by runoff, as well as reduction in general health and productivity of the soil. Erosion results in the reduction of land productivity, reduction in the efficiency of plant nutrient use, damage to seedlings, decrease in plant rooting depth, reduction in the soil's water-holding capacity, decrease in its permeability, and increase in infiltration rate. The threat that land degradation poses to food security of the

continuously growing population is especially worrisome for our state. The impact of climate change is expected to further aggravate land degradation in the state.

Important Factors affecting water and soil loss:

The erosion potential of any area is determined by four principal factors: the characteristics of its soil, its vegetative cover, its topography and its climate. Although each of these factors is discussed separately, these are inter-related in determining erosion potential.

i) Soil Characteristics

Soil characteristics influencing erosion by rainfall and runoff are those properties which affect the infiltration capacity of soil and those which affect the resistance of the soil to detachment and transport by falling or flowing water. The following four characteristics are important in determining soil erodibility:

- **Soil Texture (particle size and gradation):** Soils containing high percentages of fine sands and silt are normally the most erodible. As the clay and organic matter content of these soils increase, the erodibility decreases. Clay acts as a binder for soil particles, thus reducing erodibility.
- **Organic Matter Content:** Organic material is the "glue" that binds the soil particles together and plays an important part in preventing soil erosion. Organic matter is the main source of energy for soil organisms, both plant and animal. It also influences the infiltration capacity of the soil. Lesser soil organic matter causes deterioration of soil structure and soil permeability.
- **Soil Structure:** The way soil particles are held together, affects the soil's friability, the ease with which soil particles are detached by raindrops and runoff, and the resistance of the soil to the growth of roots and shoots.
- **Soil Permeability:** Permeability is the soil's ability to transmit air and water. Soils that are least subject to erosion from rainfall and surface runoff are those with high permeability.

Since most part of the project area has Sandy -Loam soil it is very much prone to the erosion due to presence of sand content in the soil. It can be seen in the soil map for the proposed project area.

ii) Vegetation Cover

Vegetative cover plays an important role in controlling erosion. It:

- Shields the soil surface from the impact of falling rain
- Holds soil particles in place
- Maintains the soil's capacity to absorb water

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- Reduces the velocity of runoff
- Removes subsurface water between rainfalls through the process of evapo-transpiration

iii) Topography

The size, shape and slope characteristics of an area influence the amount and rate of runoff. As both slope length and gradient increase, the rate of runoff increases and the potential for erosion is magnified.

iv) Climate

The frequency, intensity and duration of rainfall are fundamental factors in determining the amount of runoff produced in a given area. As both the volume and velocity of runoff increase, the capability of runoff to detach and transport soil particles also increases. Where storms are frequent, intense, or of long duration, erosion risks are high. Seasonal changes in temperature, as well as rainfall influence the erosion risk.

Drainage Network in Chatra District

There are as many as 40 rivers that flow in or through Chatra covering a length of 561.37 km overall. Of these, the major rivers include Lilanjan in Hunterganj (69 km), Mohani in Itkhori (50 km) Hiru (32 km) in Chatra and Chako (23 km) in Lawalong. None of these rivers is perennial. The general trend of the drainage is from SE-NW. The structural features particularly the foliation and joints exert profound impact upon the drainage and control the drainage pattern of the district. The drainage map of Chatra district is shown below.



Quantification of water and soil loss from the diverted area:

Land use pattern of the diverted land: The total land diverted for the project purpose is 1593.28 Ha of forest land. The land use pattern of the proposed area will

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have significant impact on the water and soil loss from the area. Since each of the land use pattern will have a different coefficient of run off the volume will depend on the land use, rainfall and coefficient itself.

Potential water loss from the area: The loss of water as run off depends on the type of land use, rainfall intensity and the total area of the catchment. As depicted above the land use pattern will result in the loss of a maximum of 0.3416 lakh cum of runoff.

Potential loss of soil due to erosion: The different studies suggest that average soil loss from a forested landscape is approximately 4.64 tons/ha/year. The total soil loss from the project area per year will be approximately 406 tons/year.

Peak Run-off from Project Area: An idea of peak run-off from the catchment area is imperative for sizing of drains as well as in estimating the amount of soil erosion from the catchment area. The same has been calculated below – The amount of storm water the catchment will produce can be determined with the formula-

$$Q=CAI$$

- Q: the design peak runoff rate,
- C: the runoff coefficient
- I: the rainfall intensity
- A: the surface area of the catchment area in Ha

Silt Load Assessment Using Universal Soil Loss Equation (USLE) The amount of erosion in the catchment (project) area that is likely to be caused by rainfall can be assessed with the Universal Soil Loss Equation (USLE) as shown below. The USLE takes into account the major factors that influence soil erosion by rainfall: rainfall patterns, soil types, slope steepness, and management and conservation practices.

The USLE Equation is: $A = R * K * LS * C * P$ Where,

- A = predicted soil loss (tons per ha per year)
- R = rainfall and runoff factor
- K = soil erodibility factor
- LS = slope factor (length and steepness)
- C = crop and cover management factor
- P = conservation practice factor

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Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

Chapter 5

Mitigation Plans under SMC

Introduction

In view of the potential impacts associated with the transmission line project, a comprehensive soil and moisture conservation (SMC) mitigation plan has been formulated based on the field visit and discussion with the DFOs of the respective divisions. These interventions aim to restore ecological balance, reduce land degradation, and enhance water retention capacity across affected and adjacent forest areas. The plan integrates a mix of structural, vegetative, and community-based measures designed to arrest erosion, recharge groundwater, and promote sustainable land use practices. Key components include contour trenching, silvicultural plantations, seedling distributions, check dams, pond construction, and bamboo gabbion-supported avenue plantations. Community engagement through awareness campaigns, free distribution of planting materials, and participatory maintenance frameworks further ensures long-term resilience and adaptability to climate change. Together, these measures form a holistic approach to mitigating soil and moisture loss while contributing to biodiversity conservation and improved ecosystem services.

Proposed area for interventions:

The proposed area for intervention are the project impact villages falling under the 500 mtr buffer area along the transmission line from the central position. There are 87 villages falling in the impact zone with the undulating topography ranging between 4% to 35% across the divisions. Interventions have been planned keeping in mind the slope, contour and the ground situation. The interventions are based on the treatment methodology of area treatment and drainage line treatment from ridge to valley with focus on reducing velocity of water and improving the water regime. It may help in facilitating regeneration and reducing dry soils in the forest and adjoining areas. Ponds will help in facilitating irrigation and will also improve access to water for community use except for drinking.

The proposed cost of the plan across 3 divisions are-

- Chatra South Forest Division having 47 villages and a project cost of Rs. 625.96 lakhs
- Chatra North Forest Division having 29 villages and a project cost of Rs. 625.77 lakhs
- Latehar Forest Division having 11 villages and a project cost of Rs. 202.02 lakhs

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Mitigation Plan for Chatra South Division

Potential Soil and Moisture conservation through Bio engineering cum vegetative measures

- **Contour trench@ 430 ha across 14 villages with slope 10% to 20%:** Contour trenching involves digging trenches along the natural contours of the land to intercept runoff water, reduce soil erosion, and increase water percolation. Implemented across 430 hectares in 14 villages, this measure will stabilize slopes between 10%–20% and enhance groundwater recharge. Provision of Rs. 99.80 lakh has been done for this activity.
- **Silvicultural plantations in 100 ha:** Silvicultural plantations focus on planting native or region-specific tree species to restore degraded forest areas. Spread over 100 hectares, this approach not only aids in moisture retention and soil improvement but also contributes to long-term forest regeneration and biodiversity enhancement. Provision of Rs. 117.70 lakh has been done for this activity.

Improving water regime and its Maintenance

- **Check dams** will be built on the drainage line for reducing velocity of water and also as a water storage structures. This will recharge base flow of the drainage line and will also recharge the ground water table. From the check dams wild animals can have access to water or villagers can also use the water for domestic purposes and for irrigation also.
 - **Construction of Pucca Checkdams-12Mtr X 1.2 Mtr @10L and Desiltation:** 5 check dams will be built on the convergence of the drainage lines across the 5 villages falling in the impact zone. These will be masonry check dams each built at cost of Rs.10 lakhs. Since these check dams are built on drainage lines siltation will happen naturally and hence a provision of Rs.5 lakhs has been done for desiltation of these structures.
 - **Construction of Pucca Checkdams-16Mtr X 1.2 Mtr @15L and Desiltation:** Similarly, for drainages of a bit wider dimension 3 bigger size checkdams will be built each with a cost of Rs.15 lakhs and provision for desiltation has also be done in similar fashion with a cost of Rs.4 lakhs.

Provision of Rs. 49lakh has been done for this activity.

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- **Construction of New Ponds (100*100*12) feet @8 lakhs and Desiltation:** New pond construction enhances water storage capacity in forest and rural areas, helping to conserve rainwater, recharge groundwater, and support local vegetation and wildlife. These ponds also serve as critical water sources during dry periods, thereby improving the overall soil moisture regime and resilience of the ecosystem.

Provision of Rs. 40 lakhs have been done for construction of the 5 ponds in 5 villages and Rs. 6 lakhs have been done for desiltation of the ponds.

- **Construction of Loose boulder check-dam (5m*1m*1m) @ 1348/cum and repair:** These are small barriers made by piling locally available stones across seasonal streams or drainage lines. These structures help slow down water flow, reduce soil erosion, and allow water to percolate into the ground, thereby improving moisture retention and supporting groundwater recharge. They are especially effective in hilly and undulating terrain.

Provision of Rs. 50.00 lakh has been done for construction of LBCDs of various dimension and based on the model estimate close 740 such structures can be built. Similarly, for desiltation of these structures provision of Rs. 3 lakhs have been done.

Awareness, Capacity Building & Documentation

- **Awareness regarding climate change and adaptation:** This component aims to educate local communities about the impacts of climate change and the importance of adopting soil and water conservation practices. Through workshops, training sessions, and community engagement, it will build local capacity for climate-resilient land management, promoting sustainable use of natural resources and long-term ecosystem health.

Provision of Rs. 50 lakh has been done for this activity.

- **Distribution of Seedlings to public:** This activity involves the free distribution of quality seedlings to local residents to encourage tree planting on homesteads, farmlands, and community spaces. It promotes public participation in afforestation efforts, enhances green cover, and contributes to long-term soil stabilization and moisture conservation across the landscape.

Provision of Rs. 19.12 lakh has been done for this activity with an escalation of 10% each year till 10th year.

- **Documentation:** The experience gathered over the period gets eroded due to limited capacity of the human mind to store information. The learning will be documented and kept for future reference of the respective divisions.

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Provision of Rs. 7 lakh has been done for this activity.

- **Monitoring cost:** Monitoring costs cover periodic field assessments, and evaluation of implemented soil and moisture conservation measures. This ensures quality control, timely course corrections, and effective tracking of ecological outcomes and community benefits.

This will be done by the DFO and other senior officers from the department on quarterly basis or as and when required especially before onset of monsoon and post monsoon seasons.

Provision of Rs. 25 lakh has been done for this activity.

- **Escalation @ 20 percent:** A 20% escalation cost is provisioned to account for inflation, price fluctuations in materials, and unforeseen expenses over the implementation period. This ensures financial flexibility and smooth execution of project activities without compromising quality.

Provision of Rs. 104.33 lakh has been done for this activity.




Mitigation Plan for Chatra North Division

Potential Soil and Moisture conservation through vegetative measures River Side Plantation

- **River Side Plantation: Advance Work for 2.0 Kilometers (along Lilanjan River/other rivers as per SoR of PCCF Development):** Advance work includes site preparation such as clearing, soil treatment, and pit digging along 2 km of riverbank to facilitate plantation. This initiative aims to prevent bank erosion, stabilize soil, and enhance riparian biodiversity in line with the Standard Schedule of Rates (SoR) approved by PCCF (Development).
Provision of Rs. 47.76 lakh has been done for this activity.
- **Silvicultural plantations in 50 ha:** Silvicultural plantations involve planting native and ecologically suitable species over 50 hectares to regenerate degraded forest areas, improve soil structure, and enhance water retention capacity.
Provision of Rs. 60.130 lakh has been done for this activity.
- **Avenue Plantation with bamboo gabion (1000 Gabions):** To enhance green cover and reduce soil erosion along roadsides and vulnerable stretches, avenue plantations will be undertaken with the support of 1,000 bamboo gabions. The bamboo gabions will act as protective structures, stabilizing soil and preventing washouts during heavy rains, while also supporting the healthy growth of planted saplings. This intervention will not only contribute to ecological restoration but also improve the aesthetic value of the landscape and provide long-term environmental benefits.
Provision of Rs. 54.29 lakh has been done for this activity.
- **Distribution of free planting materials:** Free seedlings and planting materials will be distributed to local farmers and residents to promote afforestation on private lands. This encourages community ownership, supports sustainable livelihoods, and enhances landscape-level greening efforts.
Provision of Rs. 19.125 lakh has been done for this activity.

Improving water regime and its Maintenance

- **Soil and Moisture Conservation Work without Plantation eg., Gully Plugging, Silt Detention Dam, Contour Trenches, Retaining Wall, Nala Treatment, Spurs, other torrent control structures, within/nearby impact zone for improvement in water Regime in total 180 Ha (1st year-120 ha& 2nd year-60 Ha each) @ 100 MD per**

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lia: This component focuses on structural interventions to improve the water regime and control erosion in the project's impact zone. Activities include gully plugging, silt detention dams, contour trenches, retaining walls, nala treatment, spurs, and other torrent control measures. These works will be implemented across 120 hectares in two phases 60 hectares each in the 1st and 2nd year, with a provision of 100 man-days per hectare. These efforts will help reduce surface runoff, enhance groundwater recharge, and stabilize vulnerable landscapes without involving tree plantation. Provision of Rs. 81.83 lakh has been done for this activity

- **Construction Check dams of various sizes** : to regulate surface runoff, enhance groundwater recharge, and support irrigation in surrounding agricultural fields, multiple check dams of different capacities will be constructed.
Provision of Rs. 107.00 lakh has been done for this activity
- **Creation of 6 new ponds with hydraulic machine and its desiltation from 8th year onwards**: ix new ponds will be developed using hydraulic machines. These structures will serve as reliable water sources for agriculture and livestock, while desiltation will be carried out from the 8th year onwards to maintain storage capacity.
Provision of Rs. 21.660 lakh has been done for this activity
- **Renovation of earthen checkdam at Gaighat (150 Ft x 10 Ft)**: The existing structure (150 ft x 10 ft) will be restored to improve water holding efficiency and provide long-term sustainability for local water needs.
Provision of Rs. 6.25 lakh has been done for this activity
- **Renovation of Pond of various sizes** : Selected ponds of varying sizes will be renovated to increase their capacity, ensure proper water retention, and reduce seasonal water scarcity.
Provision of Rs. 21.91 lakh has been done for this activity
- **Construction of Loose Boulder Check Dam and Repair** : These eco-friendly structures will be established and repaired in suitable drainage lines to reduce soil erosion, slow down runoff, and enhance moisture availability in adjoining lands.
Provision of Rs. 28.00 lakh has been done for this activity

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Awareness, Research & Documentation

- **Organizing awareness camps/ celebration of important days in local villages/School/Colleges/ Distribution of booklets, pamphlets & banners regarding Forest, Soil & Moisture Conservation/ Fixing of Soil & Water Conservation Awareness Signages, and Hoardings at Vulnerable locations, and General Awareness generation about Climate Change, etc.** Awareness generation activities will be undertaken to sensitize local communities, students, and other stakeholders about the importance of forest conservation, soil and moisture management, and climate change. These efforts will include organizing awareness camps in villages, schools, and colleges, as well as celebrating key environmental days to foster community participation. Information dissemination will be strengthened through the distribution of booklets, pamphlets, and banners, along with the installation of hoardings and signages at vulnerable locations. Such initiatives are aimed at creating long-term behavioral change and encouraging collective responsibility towards natural resource management. Provision of Rs. 42.00 lakh has been done for this activity
- **Documentary Preparation/Film Making/ Brochures/Comics,etc. for awareness generation/ Photography & documentation of activities to be undertaken under the Soil & Moisture Conservation Plan :**To enhance community awareness and ensure transparent reporting, this component includes the creation of documentaries, short films, brochures, and comics highlighting the importance of soil and moisture conservation. Additionally, photography and systematic documentation of all on-ground activities will be undertaken to track progress, promote best practices, and support future training and awareness campaigns. These communication tools will be tailored for diverse audiences, from school children to forest-dependent communities, ensuring widespread outreach and engagement. Provision of Rs. 7.50 lakh has been done for this activity
- **Monitoring by the Forest Officers and Soil and Moisture Conservation Experts:** Regular monitoring will be conducted by designated Forest Department officials and Soil & Moisture Conservation experts to ensure timely implementation, quality assurance, and ecological effectiveness of all conservation measures. Monitoring activities will include field inspections, technical evaluations, and progress documentation to assess survival rates, structural integrity, and hydrological improvements. This oversight will guide mid-course corrections and support adaptive management for achieving long-term sustainability. Provision of Rs. 24lakh has been done for this activity

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- **Escalation @ 20 percent**

A provision of 20% escalation is included to account for inflation, rising costs of materials, labor, and unforeseen contingencies during the project duration. This financial buffer ensures uninterrupted execution and maintains the quality and scope of planned soil and moisture conservation activities despite market fluctuations.

