



Initial Environmental Examination

Project Number: 41626-013
October 2015

IND: Bihar Power System Improvement Project

Strengthening of existing sub-transmission system through savings of loan amount (Transmission Component)

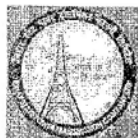
Submitted by

Bihar State Power Transmission Company Limited, Patna

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Asian Development Bank



BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

A subsidiary company of Bihar State Power (Holding) Company Ltd. Patna

CIN- U40102BR2012SGC018889

{SAVE ENERGY FOR BENEFIT OF SELF AND NATION}

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(ADB CELL)

Letter No. 5234
ADB/320/2013

Date:- 05-10-15

From,

G.K. Choubey
Chief Engineer (Trans.)
BSPTCL

To,

Country Director
India Resident Mission
Asian Development Bank, New Delhi, India

Sub: - Submission of Updated IEE, Environment Impact Categorization
& REA Checklist under savings loan – 2681 IND of Asian
Development Bank, India

Sir,

With reference to above subject, I have to say that i am submitting updated the IEE report of DPR 1 and 2 by including activities under DPR 3 and 4 along with Environment Impact Categorization & REA checklist for DPR- 4 under saving loan- 2681 IND of Asian Development, India.

Encl:- As above

Your faithfully

G.K. Choubey
20/9/2015

(G. K. Choubey)
Chief Engineer (Trans.)
BSPTCL

Initial Environmental Examination Report

September 2015

Loan 2681-IND Bihar Power System Improvement Project

**STRENGTHENING OF EXISTING SUB-TRANSMISSION SYSTEM THROUGH SAVINGS OF
LOAN AMOUNT (TRANSMISSION COMPONENT)**



Prepared by the Bihar State Power Holding Company Limited, Patna (A Successor Company of BSEB) for the Asian Development Bank.

The initial environmental examination report for strengthening of existing sub-transmission system is a document of the Bihar State Power Holding Company Limited, Patna (A Successor Company of BSEB). The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

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ABBREVIATIONS

ADB	Asian Development Bank
BSEB	Bihar State Electricity Board (erstwhile)
BSPHCL	Bihar State Power Holding Company Limited
BSPTCL	Bihar State Power Transmission Company Limited
CFC	Chlorofluorocarbon
DPR	Detailed Project Report
dBA	Decibel (weighted A)
EA	Executing Agency
EIA	Environmental Impact Assessment
ESMU	Environmental Social Management Unit
EMP	Environment Management Plan
EPC	Engineering, Procurement and Construction
GHG	Green House Gas
Gol	Government of India
GoB	Government of Bihar
GSS	Grid Substation
GRM	Grievance Redress Mechanism
GRC	Grievance Redress Committee
IEE	Initial Environmental Examination
MoEFCC	Ministry of Environment, Forest and Climate Change
NO _x	Oxides of Nitrogen
O & M	Operation and Maintenance
PIU	Project Implementation Unit
PMU	Project Management Unit
PSS	Power Substation
RSPM	Respirable Suspended Particulate Matter
SPM	Suspended Particulate Matter
SO ₂	Sulphur Dioxide
TA	Technical Assistance
T&D	Transmission and Distribution

Weights and Measures

GW	Giga watt
km (kilometre)	1,000 m
kV	kilovolt (1,000 volts)
kW	kilowatt (1,000 watts)
kWh	kilowatt-hour

EXECUTIVE SUMMARY

1.0 Introduction

1. The Government of Bihar (GoB) has undertaken various transmission network capacity addition, augmentation and improvement projects in the power sector with funding from development partners like the Asian Development Bank (ADB) for achieving its objective of making available reliable power across the State. The GoB unbundled and restructured the Bihar State Electricity Board (BSEB) with effect from 1st November, 2012. The generation, transmission and distribution businesses of the erstwhile Bihar State Electricity Board are transferred to four successor companies - Bihar State Power Generation Company Limited, Bihar State Power Transmission Company Limited (BSPTCL), North Bihar Power Distribution Company Limited and South Bihar Power Distribution Company Limited. Bihar State Power (Holding) Company Limited (BSPHCL) is the holding company. The Bihar Power System Improvement Project was approved for ADB financing in October 2010 for an amount of US \$132.2 million to part finance transmission and distribution system investments as well as capacity development component. Under strengthening of sub-transmission system (transmission component), the BSPHCL intends to utilize loan savings to (i) augment seven existing sub-stations; (ii) re-conductor 1011.30 km existing 220 kV and 132 kV transmission lines; (iii) supply and install enterprise resource program (ERP) software at the headquarters and field offices and (iv) construct 33 kV line bays in form of indoor VCB/GIS panel at 83 nos. AIS sub-stations, and replace 10 nos. of lower capacity transformers by higher capacity (80 MVA) at 5 grid sub-stations of BSPTCL.

2.0 Project Description

2. The proposed additional scope under loan savings is given below-

- (i) Augmentation of seven existing sub-stations:

Table-1

Sl No.	Name of Sub-stations	No. of addition of 50 MVA Transformer with associated bays
1	220/132/33 KV GSS Madhepura	One
2	220/132/33 KV GSS Bihta	Two
3	132/33 KV GSS Jamui	One
4	132/33 KV GSS Naugachiya	One
5	132/33 KV GSS Arah	One
6	132/33 KV GSS Vaisali	One

7	132/33 KV GSS Gangwara	One
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(ii) Re-conductoring of existing 220 KV and 132 KV transmission lines:

Table-2

Sl No.	Name of Transmission Lines	Line Distance in CKM.
1	220 KV D/C Fatuha-Khagaul Transmission Line	37.39
2	132 KV Bodhgaya-Chandauti Transmission Line Ckt. I,II,III & IV	18.10
3	132 KV S/C Bodhgaya-Wazirgunj-Nawada	63.87
4	132 KV S/C Ara-Dumraon Transmission Line	54.17
5	132 KV D/C Dehri-Dumraon Transmission Line (Old Ckt.) only one Ckt.	81.46
6	132 KV S/C Dehri-Sasaram-Kudra-Karmnasa Transmission Line	90.62
7	132 KV D/C Sonenagar-Garhwa Transmission Line up to Bihar border near Nabinagar	17.74
8	132 KV S/C Hathidah-Sheikhpura Transmission Line	28.31
9	132 KV S/C Lakhisarai-Jamalpur Transmission Line	44.37
10	132 KV Jahanabad GSS to looping point of 132 KV D/C Patna-Sipara	47.50
11	Biharsharif-Barhi 132 KV D/C Line from Biharsharif to Loc. No. Near Manpur (Gaya)with addition of 31 nos angle tower for strengthening	76
12	132 KV S/C Motihari-Bettiah	43.04
13	132 KV S/C Ramnagar-Valmikinagar-Surajpura	75.18
14	132 KV S/C Samastipur-Hajipur-ShitalpurLilo point-Chapra	121.00
15	132 KV S/C Purnea-Saharsa	101.34

16	132 KV S/C Forbesganj-Kataiya (KOSI)	39.79
17	132 KV S/C Forbesganj-Purnea	71.42
Total =		1011.30

- (iii) Supply and installation of enterprise resource program (ERP) software including supporting hardware at BSPTCL headquarters, 14 nos. of field offices and about 106 nos. GSS with project management support;

Table- 3

Existing GSS Below :

SL.NO	NAME OF GRID SUB-STATIONS	DISTRICT	BLOCK
1	Forbeshganj	Araria	Forbeshganj
2	Sonenagar	Aurangabad	Barun
3	Rafiganj	Aurangabad	Rafiganj
4	Aurangabad	Aurangabad	Aurangabad
5	Goh	Aurangabad	Goh
6	Begusarai	Begusarai	Barauni
7	Buxar	Buxar	Itarhi
8	Dumraon	Buxar	Dumraon
9	Sabour	Bhagalpur	Sabour
10	Sultanganj	Bhagalpur	Sultanganj
11	Kahalgaon	Bhagalpur	Kahalgaon
12	Naugachhia	Bhagalpur	Bhagalpur
13	Ara	Bhojpur	Ara
14	Banka	Banka	Banka
15	Darbhangha	Darbhangha	Bahadurpur
16	Motihari	East Champaran	Motihari
17	Dhaka	East Champaran	Dhaka
18	Raxaul	East Champaran	Raxaul
19	Bodh Gaya	Gaya	Bodh Gaya
20	Chandauti	Gaya	Gaya
21	Belaganj	Gaya	Belaganj
22	Tekari	Gaya	Tekari
23	Wazirganj	Gaya	Wazirganj
24	Gopalganj	Gopalganj	Gopalganj
25	Jamui	Jamui	Jamui
26	Jehanabad	Jehanabad	Jehanabad
27	Hulashganj	Jehanabad	Hulashganj
28	Katihar	Katihar	Katihar
29	Khagaria	Khagaria	Khagaria
30	Kishanganj	Kishanganj	Kishanganj
31	Mohania	Kaimur	Mohania
32	Karmnasa	Kaimur	Durgawati
33	Lakhisarai	Lakhisarai	Lakhisarai
34	Udakishanganj	Madhepura	Udakishanganj