Provision of Rs. 104.29 lakh has been done for this activity

Mitigation Plan for Latehar Division

Potential Soil and Moisture conservation through vegetative measures

- **Avenue plantation of drought hardy species with bamboo gabion (500):** This intervention involves planting drought-resistant tree species along roads or pathways, supported by bamboo gabions to protect young saplings from grazing and runoff. A total of 500 such units will enhance green cover, reduce surface erosion, and contribute to carbon sequestration while improving the local microclimate and landscape aesthetics.

Provision of Rs. 19.99 lakh has been done for this activity.

- **Contour trench -50 Ha (@55 x 0.00422 x 50 ha)**
Contour trenching involves digging trenches along the natural contours of the land to intercept runoff water, reduce soil erosion, and increase water percolation. Implemented across 50 hectares, this measure will stabilize slopes between 10%-20% and enhance groundwater recharge.

Provision of Rs. 11.605 has been done for this activity.

- **Silvicultural Operation Plantations (50 ha):** Silvicultural plantations focus on planting native or region-specific tree species to restore degraded

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forest areas. Spread over 50 hectares, this approach not only aids in moisture retention and soil improvement but also contributes to long-term forest regeneration and biodiversity enhancement.

Provision of Rs. 58.85 lakh has been done for this activity.

- **Distribution of free planting materials (500 tree/year):** This activity involves providing free saplings, seeds, and planting inputs to local communities to encourage afforestation and soil conservation on private and community lands. It promotes participatory conservation, enhances green cover, and supports long-term moisture retention and biodiversity restoration.

Provision of Rs. 10.50 lakh has been done for this activity.

Improving water regime and its Maintenance

- **Check dams** will be built on the main drainage line for storing water. This will recharge base flow of the drainage line and will also recharge the ground water table. From the check dams either irrigation channel will be carved or a lift irrigation system will be installed.

- **Construction of Pucca Checkdams (12 Mtr X 1.2 Mtr)-2 Nos :** Check dams will be built on the convergence of the drainage lines in the impact zone. These will be masonry check dams built at cost of Rs.8 lakhs. Two Pucca checkdam has been proposed of this dimension.

Provision of Rs. 16 lakh has been done for it.

- **Construction of Pucca Checkdams (14 Mtr X 1.2 Mtr)- 2Nos :** Similarly, for drainages of a bit wider dimension bigger size checkdams will be built with a cost of Rs.12 lakhs. Two Pucca checkdam has been proposed of this dimension.

Provision of Rs. 24 lakh has been done for this activity.

- **Construction of New Ponds (100*100*12) feet-2 Nos :** New Pond construction enhances water storage capacity in forest and rural areas, helping to conserve rainwater, recharge groundwater, and support local vegetation and wildlife. These ponds also serve as critical water sources during dry periods, thereby improving the overall soil moisture regime and resilience of the ecosystem.

Provision of Rs. 8.820 lakh has been done for this activity.

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Awareness, Capacity building & Documentation

- **Organizing awareness camps in local villages to address soil & water conservation:** Awareness camps will be conducted in local villages to educate communities on the importance of soil and water conservation practices. These camps will cover sustainable land use, benefits of afforestation, climate adaptation, and eco-friendly farming. The goal is to build local capacity, encourage participation, and foster stewardship of natural resources for long-term ecological sustainability.

Provision of Rs. 9.00 lakh has been done for this activity.

- **Printing of booklets, pamphlets & banners regarding Forest, Soil & Moisture conservation:** This activity involves the development and distribution of IEC (Information, Education & Communication) materials such as booklets, pamphlets, and banners focused on forest conservation, soil protection, and moisture retention techniques. These materials will be used during awareness campaigns, training sessions, and community meetings to spread knowledge, encourage best practices, and promote participatory conservation efforts.

Provision of Rs. 2.5 lakh has been done for this activity.

- **Monitoring cost:** Monitoring costs cover periodic field assessments, documentation, and evaluation of implemented soil and moisture conservation measures. This ensures quality control, timely course corrections, and effective tracking of ecological outcomes and community benefits.

Provision of Rs 5 lakh for this activity.

- **Escalation @ 20 percent:** A 20% escalation cost is provisioned to account for inflation, price fluctuations in materials, and unforeseen expenses over the implementation period. This ensures financial flexibility and smooth execution of project activities without compromising quality.

Provision of Rs. 33.25 lakh for this activity.

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ANNEXURE-I

Demographic Details of Impact Area

S.NO	VILLAGE	DISTRICT	BLOCK	No. HOUSEHOLD	TOTAL POPULATION	AREA (HA)
1	Kolwa	Chatra	Hunterganj	27	156	96.51
2	Bedauli	Chatra	Hunterganj	9	38	150.05
3	Gaighat	Chatra	Hunterganj	64	488	59.43
4	Gidhaur	Chatra	Hunterganj	29	195	6.02
5	Naunia Chuan	Chatra	Hunterganj	1	11	37.64
6	Kasdabar	Chatra	Hunterganj	23	186	57.11
7	Luta	Chatra	Hunterganj	32	171	32.93
8	Daha	Chatra	Hunterganj	125	691	0.09
9	Hatwaria	Chatra	Hunterganj	24	132	88.21
10	Bajinathpur	Chatra	Hunterganj	0	0	14.12
11	Raharbar	Chatra	Hunterganj	50	287	54.60
12	Chitua	Chatra	Hunterganj	0	0	101.61
13	Koluapahar	Chatra	Hunterganj	1	1	4.25
14	Baniadih	Chatra	Hunterganj	35	230	79.81
15	Ketaribar	Chatra	Hunterganj	98	661	26.27
16	Jhagartari	Chatra	Hunterganj	4	37	64.89
17	Jutha	Chatra	Hunterganj	30	195	13.09
18	Parma Chak	Chatra	Hunterganj	69	398	17.27
19	Paini Kalan	Chatra	Hunterganj	255	1424	240.22
20	Paini Khurd	Chatra	Hunterganj	0	0	41.13
21	Nawadih	Chatra	Hunterganj	111	683	11.51
22	Erabonga	Chatra	Hunterganj	7	39	2.74
23	Kasiadih	Chatra	Hunterganj	102	502	3.56
24	Demdem	Chatra	Hunterganj	56	419	98.09
25	Dhobey	Chatra	Hunterganj	159	871	46.66
26	Salaiya	Chatra	Hunterganj	291	1694	0.06
27	Postia	Chatra	Hunterganj	218	1298	346.93
28	Bandataur	Chatra	Hunterganj	18	103	77.33
29	Gorre	Chatra	Hunterganj	14	80	20.84
30	Garnhartari	Chatra	Chatra	20	88	9.09
31	Sikid	Chatra	Chatra	178	994	154.40
32	Sehada	Chatra	Chatra	84	355	0.15
33	Saughri	Chatra	Chatra	129	844	305.96
34	Darha	Chatra	Chatra	339	2167	200.31
35	Larkua	Chatra	Chatra	98	549	137.79

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36	Sajna	Chatra	Chatra	40	220	5.37
37	Amauna	Chatra	Chatra	29	179	0.19
38	Suruji	Chatra	Chatra	30	183	149.39
39	Kathantia	Chatra	Chatra	142	728	9.15
40	Karma	Chatra	Chatra	16	103	57.11
41	Ghurnadih	Chatra	Chatra	24	209	21.87
42	Nartuna	Chatra	Chatra	0	0	54.27
43	Sared	Chatra	Chatra	26	127	24.19
44	Geri	Chatra	Chatra	183	1139	75.60
45	Ambadih	Chatra	Chatra	44	227	82.29
46	Parbat alias	Chatra	Chatra	244	1569	260.99
47	Korcha	Chatra	Chatra	56	305	20.93
48	Malia	Chatra	Chatra	30	179	3.92
49	Gulbutu	Chatra	Chatra	25	105	84.59
50	Basaria	Chatra	Chatra	2	13	2.20
51	Bhang	Chatra	Chatra	138	629	127.90
52	Sinduari	Chatra	Chatra	141	740	13.85
53	Pharenda	Chatra	Chatra	18	147	27.27
54	Bhagmania	Chatra	Chatra	67	412	10.29
55	Bara	Chatra	Chatra	20	107	28.34
56	Salaia	Chatra	Chatra	12	60	15.28
57	Badhar	Chatra	Chatra	11	82	13.93
58	Barhgaon	Chatra	Chatra	7	39	35.11
59	Manatu	Chatra	Chatra	3	22	8.09
60	Rakhed	Chatra	Lawalaung	46	340	9.68
61	Jogiadih	Chatra	Lawalaung	0	0	162.31
62	Bhagnadih	Chatra	Lawalaung	0	0	91.08
63	Tilra	Chatra	Lawalaung	28	152	0.20
64	Lamta	Chatra	Lawalaung	228	1381	206.03
65	Jiraun	Chatra	Lawalaung	30	209	20.31
66	Baksi	Chatra	Lawalaung	3	22	166.14
67	Kuthan	Chatra	Simariya	36	198	138.77
68	Belgara	Chatra	Simariya	199	1293	102.65
69	Bagra	Chatra	Simariya	302	1669	178.37
70	Dundua	Chatra	Simariya	288	1501	135.85
71	Serandag	Chatra	Simariya	277	1926	18.32
72	Kendu	Chatra	Simariya	193	1234	278.97
73	Pathak Khap	Chatra	Simariya	0	0	5.00
74	Nwada	Chatra	Simariya	194	1106	99.78

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75	Kasari	Chatra	Simariya	362	2104	77.24
76	Kasiatu	Chatra	Simariya	238	1322	332.70
77	Sibla	Latehar	Balumath	184	1225	211.96
78	Jhimmathuma	Latehar	Balumath	50	274	11.78
79	Makra	Latehar	Balumath	111	604	101.97
80	Bhatehatra	Latehar	Balumath	201	1085	73.93
81	Kusamha	Latehar	Balumath	69	355	69.71
82	Besra	Latehar	Balumath	168	907	198.39
83	Toti	Latehar	Balumath	366	1968	3.08
84	Barwadih	Latehar	Balumath	51	299	104.30
85	Raher	Latehar	Balumath	132	752	132.42
86	Charra	Latehar	Balumath	169	1025	194.31
87	Phulbasia alias Amarwadih	Latehar	Balumath	253	1315	192.02
TOTAL				8186	47777	7050.09

ANNEXURE-II

Interventions List Village wise

S.No.	Village	List of Intervention Chatra North Division
1	Daha	Avenue Plantation (500 Gabion); New Pond (60x45) – (24.390027, 84.839302); New Pond (30x60) (24.380391, 84.838031); New Pond (30x60) (24.38915, 84.83818)
2	Bajinathpur	Awareness Programme, Avenue Plantation (100 Gabion)
3	Hatwaria	Avenue Plantation (400 Gabion), Contour Trench – 15.74 ha; New Pond (100X100) – (24.382596, 84.852781); Pond Renovation (100x100) – (24.384696, 84.857757); Pond Renovation (150x150) – (24.39443, 84.85623); Check Dam (10x1.2 m) – (24.381662, 84.852648)
4	Gidhaur	Awareness Programme and Free Planting Material, Contour Trench – 28.31 ha, Checkdam (7 x 1.2 m)- 24.406136, 84.85208
5	Dhobey	Contour Trench – 49.42 ha, Check Dam (10x1.2 m) – (24.3167, 84.8526)
6	Ketaribar	Contour Trench – 19.04 ha, Pond Renovation (150x150)- (24.3423, 84.8594)
7	Naunia	Contour Trench – 32.37 ha, Check Dam (10x1.2m) (24.394259, 84.855756)
8	Kasdabar	Contour Trench – 10.56 ha, New Pond (100x100) – (24.397006, 84.86658).
9	Chitua	Contour Trench – 24.21 ha, Check Dam (6X1.2 m) – (24.376854, 84.843005)
10	Gaighat	Awareness Programme, Pond Renovation (50x30) – (24.403095, 84.866331)
11	Kolwa	Awareness Programme, Free Planting Material, Check Dam (10x1.2 m) – (24.412534, 84.883761)
12	Parmachak	Awareness Programme, Free Planting Material, Check Dam (7x1.2 m) – (24.356145, 84.845218)
13	Painikalan	Pond Renovation (2) (100x100) – (24.338266, 84.827947), (24.342672, 84.829339), Silviculture
14	Raharbar	Awareness Programme, Pond Renovation (100x100) – (24.381854, 84.846842)

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Raghendra Kumar
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S.No.	Village	List of Intervention Chatra North Division
14 (a)	Teturia	Awareness Programme and Riverside Plantation in Lilanjan river (2 km) (24.38143, 84.81208)
15	Kasiadih	Awareness Programme, Pond Renovation (100x100) – (24.326054, 84.851084)
16	Baniadih	Pond Renovation (2) (150x150) – (24.365252, 84.841802), (24.365124, 84.84183)
17	Erabonga	Awareness Program, Free Planting Material, LBCD Nala Coordinate- (24.335697, 84.85055), Checkdam (7x1.2 m)- 24.3327, 84.8461
18	Bedauli	New Pond (100x100) – (24.41095, 84.881522), Free Planting Material
19	Charra	Free Planting Material, LBCD Nala Coordinate- (23.866862, 84.89721)
20	Koluapahar	Awareness Program, LBCD Nala Coordinate- (24.36627, 84.85989)
21	Jhagartari	Free Planting Material, LBCD Nala Coordinate- (24.36344, 84.84067)
22	Jutha	Free Planting Material, LBCD Nala Coordinate- (24.35874, 84.85025)
23	Nawadih	Awareness Program, Free Planting Material, LBCD Nala Coordinate- (24.340288, 84.85722)
24	Postia	Awareness Program; Free Planting Material, LBCD Nala Coordinate- (24.29848, 84.83374)
25	Bandatanr	Free Planting Material, LBCD Nala Coordinate- (24.29287, 84.82258)
26	Gorre	Free Planting Material, LBCD Nala Coordinate- (24.27833, 84.82441)
27	Salaia	Awareness Program, LBCD Nala Coordinate- (24.12856, 84.85757)
28	Demdem	Free Planting Material, LBCD Nala Coordinate- (24.32178, 84.83509)
29	Luta	Awareness Program; LBCD Nala Coordinate- (24.37549, 84.87936)


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List of Intervention Chatra South Division

S.NO	VILLAGE	BLOCK	Intervention
1	Gamhartari	Chatra	Silviculture
2	Sikid	Chatra	Checkdam, Silviculture, Contour Trench
3	Sehada	Chatra	Avenue Plantation
4	Sanghri	Chatra	Checkdam, Avenue Plantation, Contour Trench
5	Darha	Chatra	River side plantation, Contour Trench
6	Larkua	Chatra	Free Plantation Material
7	Sajna	Chatra	Free Plantation Material
8	Amauna	Chatra	River side plantation, LBCD
9	Suruj	Chatra	New Pond, Avenue Plantation
10	Kathautia	Chatra	River side plantation
11	Karma	Chatra	Free Planting Material
12	Ghurnadih	Chatra	Checkdam, Avenue Plantation
13	Nartama	Chatra	River side plantation, LBCD
14	Sared	Chatra	Free Plantation Material
15	Geri	Chatra	River side plantation, LBCD
16	Ambadih	Chatra	River side plantation, LBCD
17	Parbat alias Barahmana	Chatra	Free Plantation Material, Contour Trench
18	Korcha	Chatra	River side plantation, LBCD
19	Malia	Chatra	Free Plantation Material
20	Gulhutu	Chatra	Free Plantation Material
21	Basaria	Chatra	Free Plantation Material
22	Bhang	Chatra	New Pond, Avenue Plantation
23	Sinduari	Chatra	River side plantation, LBCD
24	Pharenda	Chatra	Pond Renovation
25	Bhagmania	Chatra	Free Plantation Material
26	Bara	Chatra	River side plantation, LBCD
27	Salaia	Chatra	River side plantation, LBCD
28	Badhar	Chatra	Free Plantation Material
29	Barhgaon	Chatra	River side plantation, LBCD
30	Manatu	Chatra	Checkdam, Avenue Plantation
31	Rakhed	Simariya	River side plantation, LBCD
32	Jogiadih	Simariya	River side plantation
33	Bhagnadih	Simariya	Free Plantation Material
34	Tilra	Simariya	River side plantation, LBCD
35	Lamta	Simariya	Free Plantation Material
36	Jiraun	Simariya	River side plantation, LBCD
37	Baksi	Simariya	New Pond, Avenue Plantation
38	Kuthan	Simariya	River side plantation, LBCD
39	Belgara	Simariya	Free Plantation Material

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40	Bagra	Simariya	River side plantation
41	Dundua	Simariya	Pond Renovation
42	Serandag	Simariya	Free Plantation Material
43	Kendu	Simariya	Check dam, Avenue Plantation, River side Plantation
44	Pathak Khap	Simariya	Free Plantation Material
45	Nawada	Simariya	Pond Renovation, Contour Trench
46	Kasari	Simariya	Free Plantation Material, Contour Trench
47	Kasiatu	Simariya	Silviculture

List of Intervention Latehar Division

S.NO	VILLAGE	BLOCK	Intervention
1	Sibla	Balumath	Contour Trench, Silviculture
2	Jhirmatkuma	Balumath	Silviculture
3	Makra	Balumath	River side plantation, LBCD
4	Bhatchatra	Balumath	River side plantation, LBCD
5	Kusamba	Balumath	Silviculture
6	Besra	Balumath	New Pond, Avenue Plantation, Checkdam (2)
7	Toti	Balumath	Free Plantation Material
8	Barwadih	Balumath	Silviculture
9	Rahea	Balumath	Silviculture
10	Charra	Balumath	Checkdam, River side Plantation
11	Phulbasia alias Amarwadih	Balumath	Contour Trench, Silviculture, New Pond

ANNEXURE-III

Forest Area Division Area

Sl.No	Forest Division	Forest Area (ha)
1	Chatra North	145.79
2	Chatra South	1215.49
3	Latehar	232.00
Total		1593.28

ANNEXURE-IV

Co-ordinates of New Pond

SLNo	Latitude	Longitude	Village	Block	District
	24.390027	84.839302	Daha	Hunterganj	Chatra North
	24.389391	84.838031	Daha	Hunterganj	Chatra North
	24.38915	84.83818	Daha	Hunterganj	Chatra North
	24.41095	84.881522	Bedauli	Hunterganj	Chatra North
	24.382596	84.852781	Hatwaria	Hunterganj	Chatra North
	24.397006	84.86658	Kasdabar	Hunterganj	Chatra North
	24.204985	84.83267	Suruj	Chatra	Chatra South
	24.134606	84.84685	Bhang	Chatra	Chatra South
	24.075052	84.86082	Baksi	Simariya	Chatra South

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	24.204985	84.83267	Suruj	Chatra	Chatra South
	24.134606	84.84683	Bhang	Chatra	Chatra South
	24.075052	84.86082	Baksi	Simariya	Chatra South
	23.906529	84.884824	Besra	Balumath	Latehar
	23.852967	84.903978	Phulbasia	Balumath	Latehar

ANNEXURE-V

Co-ordinates of Renovation of Pond (100*100)

Sl.No	Latitude	Longitude	Village	Block	District
1	24.403095	84.866331	Gaighat	Hunterganj	Chatra North
2	24.384696	84.857757	Hatwaria	Hunterganj	Chatra North
3	24.326054	84.851084	Kasiadih	Hunterganj	Chatra North
4	24.338266	84.827947	Painikalan	Hunterganj	Chatra North
5	24.342672	84.829339	Painikalan	Hunterganj	Chatra North
6	24.381854	84.846842	Rahabar	Hunterganj	Chatra North
7	24.381864	84.846584	Raharbar	Hunterganj	Chatra North

Co-ordinates of Renovation of Pond (150*150)

Sl.No	Latitude	Longitude	Village	Block	District
8	24.365252	84.841802	Baniadih	Hunterganj	Chatra North
9	24.365124	84.84183	Baniadih	Hunterganj	Chatra North
10	24.39443	84.85623	Hatwaria	Hunterganj	Chatra North
11	24.342342	84.859409	Ketanbar	Hunterganj	Chatra North

ANNEXURE-VI

Co-ordinates of Checkdam

S.No	Latitude	Longitude	Village	Block	District
1	84.828611	24.268889	Sikid	Chatra	Chatra South
2	84.879245	24.015502	Kendu	Chatra	Chatra South
3	84.852222	24.123611	Manatu	Chatra	Chatra South
4	84.841144	24.237778	Sanghri	Chatra	Chatra South
5	84.830195	24.19058	Nartama	Chatra	Chatra South
6	84.843005	24.376854	Chitua	Hunterganj	Chatra North
7	84.883761	24.412534	Kolwa	Hunterganj	Chatra North
8	84.845218	24.356145	Parma Chak	Hunterganj	Chatra North
9	84.846189	24.332763	Erahonga	Hunterganj	Chatra North
10	84.855756	24.394259	Nannia	Hunterganj	Chatra North
11	84.852648	24.381662	Hatwaria	Hunterganj	Chatra North
12	84.8526	24.31670	Dhobey	Hunterganj	Chatra North
	84.85208	24.40613	Girdhor	Hunterganj	Chatra North
13	84.881667	23.948056	Sibla	Balumath	Latehar
14	84.888889	23.868333	Charra	Balumath	Latehar
15	84.885741	23.894802	Besra	Balumath	Latehar
16	84.885977	23.905380	Besra	Balumath	Latehar

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Photographs of Forest Nala and Check dams



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Avenue Plantation



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Avenue Plantation



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Contour Trench



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AKT - Hazarihagh

Ray

Contour Trench



Id: 2406233
 tude: 84.852208
 lon: 186.3313.42 m
 acy: 6.424 m
 23-07-2025 13:41
 Gidher: Contour trench



Latitude: 24.403334
 Longitude: 84.8548
 Altitude: 99.56±2.1 m
 Accuracy: 1.543 m
 Time: 23-07-2025 13:47
 Note: Gidher Contour trench site forrest



Id: 24402592
 tude: 84.854573
 lon: 199.9615.83 m
 acy: 4.603 m
 23-07-2025 13:47
 Gidher: Contour trench



Latitude: 24.383936
 Longitude: 84.85639
 Elevation: 222.47±10.4 m
 Accuracy: 2.889 m
 Time: 23-07-2025 15:14
 Note: Hethwana cantur sit

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Contour Trench



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 UKT - 1437-11/2025

Loose Boulder Checkdam



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Loose Boulder Checkdam



Ray



Checkdam



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Check Dam



New Pond



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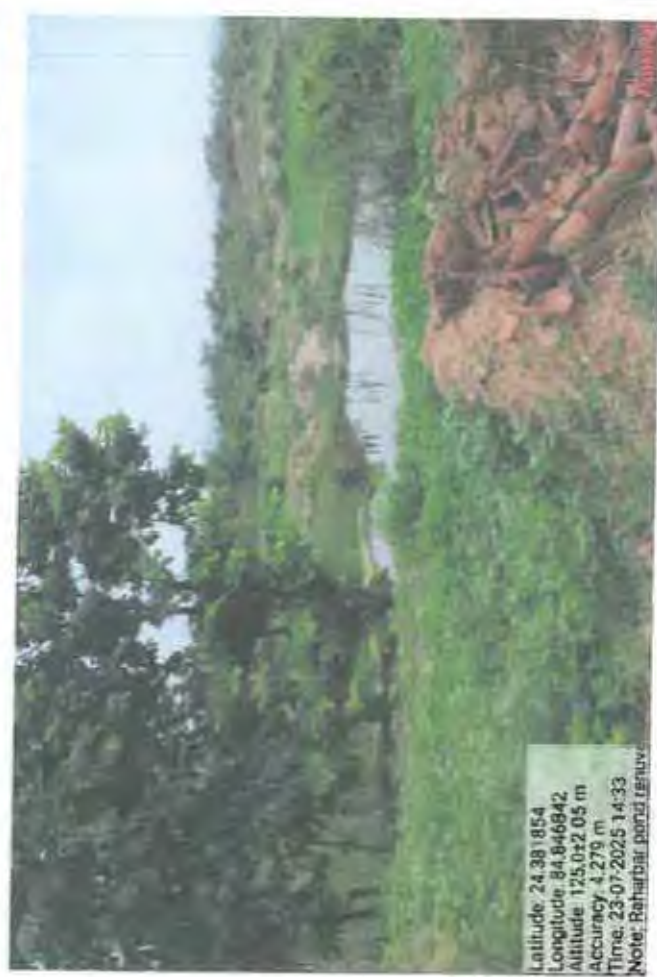


New Pond



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Renovation of Pond (100*100)



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Renovation of Pond (100*100)



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Renovation of Pond (150*150)



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Silviculture



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Site Visit By Ranger



Raghvendra Kumar
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13 Aug 2025 17:12:01

24.38143617N 84.81210062E

269° W

Unnamed Road

Tetaria

Jharkhand

Altitude: 129.2msnm

Speed: 0.0km/h

Village-tetariya

Index number: 13

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13 Aug 2025 17:06:47

24.38126247N 84.81261428E

50° NE

Tetaria

Jharkhand

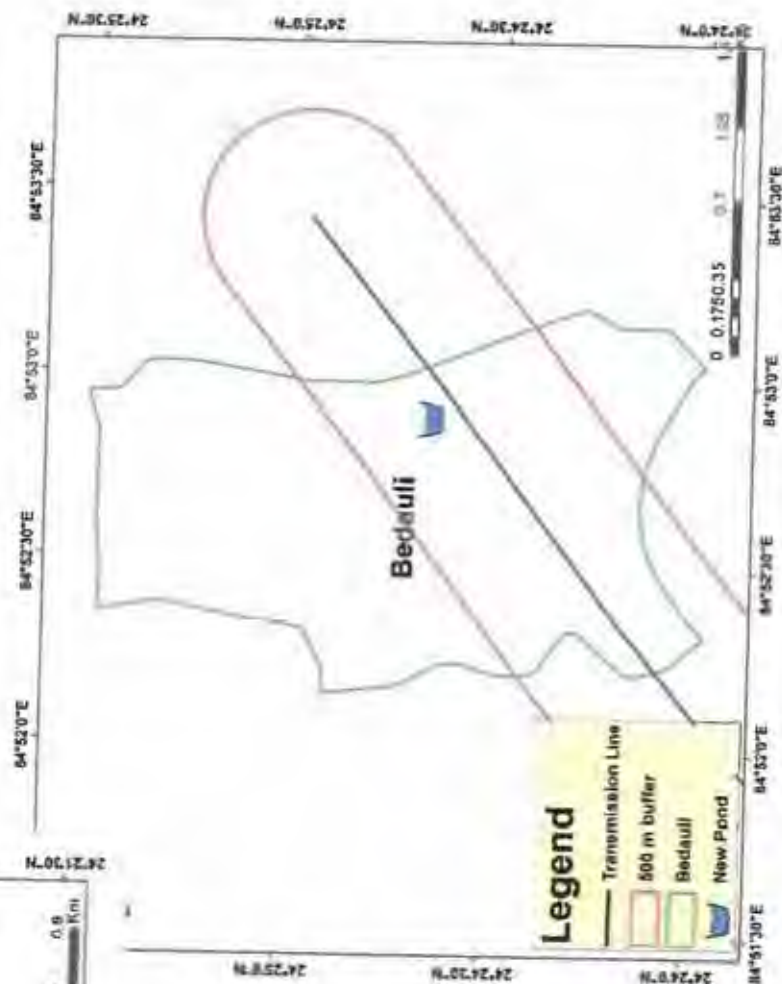
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Speed: 0.0km/h