35	Muzaffarpur	Muzaffarpur	Muzaffarpur
36	Jamalpur	Munger	Jamalpur
37	Madhubani	Madhubani	Rahika
38	Pandaul	Madhubani	Pandaul
39	Jainagar	Madhubani	Jainagar
40	Phulparas	Madhubani	Phulparas
41	Nawadah	Nawadah	Nawadah
42	Biharsharif	Nalanda	Biharsharif
43	Baripahari	Nalanda	Biharsharif
44	Rajgir	Nalanda	Rajgir
45	Ekangarsarai	Nalanda	Ekangarsarai
46	Fatuah	Patna	Fatuah
47	Khagaul	Patna	Danapur
48	Jakkanpur	Patna	Patna Sadar
49	Masaurhi	Patna	Masaurhi
50	Bihta	Patna	Bihta
51	Gayghat	Patna	Patna City
52	Mithapur	Patna	Patna City
53	Katra	Patna	Patna Sadar
54	Hathidah	Patna	Mokamah
55	Barh	Patna	Barh
56	Purnea	Purnea	Purnea East
57	Dehri-On-Sone	Rohtas	Dehri
58	Sasaram	Rohtas	Sasaram
59	Bikramganj	Rohtas	Surajpur
60	Banjari	Rohtas	Bangari
61	Sitamarhi	Sitamarhi	Dumra
62	Chapra	Saran	Chapra
63	Sheetalpur	Saran	Sheetalpur
64	Siwan	Siwan	Siwan
65	Samastipur	Samastipur	Samastipur
66	Dalsingsarai	Samastipur	Dalsingsarai
67	Supaul	Supaul	Supaul
68	Kataiya (Birpur)	Supaul	Basantpur
69	Saharsa	Saharsa	Kahra
70	Shekhpura	Shekhpura	Shekhpura
71	Hajipur (220)	Vaishali	Hajipur
72	Vaishali	Vaishali	Vaishali
73	Bettiah	West Champaran	Bettiah
74	Ramnagar	West Champaran	Ramnagar
75	Karpi (Ataula)	Arwal	Karpi
76	Musrakh	Siwan	Musrakh
77	Harnaut	Nalanda	Harnaut
78	Digha	Patna	Digha
79	Sherghati	Gaya	Sherghati
80	SKMCH	Muzaffarpur	SKMCH

81	Jagdishpur	Bhojpur	Jagdishpur
82	Runni Saidpur	Sitamarhi	Runni Saidpur
83	Nalanda	Nalanda	Nalanda
84	Sipara (Gaurichak)	Patna	Gaurichak
85	Hajipur	Vaishali	Hajipur
86	Madhepura	Madhepura	Madhepura
87	Karbigahiya	Patna	Karbigahiya
88	Ekma	Saran	Ekma
89	Kudra	Kaimur	Kudra
90	Sonebarsa	Saharsa	Sonebarsa
91	Tehta	Jahanabad	Tehta
92	Jandaha	Vaishali	Jandaha
93	Imamganj	Gaya	Imamganj
94	Kusheshwarsthan	Darbhangha	Kusheshwarsthan
GRIDS UNDER CONSTRUCTION			
SL.NO .	NAME OF GRID SUB-STATIONS	DISTRICT	Block
1.0	Bihta	Patna	Bihta
2.0	Pusouli	Kaimur	Kudra
3.0	Sonenagar	Aurangabad	Barun
4.0	Samastipur	Samastipur	Ujiarpur
5.0	Mushahari	Muzaffarpur	Mushahari
6.0	Motipur	Muzaffarpur	Motipur
7.0	Supaul	Supaul	Bishunpur
8.0	Kishanganj	Kishanganj	Kochadam
9.0	Gangwara	Darbhangha	Darbhangha
10.0	Sheohar	Sheohar	Sheohar
11.0	Dhanaha	West Champaran	Thakrahan
12.0	Kochas	Rohtas	Kochas