Village-tetariya

Index number: 4

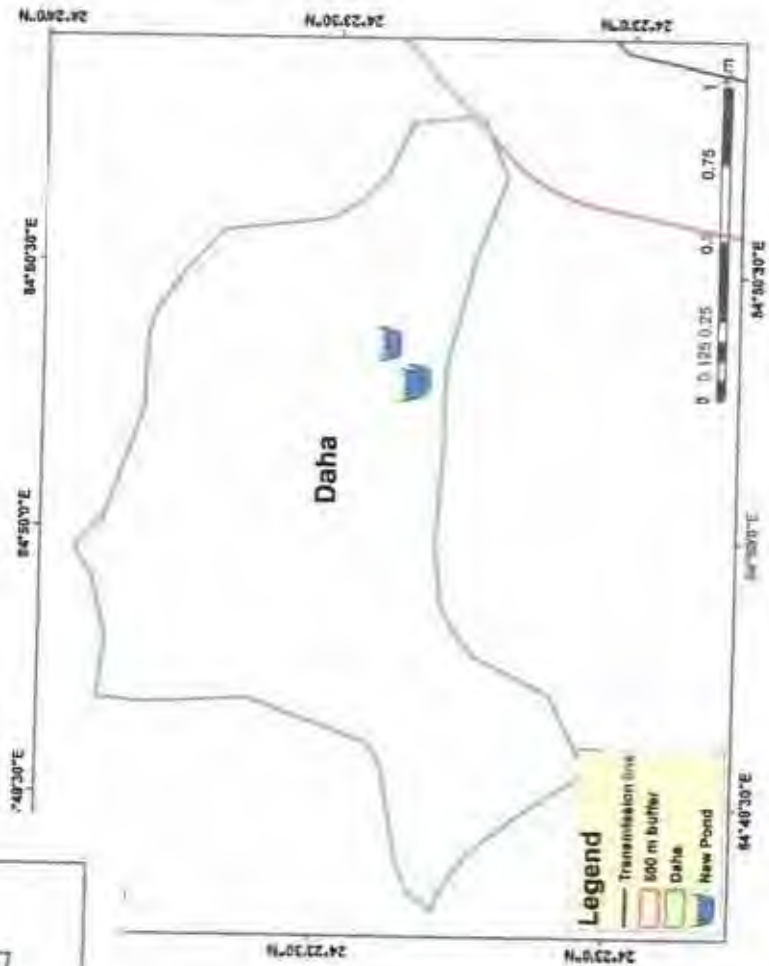
Chatra North Forest Division



Page

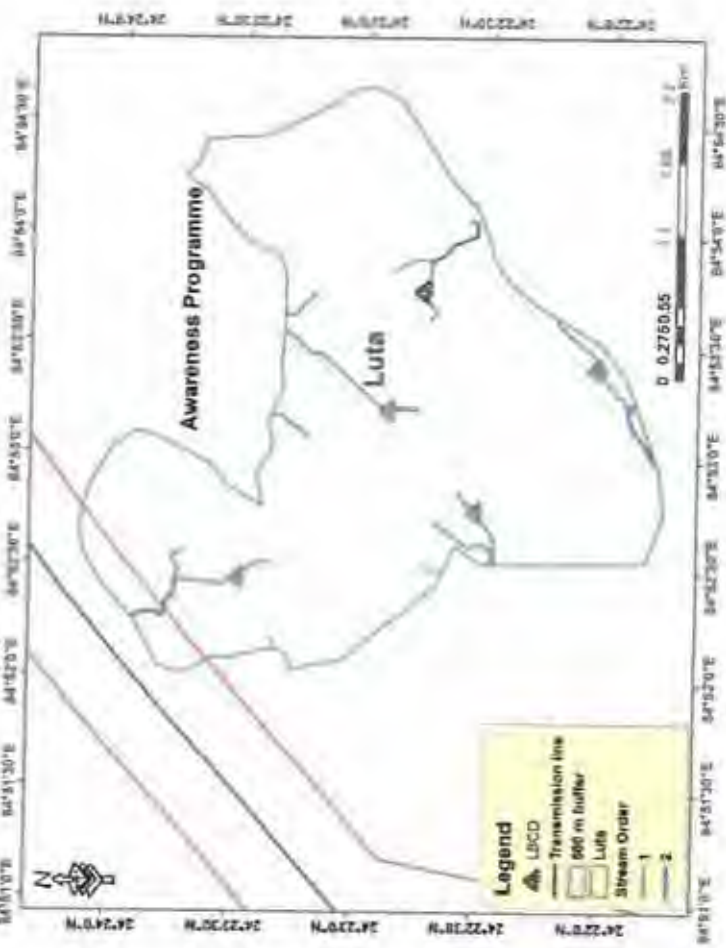
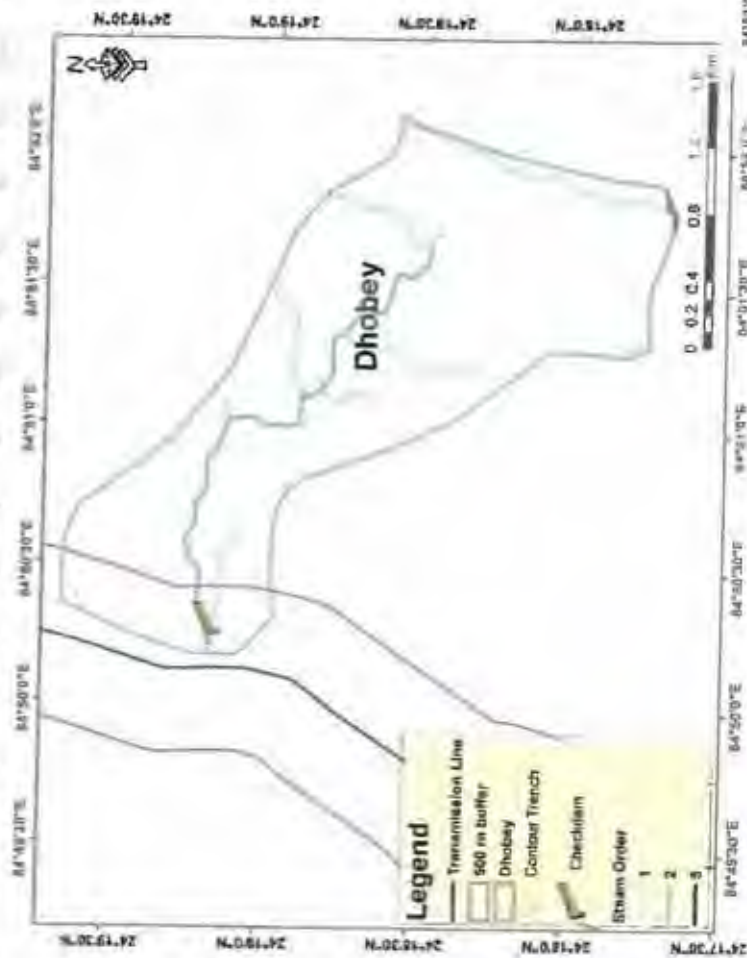
Radhika Kumar
Head-Projects (Site) TL
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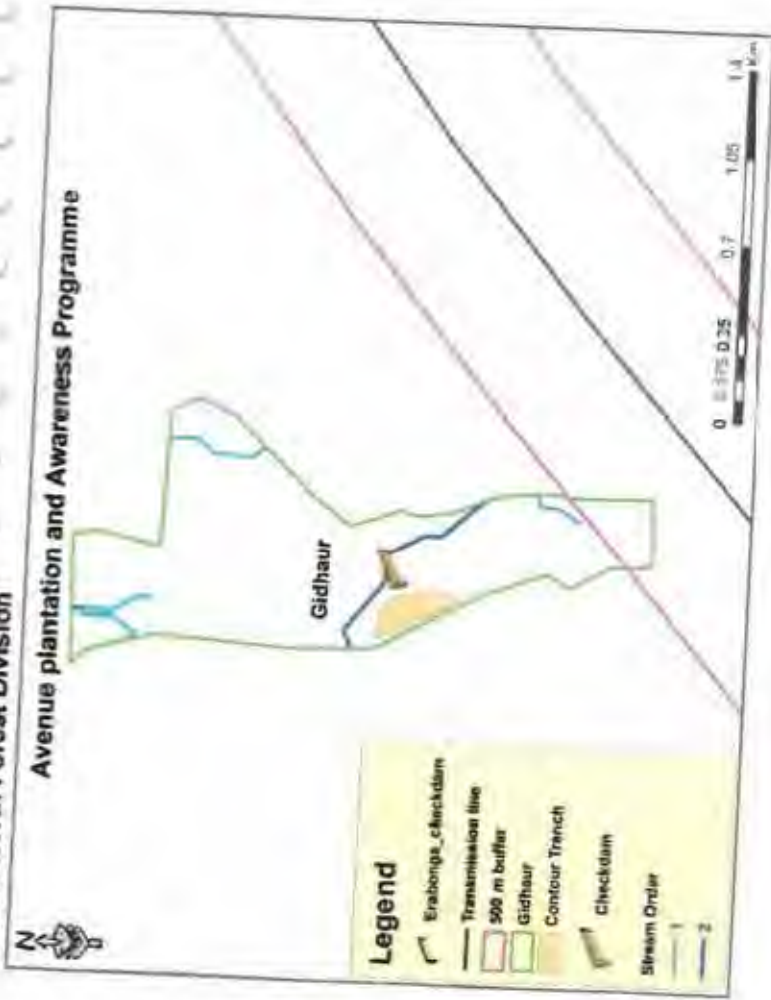
Ray
 Raynagar a Kullar
 Head-Projects (Site) TL
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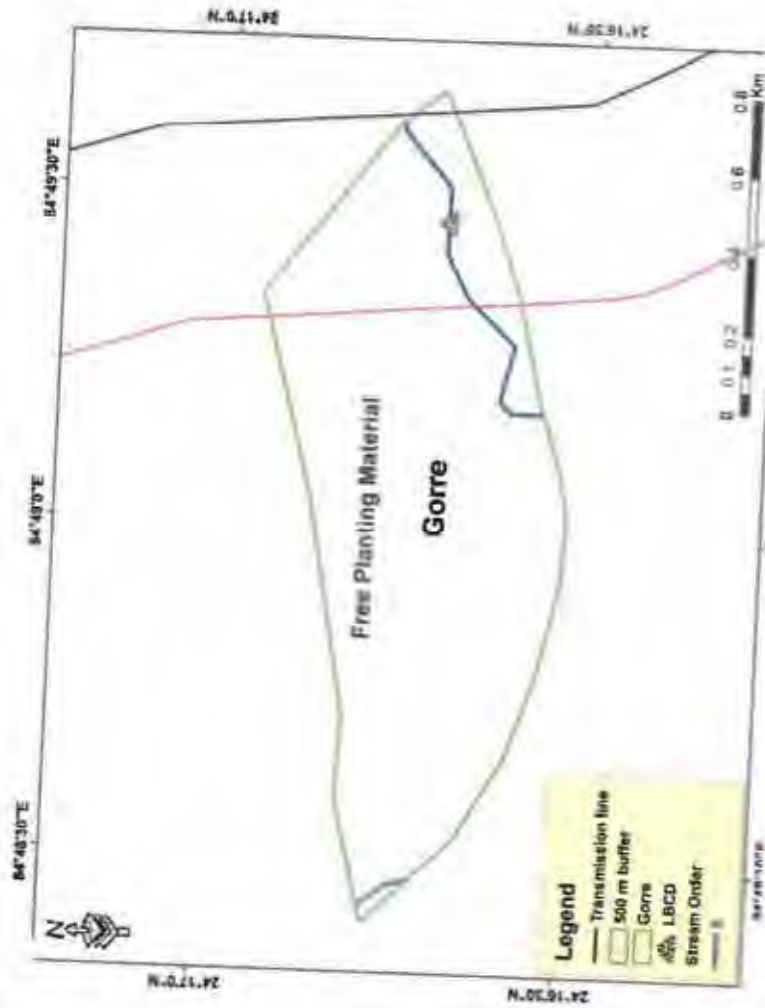


Raghuendra Kumar
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Avenue plantation and Awareness Programme

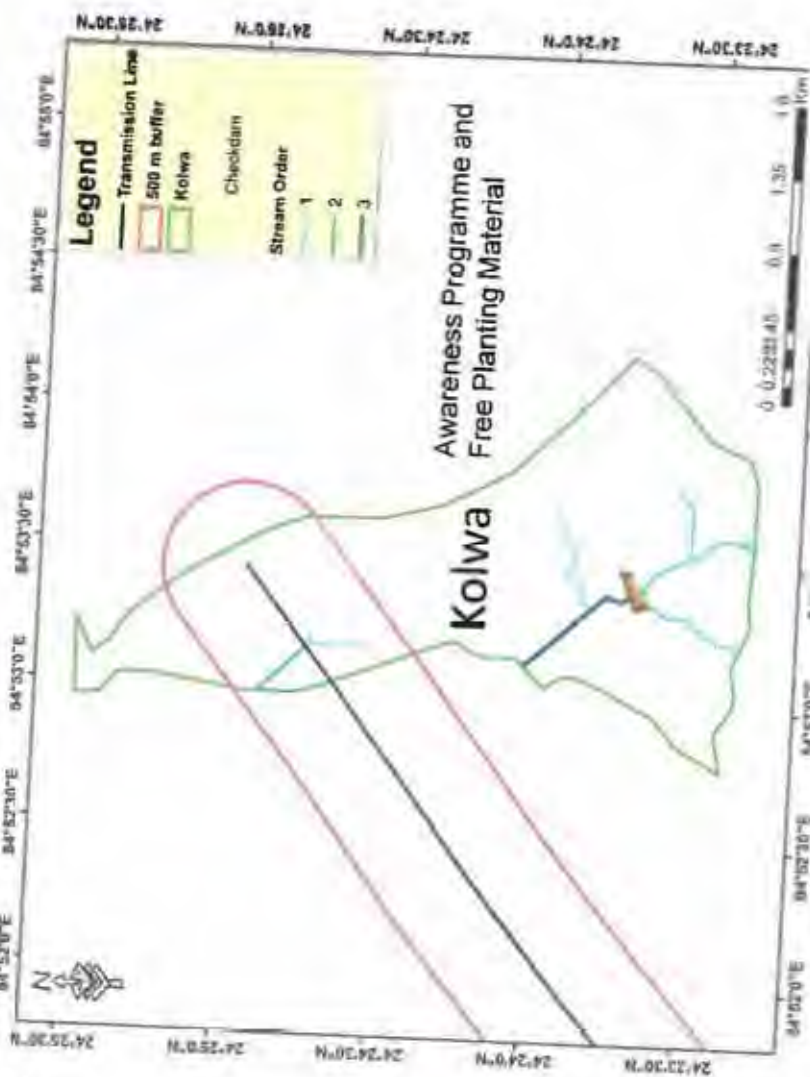
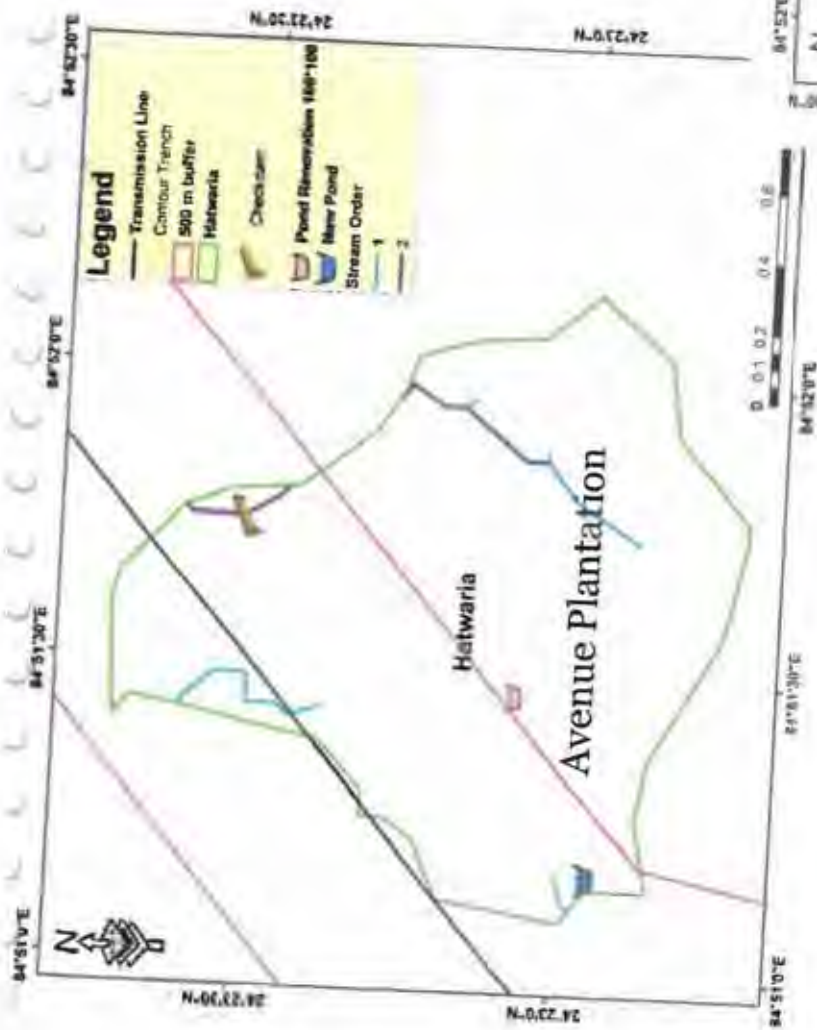


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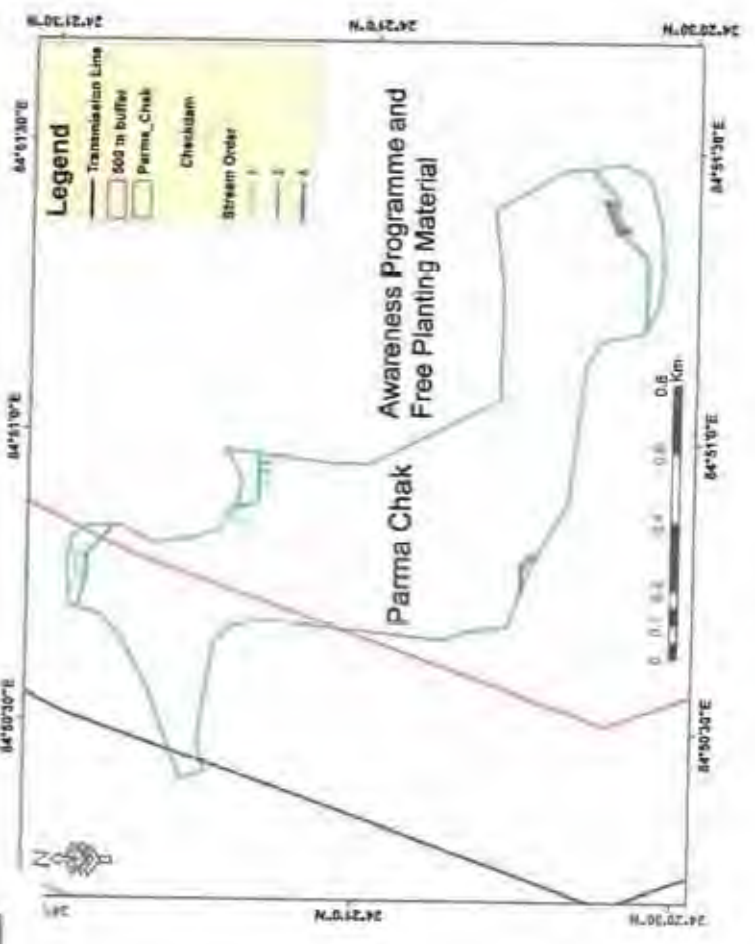
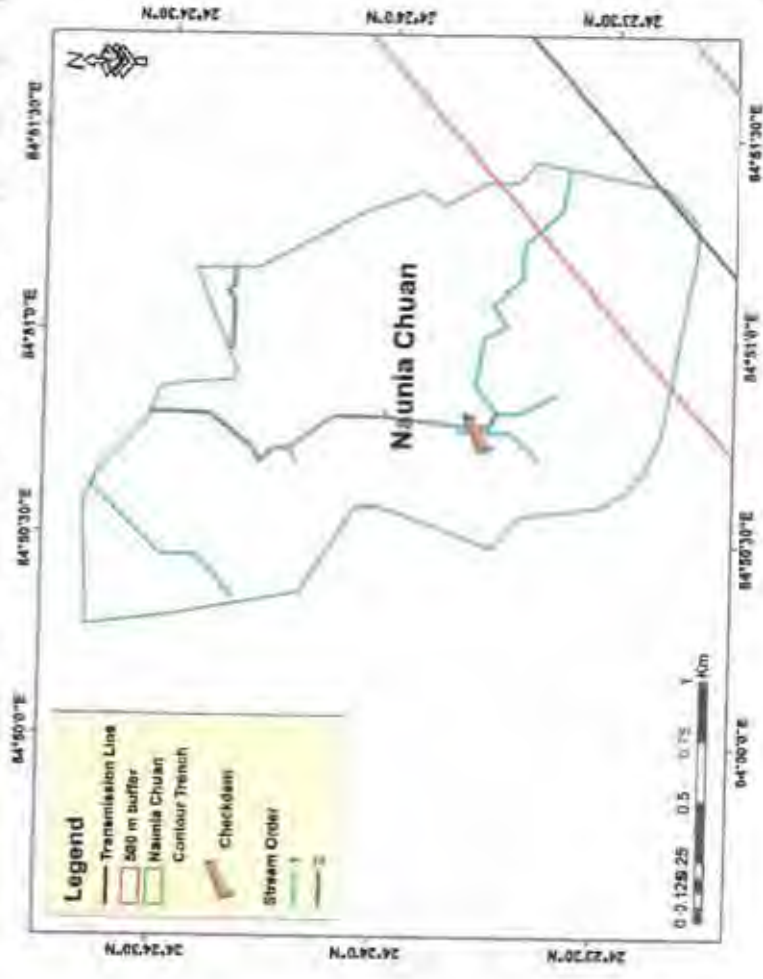
Chatra North Forest Division