- (iv) Construction of 33 kV line bays in form of indoor VCB/GIS panel at 83 nos. of 220/132/33 kV and 132/33 kv AIS substations, and replacement of 2 nos. of 50 MVA and 8 nos. of 20 MVA transformers by 10 nos. of 80 MVA 132/33 kV transformers at 5 Grid substations.

Table 4: Component A: 33 kV Bay extensions at 220 & 132 kV GSS's

SNo.	Name of work	Nos. of 33 KV bay extension
North Bihar - In the form of Indoor VCB Panel		
1	03 Nos. 33 kV bay extension at 132/33 kV GSS Dalsinghsarai.	3
2	05 Nos. 33 kV bay extension each at 132/33 kV GSS Begusarai, Kusheshwarsthan, Gangwara, Raxaul, Khagaria, Kishanganj, Madhepura, Udakishanganj, Madhubani, Jhanjharpur, Pandaul, Jainagar, Phulparas, Kataiya and Sonebarsa	5
3	06 Nos. 33 kV bay extension each at 132/33 kV GSS Shitalpur, Samastipur and Ramnagar	6

4	07 Nos. 33 kV bay extension each at 132/33 kV GSS Mushrakh, Jandaha and Supaul	7
5	08 Nos. 33 kV bay extension at 132/33 kV GSS Forbeisganj, Motihari, Dhaka, Hazipur and Bettiah	8
6	10 Nos. 33 kV bay extension each at 132/33 kV GSS Gopalganj, Sitamarhi and Saharsa	10
7	12 Nos. 33 kV bay extension at 132/33 kV GSS Siwan.	12
South Bihar - In the form of Indoor VCB Panel		
8	05 Nos. 33 kV bay extension each at 132/33 kV GSS Ataulah, Sonenagar, Rafiganj, Jagdishpur, Buxar, Dumraon, Sabour, Kahalgaon, Chandauti, Belaganj, Tekari, Wazirganj, Imamganj, Sherghati, Jehanabad, Hulasganj, Tehta, Mohania, Kochas, Nawada, Baripahari, Rajgir, Ekangarsarai, Harnaut and Dehri-on-Sone	5
9	06 Nos. 33 kV bay extension at 132/33 kV GSS Goh	6
10	07 Nos. 33 kV bay extension each at 132/33 kV GSS Sultanganj, Karmnasa, Kudra and Bikramganj	7
11	08 Nos. 33 kV bay extension at 132/33 kV GSS Ara, Banka, Sasaram and Naugachia	8
12	10 Nos. 33 kV bay extension each at 132/33 kV GSS Aurangabad, Bodhgaya, Jamui, Lakhisarai, Jamalpur, Nalanda and Sheikhpura	10
Patna- In the form of Indoor GIS Panel		
13	05 Nos. 33 kV bay extension each at 132/33 kV GSS Fatuha, Jakkanpur, Masaurhi and Bihta	5
14	07 Nos. 33 kV bay extension at 132/33 kV GSS Barh, Meethapur and Katra	7
15	10 Nos. 33 kV bay extension at 132/33 kV GSS Khagaul, Gaighat, Digha and Sipara	10

Table 5: Component B: Replacement of 50 MVA and 20 MVA Transformer by 80 MVA Transformer