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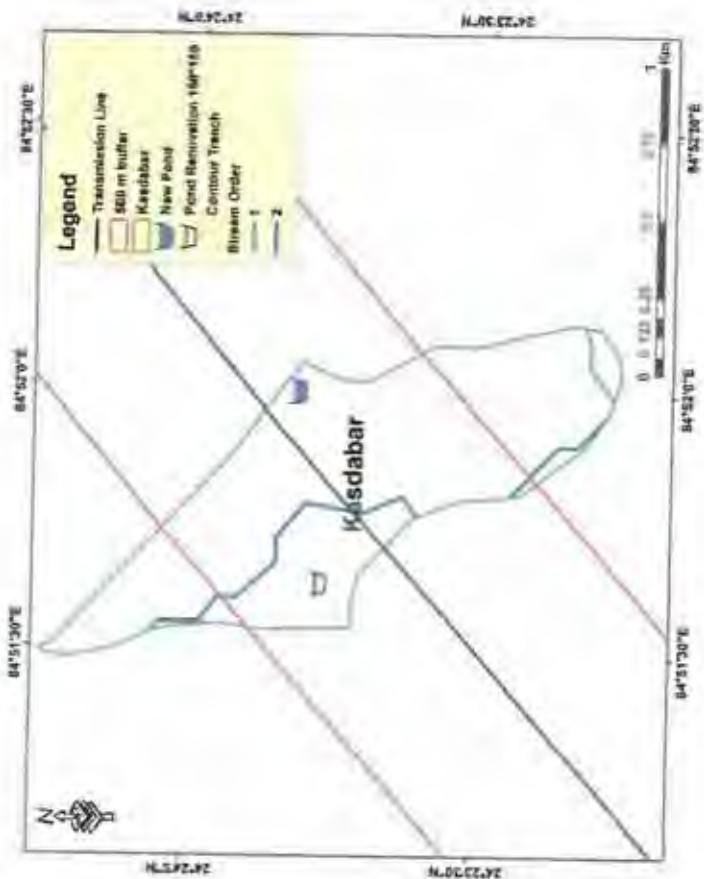
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 Raghvendra Kumar
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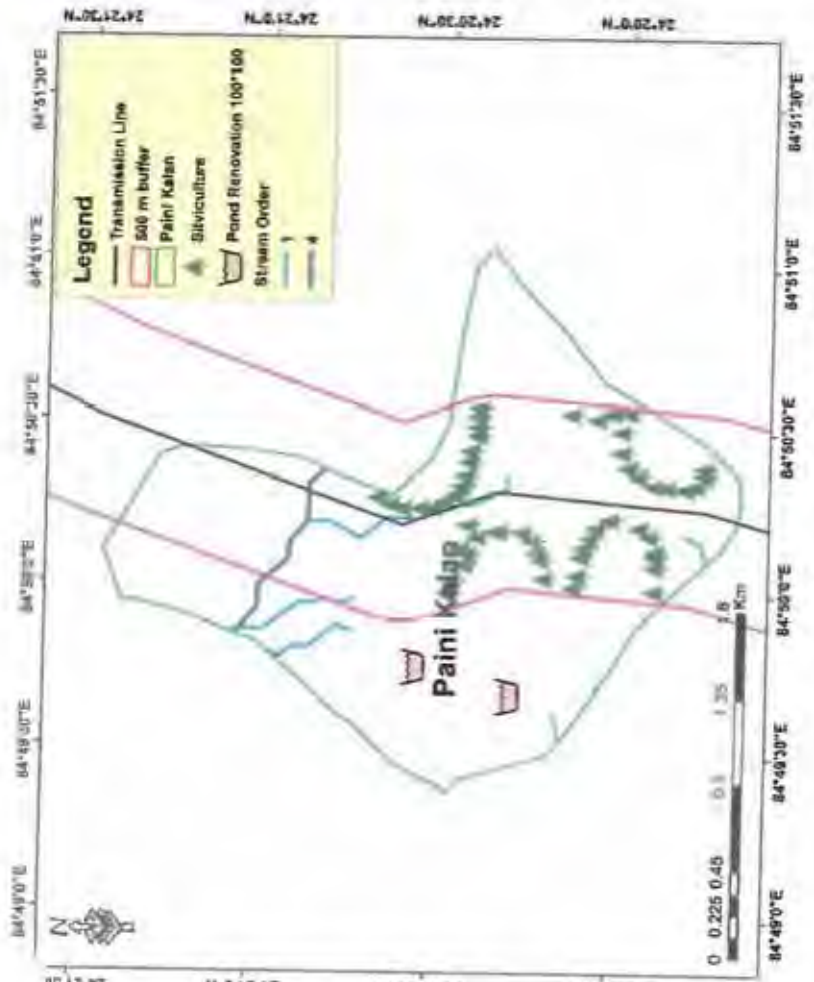
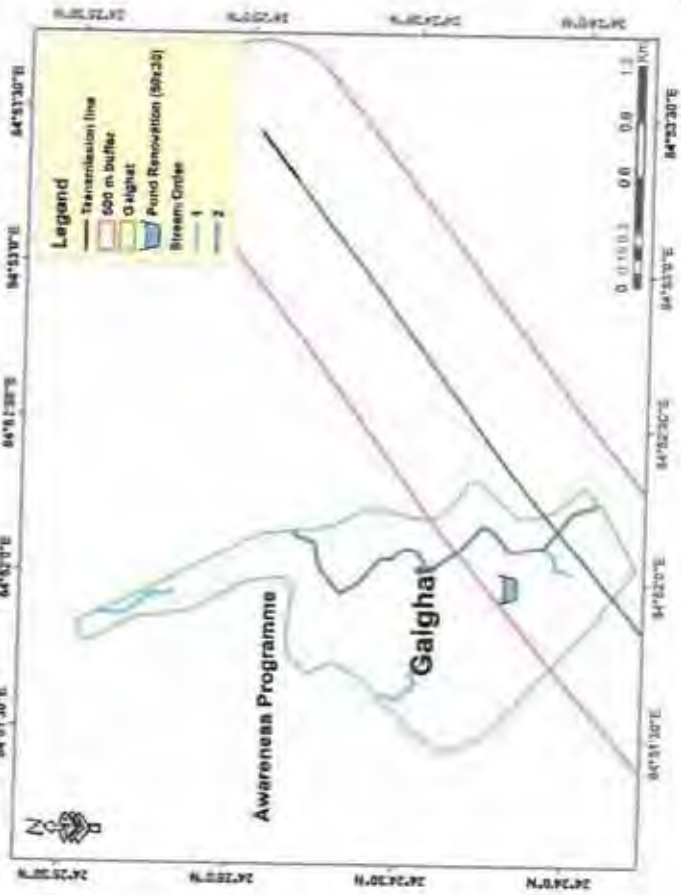
Chatra North Forest Division



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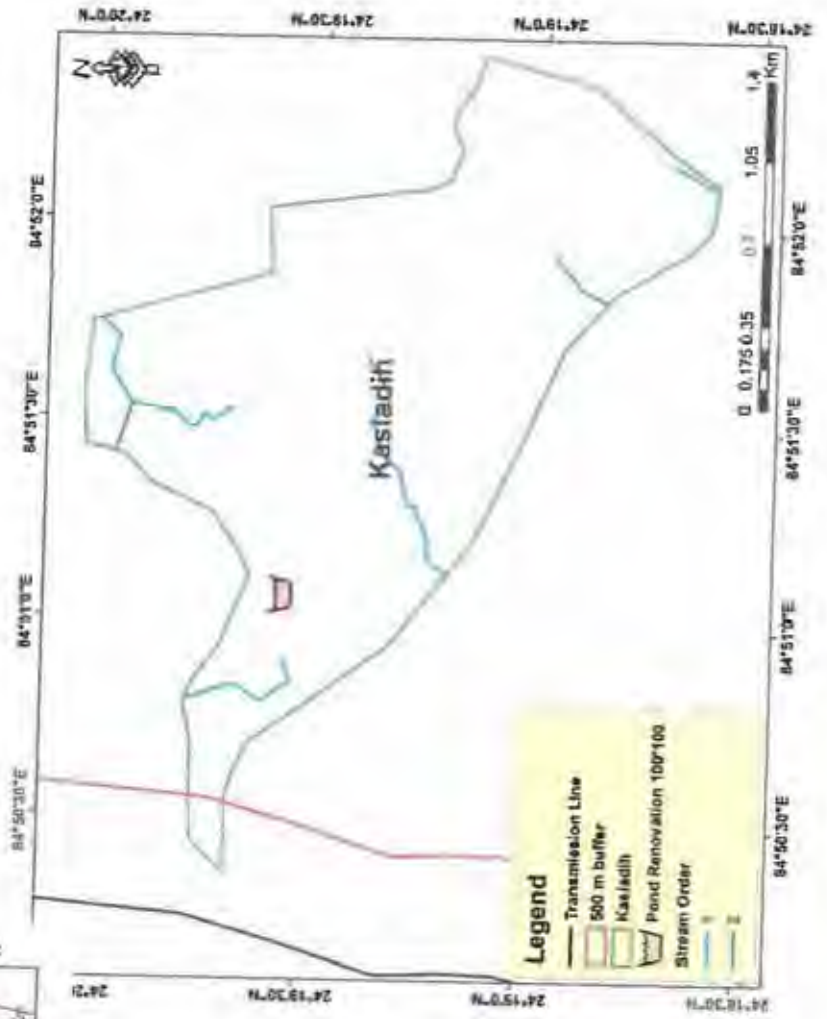
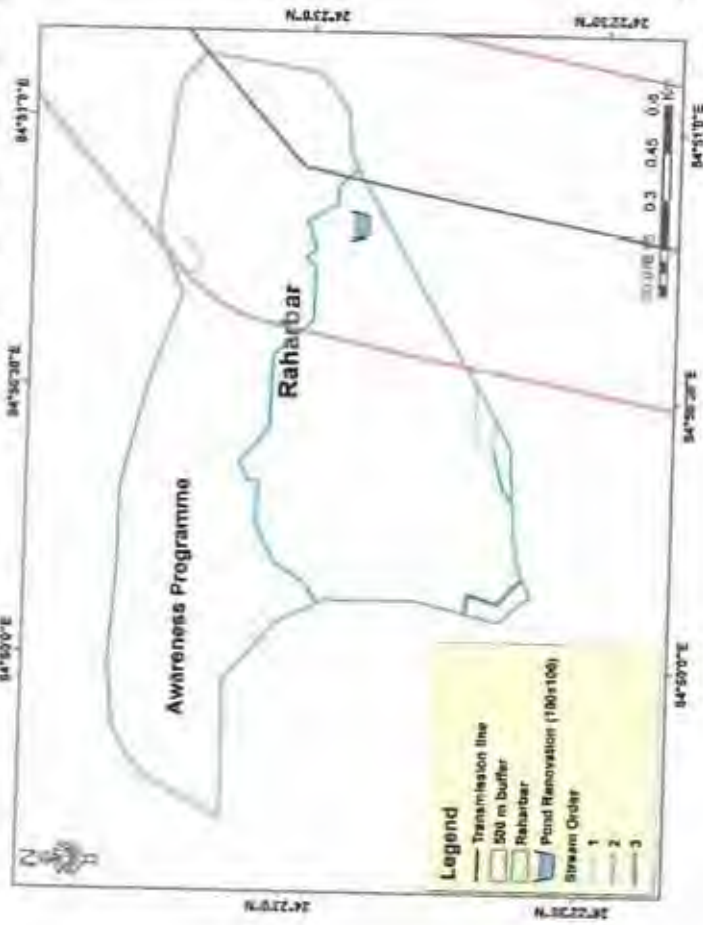
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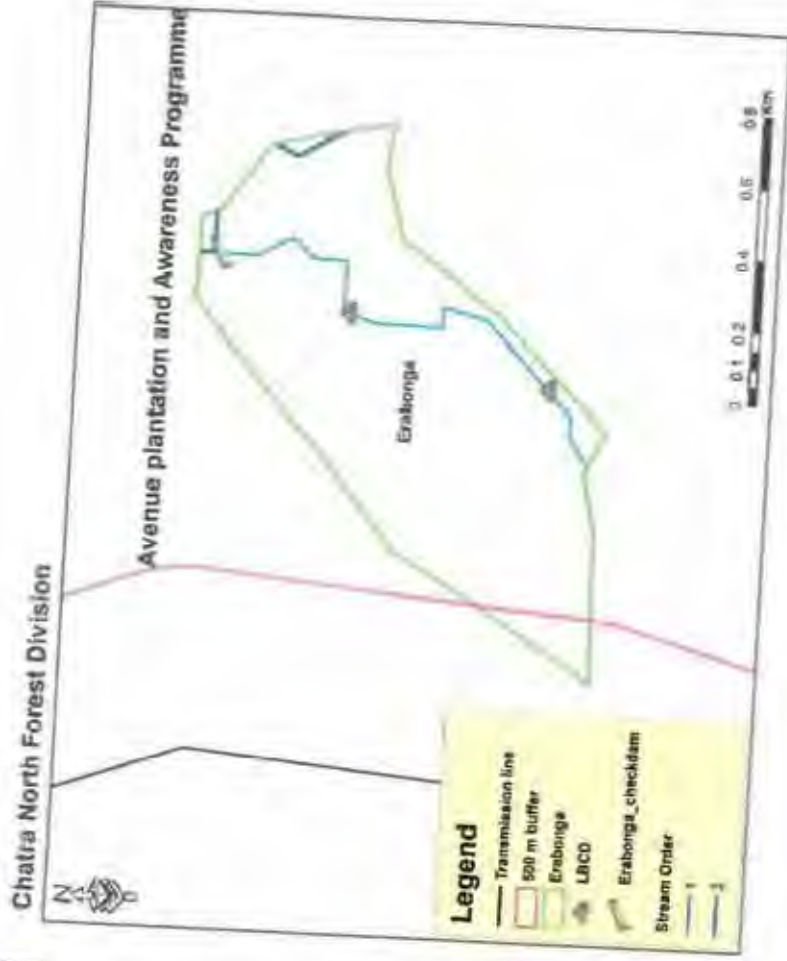
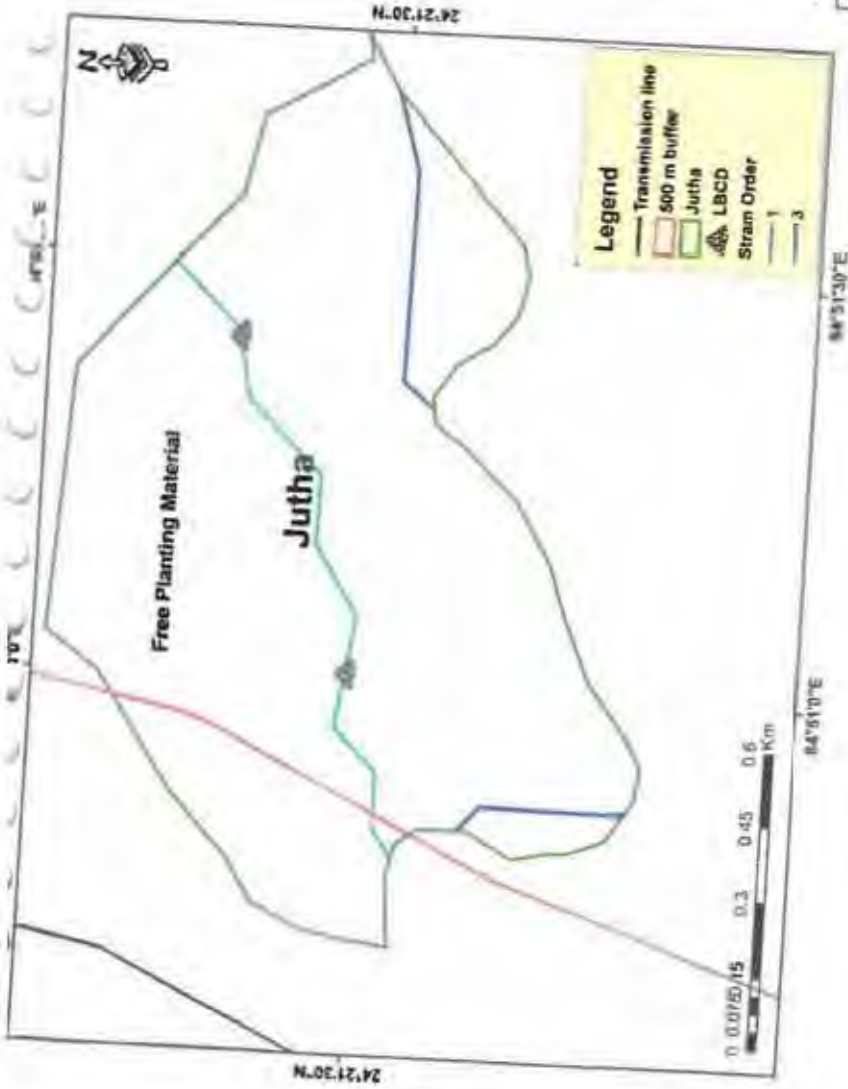
Raam
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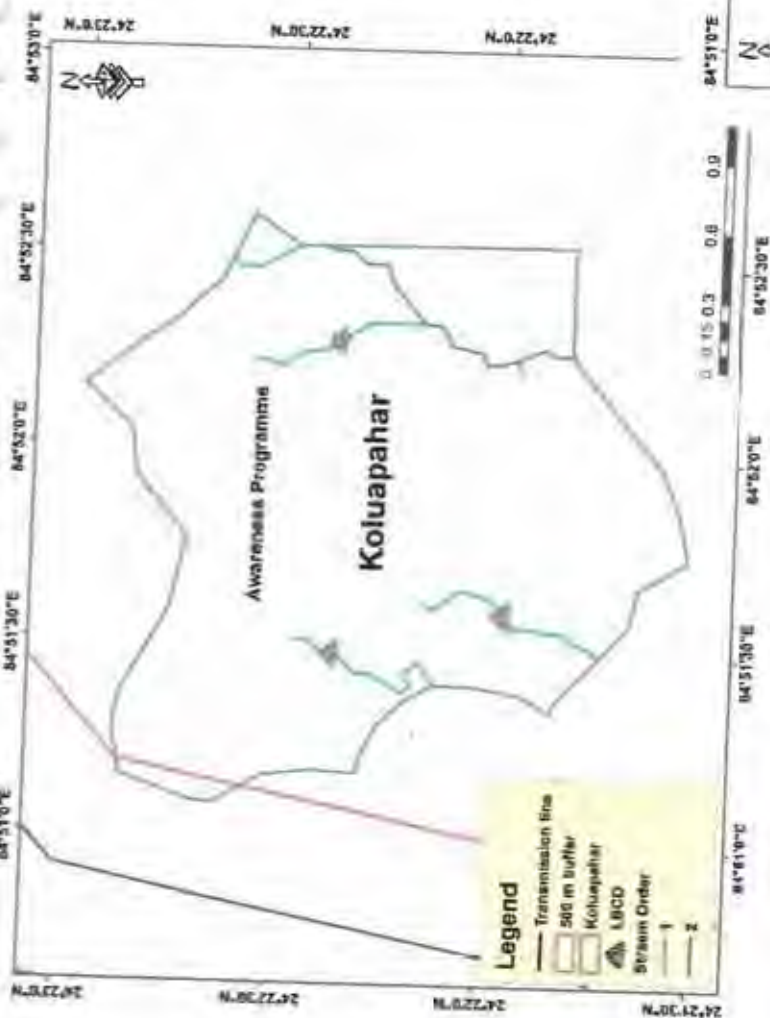
R.A.A.
Raghvendra Kumar
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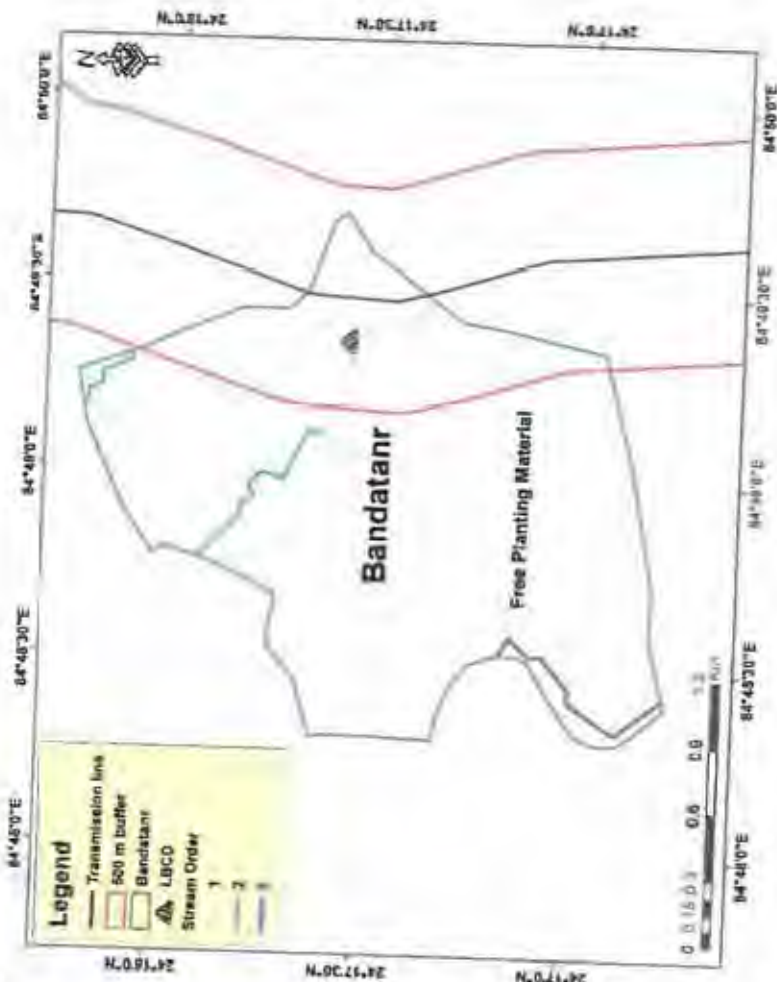
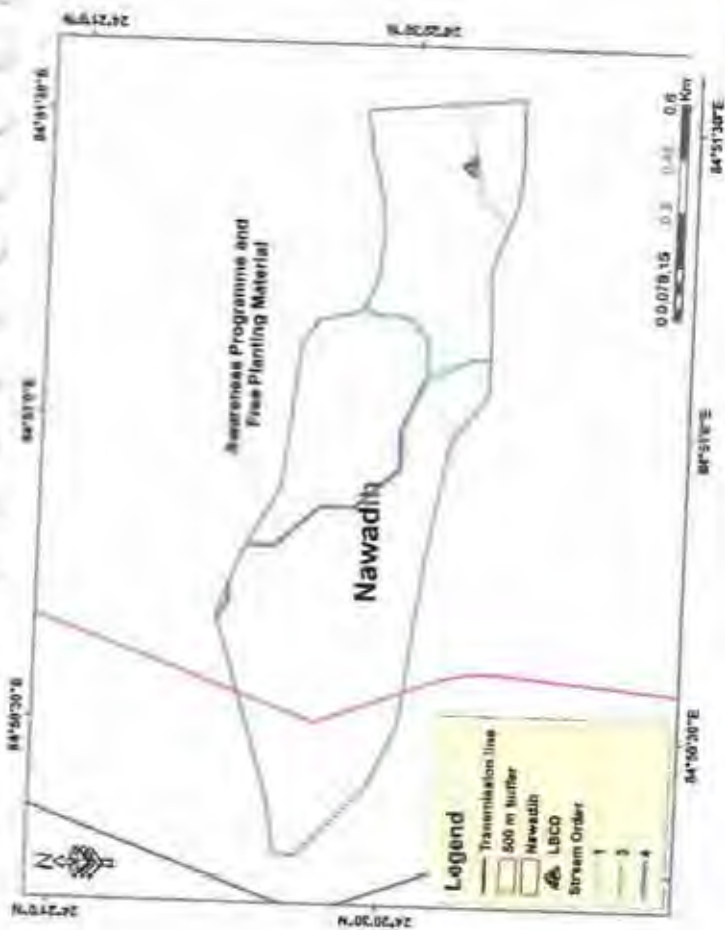
Raj
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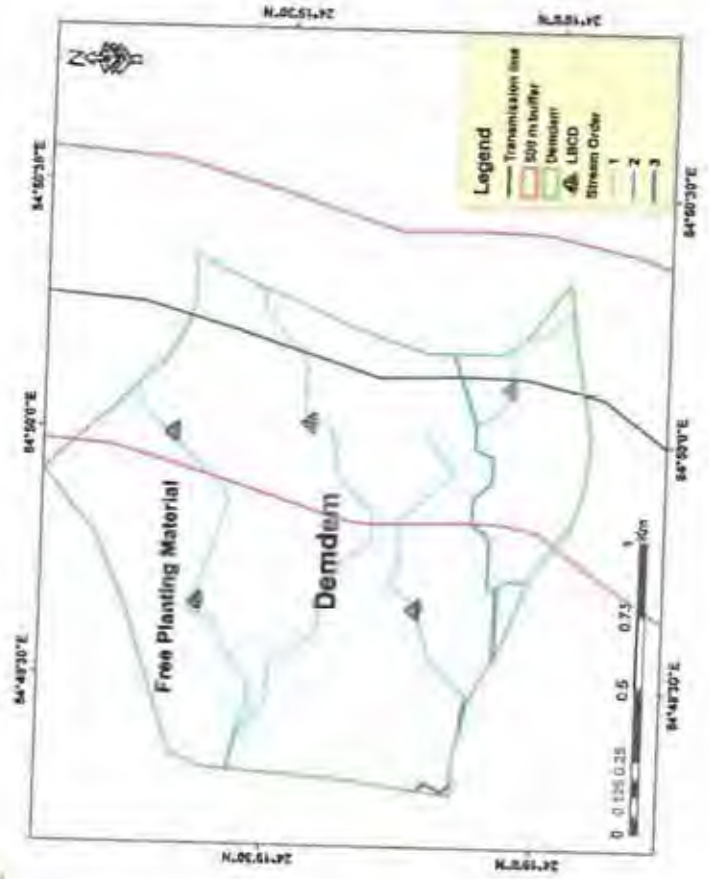
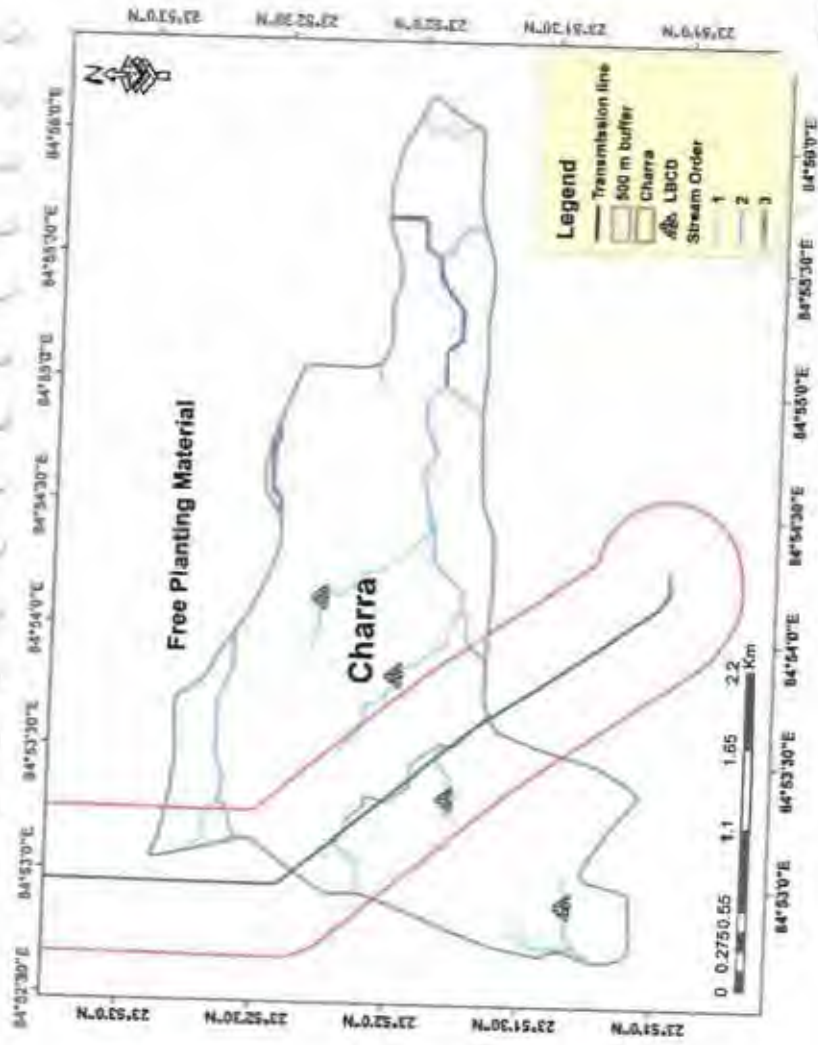
Raghu
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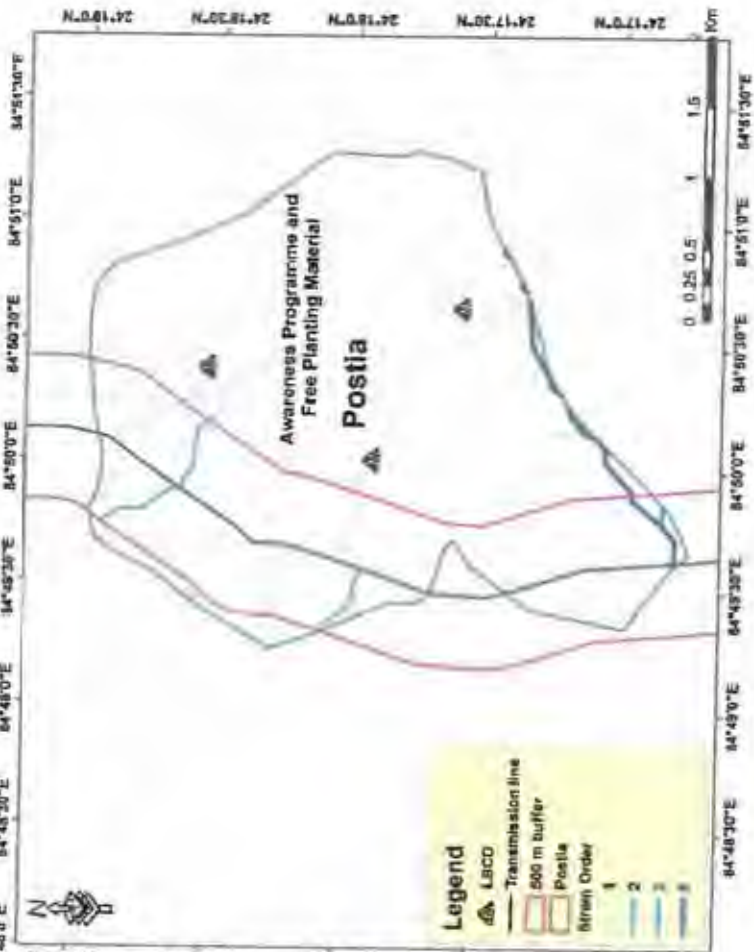
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 Jaghveer Kumar
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Chatra North Forest Division

Avenue plantation and Awareness Programme

Bajjnathpur

Legend

- Transmission line
- 500 m buffer
- Bajjnathpur



Raj

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NKTL Hazaribagh

Chatra North Forest Division

Riverside Plantation

Awareness Programme

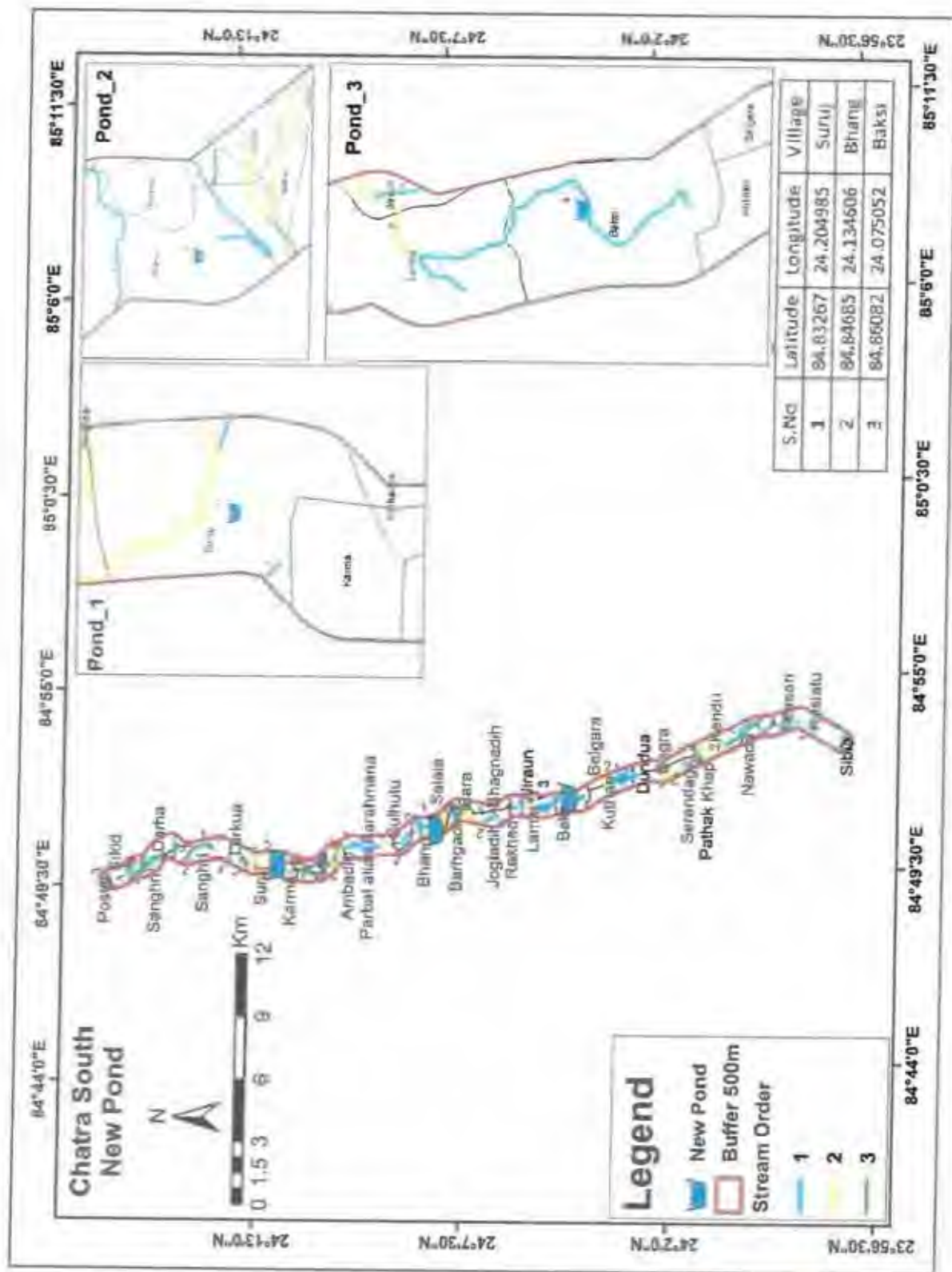
Tetaria

Lilanjn River

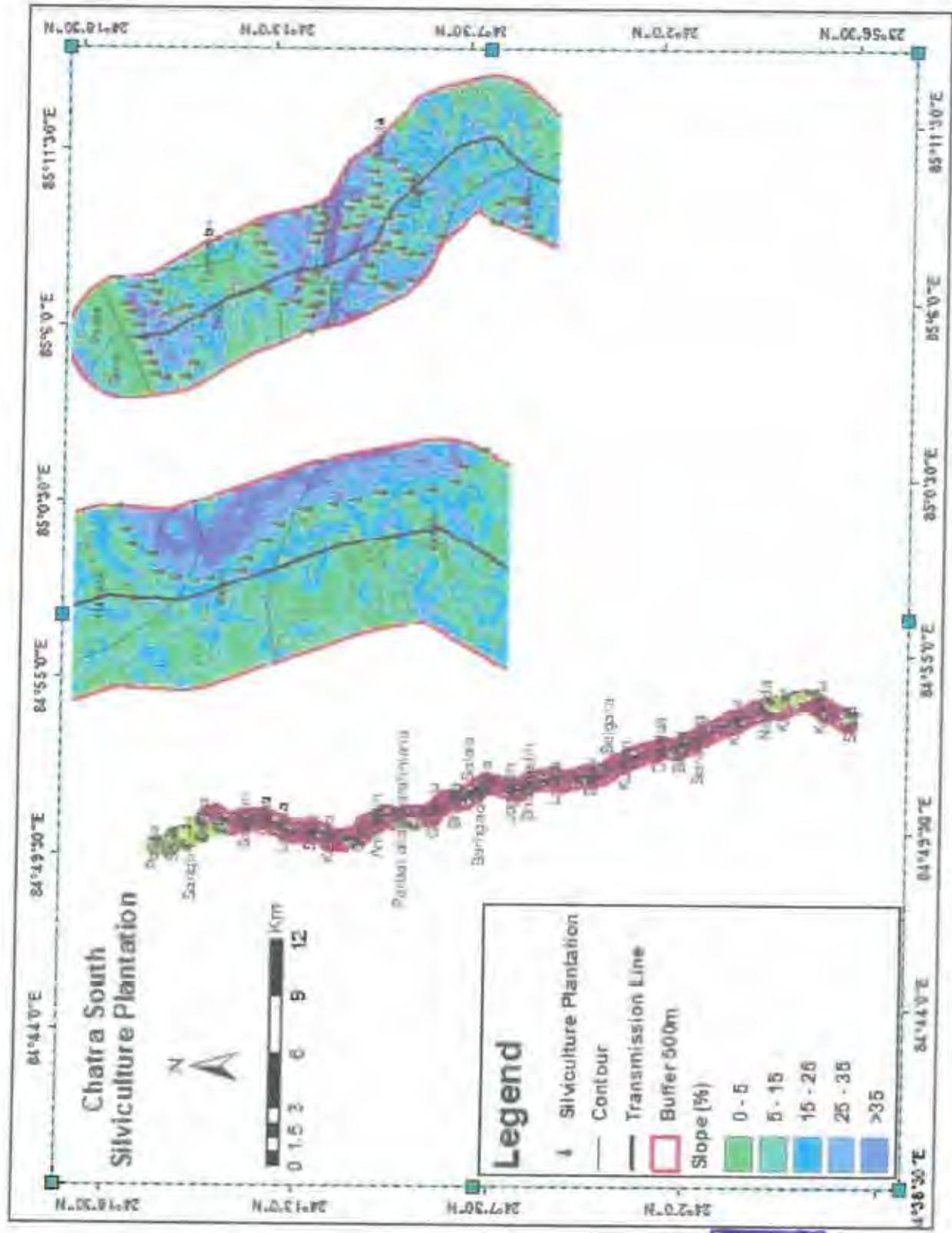
Legend

- Transmission line
- 500 m buffer
- Tetaria
- Stream Order
- 1
- 2
- 6 (Lilanjn River)
- Riverside Plantation





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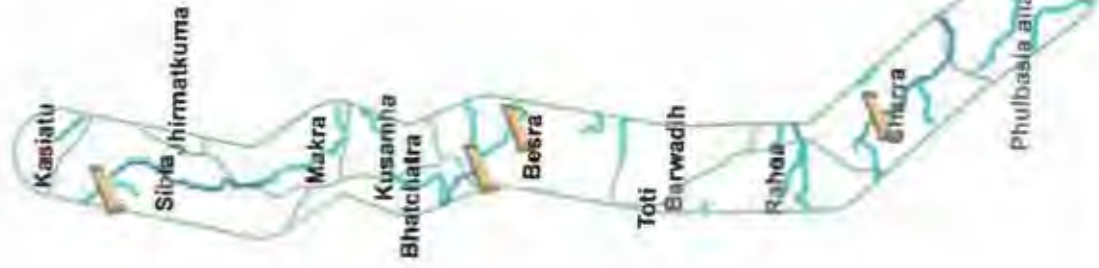
Adani Transmission line

84°49'30"E

84°55'0"E

Latehar Forest Division

Checkdam



Legend

Checkdam

Stream Order

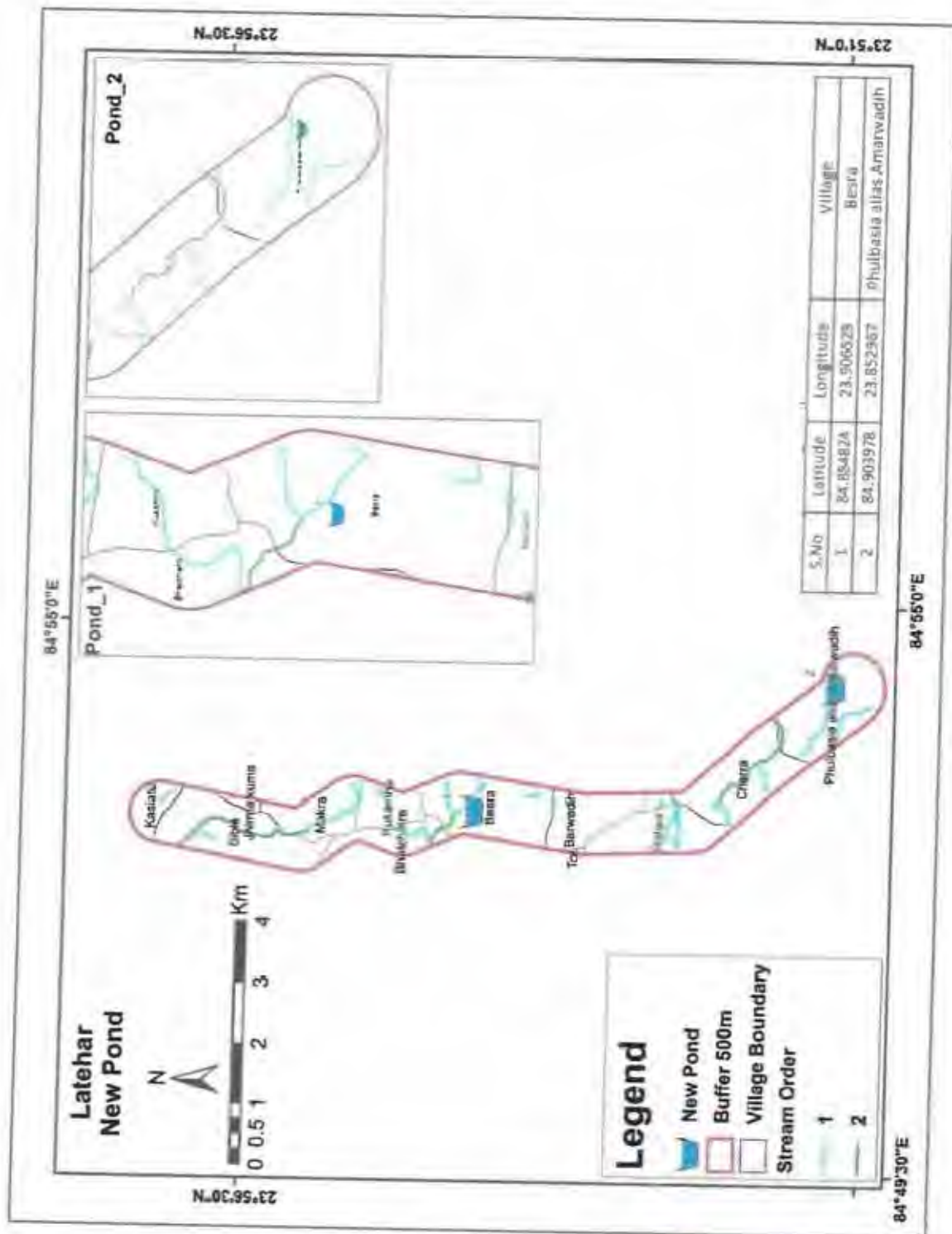
1

2

Village Boundary

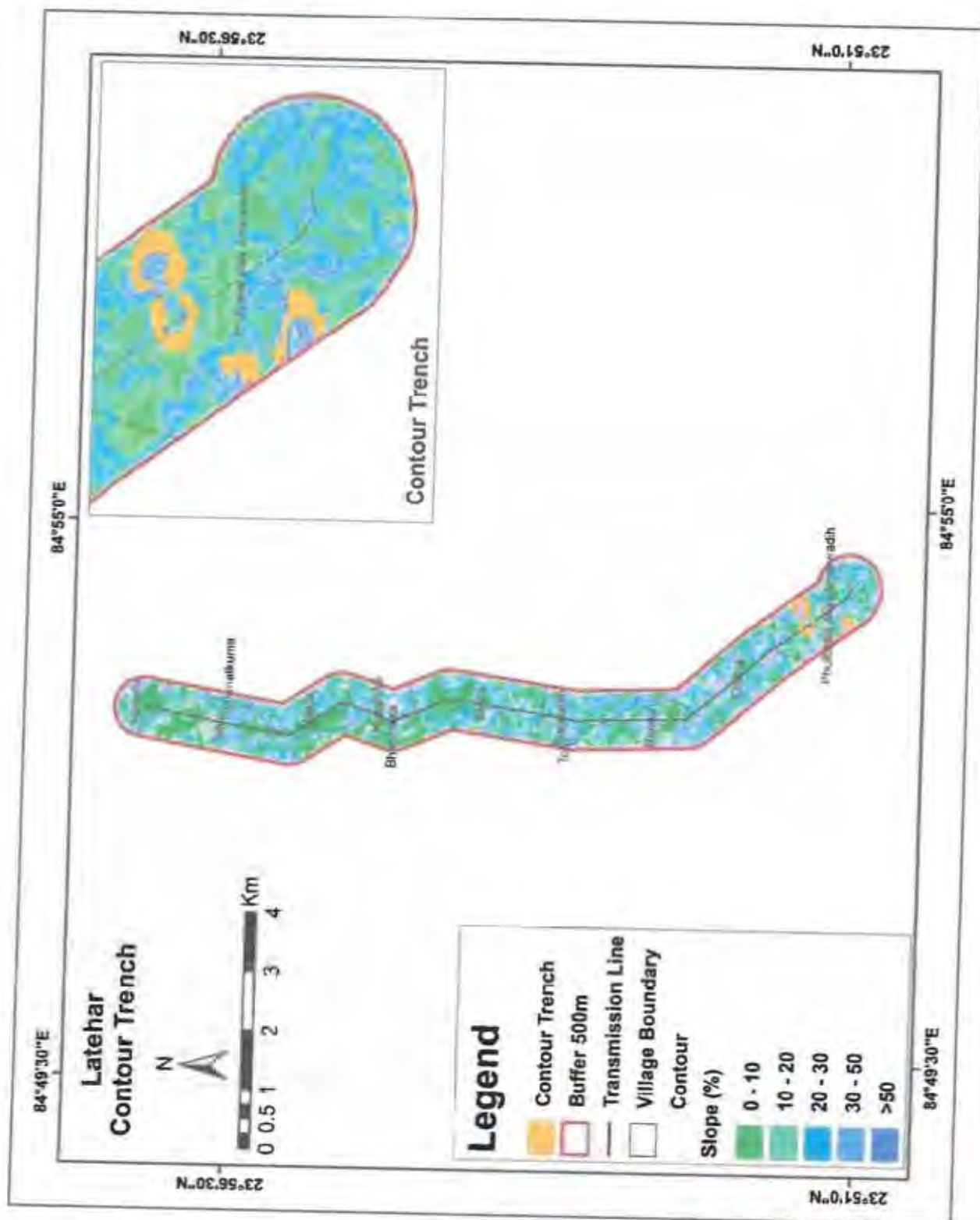
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2	84.88889	23.868333	Charra
3	84.88574	23.894802	Besra
4	84.86597	23.90538	Besra

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NKTL - Hazaribagh



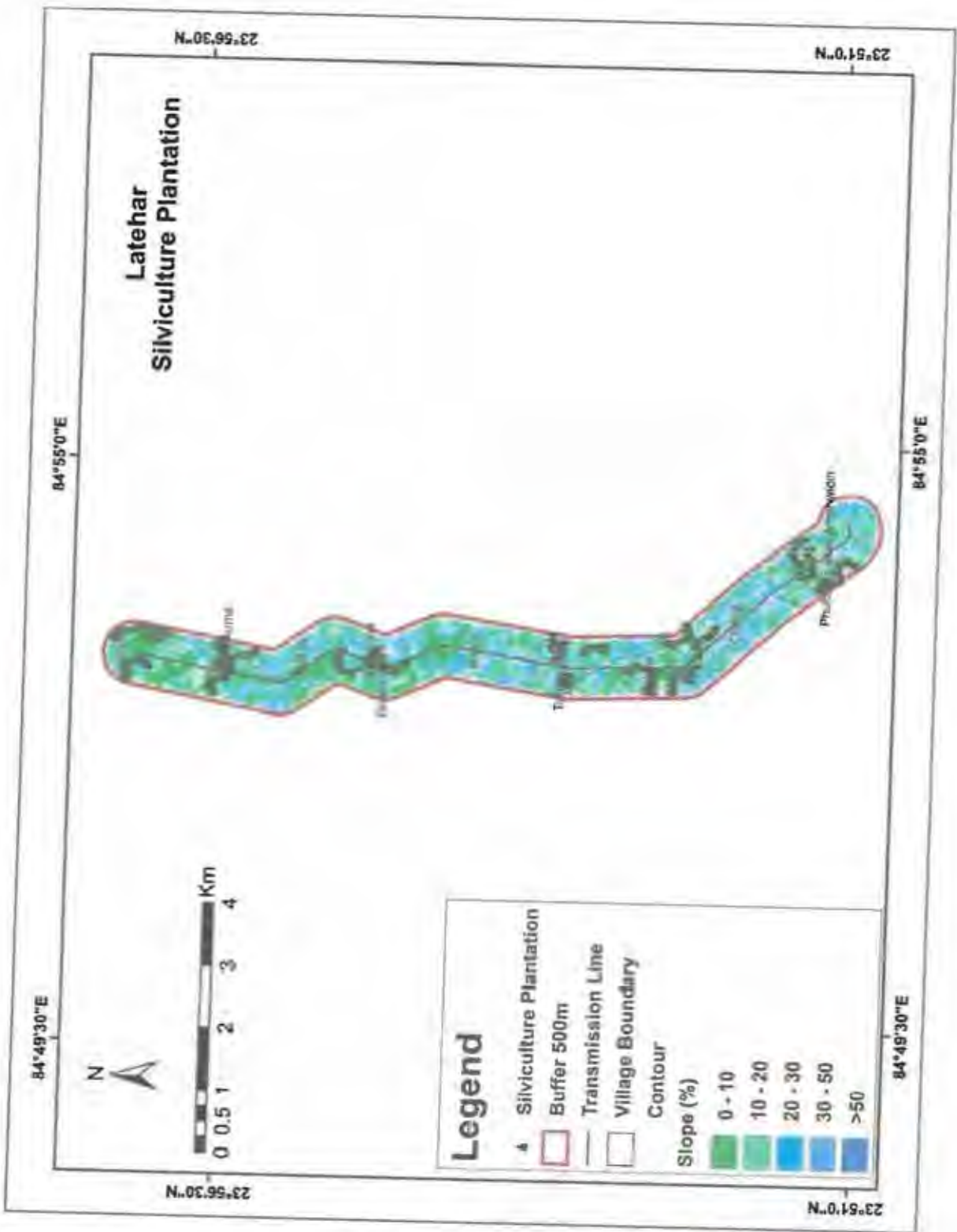
Rak

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NKTL - Hazaribagh**



23.9m

Raghuendra Kumar
Head-Projects (Site) TL
NKFL - Hazaribagh



Ravi
Raghendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

ESTIMATE FOR CONSTRUCTION OF PUCCA CHECK DAM LATEHAR
AS PER SCHEDULE OF WATER RESOURCE DEPARTMENT & B.C.D. EFFECTIVE FROM 20 JULY 2022

Sl No	Item No	Description	No	L Ft	B Ft	H Ft	Quantity	Unit	Rate (Rs) x	Amount (Rs) xi
	II	III	IV	v	vi	vii	viii	ix	x	xi
1	5.1.1.2 W.R.D	Earthwork excavation in foundation and plinth								
		Crest wall Or weir wall	1	30.00	6.00	5.00	900.00	cft		
		Abutment	2	25.00	6.00	5.00	1500.00	cft		
		U/S wing wall	2	6.00	6.00	5.00	360.00	cft		
		D/S wing wall	2	6.00	6.00	5.00	360.00	cft		
		U/S & D/S cut off wall	2	30.00	2.50	5.00	750.00	cft		
		U/S floor bed	1	30.00	6.00	1.00	180.00	cft		
		D/S floor bed	1	30.00	6.00	1.00	180.00	cft		
							4230.00	cft		
							119.80	m3	107.40	12706.10
2	5.1.1.3 b.c.d	Providing coarse clean sand in filling								
		Crest wall Or weir wall	1	30.00	6.00	0.50	90.00	cft		
		Abutment	2	25.00	6.00	0.50	150.00	cft		
		U/S wing wall	2	6.00	6.00	0.50	36.00	cft		
		D/S wing wall	2	6.00	6.00	0.50	36.00	cft		
		U/S & D/S cut off wall	2	30.00	2.50	0.50	75.00	cft		
		U/S floor bed	1	30.00	6.00	0.50	90.00	cft		
		D/S floor bed	1	30.00	6.00	0.50	90.00	cft		
							567.00	cft		
3	5.6.8 W.R.D	Providing & laying boulder soling foundation					16.08	m3	589.51	9486.27
		All comp. job								
		Crest wall Or weir wall	1	30.00	6.00	0.50	90.00	cft		
		Abutment	2	25.00	6.00	0.50	150.00	cft		
		U/S wing wall	2	6.00	6.00	0.50	36.00	cft		
		D/S wing wall	2	6.00	6.00	0.50	36.00	cft		
		U/S & D/S cut off wall	2	30.00	2.50	0.50	75.00	cft		
		U/S floor bed	1	30.00	6.00	0.50	90.00	cft		
		D/S floor bed	1	30.00	6.00	0.50	90.00	cft		
							567.00	cft		
4	5.3.2.3 b.c.d	Providing P.C.C M-100 with nominal mix of (1:3:6) in foundation and plinth all comp job					16.08	m3	1756.40	28203.87
		Crest wall Or weir wall	1	30.00	5.00	0.50	75.00	cft		
		Abutment	2	25.00	5.00	0.50	125.00	cft		
		U/S wing wall	2	6.00	5.00	0.50	30.00	cft		
		D/S wing wall	2	6.00	5.00	0.50	30.00	cft		
		U/S & D/S cut off wall	2	30.00	2.50	0.50	75.00	cft		
		U/S floor bed	1	30.00	5.00	0.50	75.00	cft		
		D/S floor bed	1	30.00	5.00	0.50	75.00	cft		
							485.00	cft		
							13.74	m3	5153.39	70784.31
5	5.3.3.1	Reinforced cement concrete work in beams, suspended floors, roof having slope up to 15 landings, balconies, shelves, chajjas, lintels, bands, plain windows sills, staircases and spiral stair cases above plinth level up to floor five level, excluding the cost of centering, shuttering, finishing and reinforcement with 1:1.5:3 (cement: 1.5 coarse sand (zone-3): 3 graded stone aggregate 20mm nominal size)	1	30.0	0.25	13.00	87.50	cft		
							2.76	m3	6308.87	17420.41

Rag

Raghvendra Kumar
Head-Projects (Site) T1
NKTI - Hazaribagh

Carraige of material								
a	sand (20 km)					102.555	m ³	234.04
b	chips (20km)					14.687	M ³	442.36
c	boulder (20km)					189.666	M ³	532.31

B 131459.94
 A+B 745878.79
 Less 9 1%contractor's profit -67874.97
 678003.82
 Add 18% G.S.T 122040.69
 800044.51
 TOTAL SAY 8,00,000.00

Less 9 1%contractor's profit
 Add 18% G.S.T

TOTAL
 SAY
 ARCHITECT GROUPS
 Anil Kumar Singh

Rag

Raghvendra Kumar
 Head-Projects (Site) TL
 NKTL - Hazaribagh

ESTIMATE FOR CONSTRUCTION OF PUGCA CHECK DAM LATEHAR
AS PER SCHEDULE OF WATER RESOURCE DEPARTMENT & B.C.D EFFECTIVE FROM 28 JULY 2022

Sl No	Item No	Description	No	L Ft	B Ft	H Ft	Quantity	Unit	Rate (Rs)	Amount (Rs)
i	ii	iii	iv	v	vi	vii	viii	ix	x	xi
1	5.1.9.2	Earthwork excavation in foundation and plinth.								
		Crest wall Or weir wall	1	45.00	7.00	5.00	1575.00	cft		
		Abutment	2	35.00	7.00	5.00	2450.00	cft		
		U/S wing wall	2	8.00	7.00	5.00	560.00	cft		
		D/S wing wall	2	8.00	7.00	5.00	560.00	cft		
		U/S & D/S cut off wall	2	45.00	2.50	5.00	1125.00	cft		
		U/S floor bed	1	45.00	7.00	1.00	315.00	cft		
		D/S floor bed	1	45.00	7.00	1.00	315.00	cft		
							6900.00	cft		
							195.41	m3	107.40	20987.26
	5.1.10	Providing coarse clean sand in filling								
	b.c.d	Crest wall Or weir wall	1	45.00	7.00	0.50	157.50	cft		
		Abutment	2	35.00	7.00	0.50	245.00	cft		
		U/S wing wall	2	8.00	7.00	0.50	56.00	cft		
		D/S wing wall	2	8.00	7.00	0.50	56.00	cft		
		U/S & D/S cut off wall	2	45.00	2.50	0.50	112.50	cft		
		U/S floor bed	1	45.00	7.00	0.50	157.50	cft		
		D/S floor bed	1	45.00	7.00	0.50	157.50	cft		
							942.00	cft		
							26.68	m3	589.51	15726.94
3	5.6.8	Providing & laying boulder soling foundation								
	W.R.D	All comp. job.								
		Crest wall Or weir wall	1	45.00	7.00	0.50	157.50	cft		
		Abutment	2	35.00	7.00	0.50	245.00	cft		
		U/S wing wall	2	8.00	7.00	0.50	56.00	cft		
		D/S wing wall	2	8.00	7.00	0.50	56.00	cft		
		U/S & D/S cut off wall	2	45.00	2.50	0.50	112.50	cft		
		U/S floor bed	1	45.00	7.00	0.50	157.50	cft		
		D/S floor bed	1	45.00	7.00	0.50	157.50	cft		
							942.00	cft		
							26.68	m3	1756.40	46857.23
4	5.3.2.3	Providing P.C.C M-100 with nominal mix of (1:3:6) in foundation and plinth all comp job								
	b.c.d	Crest wall Or weir wall	1	45.00	6.00	0.50	135.00	cft		
		Abutment	2	35.00	6.00	0.50	210.00	cft		
		U/S wing wall	2	8.00	6.00	0.50	48.00	cft		
		D/S wing wall	2	8.00	6.00	0.50	48.00	cft		
		U/S & D/S cut off wall	2	45.00	2.50	0.50	112.50	cft		
		U/S floor bed	1	45.00	6.00	0.50	135.00	cft		
		D/S floor bed	1	45.00	6.00	0.50	135.00	cft		
							823.50	cft		
							23.32	m3	5153.39	120187.39
		Reinforced cement concrete work in beams, suspended floors, roof having slop up to 15 landings, balconies, shelves, chajjas, lintels, bands, plain windows sills, staircases and spiral stair cases above plinth level up to floor five level, excluding the cost of centering, shuttering, finishing and reinforcement with 1:1.5:3 (cement: 1.5 coarse sand (zone-3): 3 graded stone aggregate 20mm nominal size)	1	45.0	0.50	14.00	315.00	cft		
5	5.5.11						8.92	m3	6308.87	56281.34

Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

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Raghvendra Kumar
Head-Projects (Site) & E
NKTL - Hazaribagh

Carraige of material						A	
a	sand (20 km)						978878.24
b	chips (20km)			128.788	m3	234.04	30141.58
c	boulder (20km)			29.019	M ³	442.36	12836.71
				182.049	M ³	532.31	96906.46

B

A+B

Less 9 1%contractor's profit

Add 18% G S T

139884.75
1118762.99
-101807.43
1016955.56
183052.00
1200007.56
12,00,007.56
12,00,000.00

TOTAL
SAY

Rag

Raghvendra Kumar
Head-Projects (Site) TL
NKTL - Hazaribagh

Summary of Soil and Moisture Conservation Plan Payments					
Sl. No	Particulars	Chatra North Forest Division (in Rs)	Chatra South Forest Division (In Rs)	Latehar Forest Division (In Rs)	Total (In Rs)
B	Sanctioned Amount by office of PCCF cum Wildlife & Chief Wildlife Warden, Ranchi, Jharkhand vide office order no. 142 dated 12.09.2025	6,25,77,500	6,25,96,000	2,02,02,000	14,53,75,500
1	Lump-sum amount deposited by NKTL (0.5% of Project Cost) towards Soil & Moisture Conservation Plan on dated 06.11.2023	26,20,000	50,76,800	6,51,299	83,48,099
2	Balance amount deposited towards Soil & Moisture Conservation Plan order dated 12.09.2025 and payment dated 26.09.2025	5,99,57,500	5,75,19,200	1,95,50,701	13,70,27,401





FCA Projects, Diverted Land, CA Land Management

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Detailed Summary of Selected FCA Project

Project Basic details

S.No.	Project Name	Project Year	Project Type	Purpose of Diversion	Total Land Diverted	User Agency
1	Construction of 400 kV D/C North Karanpura to Gaya transmission line (Jharkhand Portion)	2023	Transmission Line	Ministry of Power, Govt. of India has initiated a scheme for establishment of Transmission System for "Immediate Evacuation for North Karanpura (3X660MW) generation project of M/s NTPC North Karanpura. As a part of the said project a SPV is formed for Construction of Transmission system	197.012	NORTH KARANPURA TRANSCO LIMITED, unita Sadan 1st Floor Ashram Marg Bariatu Near Military Firing Range, Jharkhand, Ranchi, northkaranpuratransco@gmail.com, 7808958161,

Details of Diverted forest land

S.No.	Area Diverted (In Hac)	Division	Range	Forest Type	Location
1	15.359	Latehar	Balumath	Protected Forest (PF)	
2	61.772	Chatra North	Hunterganj	Protected Forest (PF)	Hunterganj- 297
3	119.881	Chatra South	Simaria	Revenue Forest	kasiyatu and ot

Details of Lands received from user agency for Compensatory Afforestation

S.No.	Land Type	Area(in Ha)	District	Range	Notification order No.
1	Degraded Notified Forest	30.718		Chandawa [Latehar]	
2	Degraded Notified Forest	124.000		Hunterganj [Chatra North]	
3	Revenue Forest Land	50.000	Chatra * [Gidhaur]	Chatra Sadar [Chatra South]	
4	Revenue Forest Land	40.000	Chatra * [Chatra]	Chatra Sadar [Chatra South]	
5	Revenue Forest Land	102.000	Chatra * [Chatra]	Chatra Sadar [Chatra South]	
6	Revenue Forest Land	48.000	Chatra * [Chatra]	Chatra Sadar [Chatra South]	

Details of the amount demanded from UA against the FCA project

S.No.	FCA Proj. File No	Project Name	State	Proj. Year	Order No.	Date	NPV	CA	ACA	PCA	PAF	CAT	SZ	Others	Total Demand
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Data Not Available

Details of the amount received from UA against the FCA project.

S.No.	FCA Project File No	Proj. Name	State	Proj. Year	Ref. No.	Ref. Date	Receipt Date	NPV	CA	ACA	PCA	PAF	CAT	SZ	Others	Total Received
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Data Not Available

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