SNo.	Name of work	Nos. of transformers of 20 MVA/50 MVA
1	At 132/33 KV Power Transformer with associated bays at Fatuha GSS	2 X 50 MVA
2	Replacement of 02 X 20 MVA by 2 X 80 MVA 132/33 KV Power Transformer with associated bays at Jandaha GSS	2 X 20 MVA
3	Replacement of 02 X 20 MVA by 2 X 80 MVA 132/33 KV Power Transformer with associated bays at Vaishali GSS	2 X 20 MVA
4	Replacement of 02 X 20 MVA by 2 X 80 MVA 132/33 KV Power Transformer with associated bays at Nalanda GSS	2 X 20 MVA
5	Replacement of 02 X 20 MVA by 2 X 80 MVA 132/33 KV Power Transformer with associated bays at Ekangarsarai GSS	2 X 20 MVA

3.0 Environmental Requirements

3. The Safeguard Policy Statement 2009 (SPS 2009) of ADB sets out the requirements for environmental safeguard that apply to all ADB-financed projects. Under the SPS 2009, this project was classified as of environment category B requiring preparation of an initial environmental examination (IEE) report. Following the requirements of SPS 2009, this draft IEE is prepared covering the additional components (out of loan savings) for power transmission system improvement.
4. The Ministry of Environment, Forests and Climate Change (MoEF CC), GoI, in its notification dated September 2006, has exempted transmission projects from environmental clearances. Expansion of facilities within existing sub-stations including extensions and augmentations of facilities within existing sub-stations are also not listed as requiring environmental assessment.

4.0 Anticipated Environmental Impacts and Mitigation Measures

5. The strengthening of sub-transmission system subprojects is well within the existing GSS"s and along the existing right-of-way (ROW) of transmission lines; and therefore no additional encroachment, landscape or impacts associated with physical disfiguration of the urban cityscape or rural landscape are expected from construction. The transformers that are replaced will not be wasted but will be removed and transferred to at another BSPTCL facility where those will be reconditioned, stored and eventually transferred to another GSS to be reused. There is no foreseeable significant disturbance outside the substations /ROW of transmission lines, and construction related waste disposal should not be a significant consideration if routine environmental management procedures and engineering controls are implemented thoroughly.
6. None of the proposed sub-projects under the scope of this IEE are located within or near to or passing through any environmentally and ecologically sensitive protected areas (such as national parks, sanctuaries, bio-reserves, reserved forests) or monuments of historical /archeological importance protected under the law. At some locations the lines are crossing the rivers. Three lines from re-conductoring of 220/132 kV transmission line are crossing Kiul, Gandak & Koshi rivers. The subprojects are not expected to cause any significant, irreversible adverse environmental impacts but may cause temporary impacts related with construction activities such as noise and dust levels that may cause inconvenience to local people. However, vegetation and land clearing within the substation sites and transmission line ROWs will be required. The accumulation of construction debris and scrap, etc. can be readily mitigated by good construction engineering practices and proper planning. An environmental management plan and environmental monitoring plan have been prepared and given in Table 11 and Table 12 respectively. Part of the capacity building component of the Project is safeguards training for the executing and implementing agencies.

5.0 Information Disclosure, Consultation, and Participation

7. Initial stakeholder consultations have been done during the site visits. Consultations with project stakeholders in varying degrees will continue throughout the life of the project.

This draft IEE will be posted on the ADB website as required by SPS 2009 and Public Communications Policy 2011. A project factsheet including the environmental management and monitoring plans in local language will be posted on BSPHCL website and made available at the field offices.

6.0 Implementation Arrangements

8. An environmental and social management unit (ESMU) has been established within the Project Management Unit (PMU) of BSPTCL. ESMU is responsible for safeguards compliance monitoring of contractor(s) during construction. The ESMU will be primarily responsible for ensuring that the environmental management plan (EMP) is properly implemented and will prepare the environmental monitoring reports for submission to ADB at least twice a year during construction. ESMU shall ensure that a copy of the EMP is included in the bid and contract documents. ESMU through PMU will inform EPC Contractor(s) of their responsibility to comply with the EMP and the requirements of ADB. The IEE report will be shared with the bidders for their understanding of the environmental safeguards related requirements

7.0 Grievance Redress Mechanism

9. A grievance redress mechanism will be in place to deal with complaint(s) from affected persons (APs) during implementation if any. GRC is set up by the PMU as soon as the project commences and will function as such from construction to operation. The PMU will ensure the representation of women on the members of GRC which will consist of representatives from the local Panchayat Head, a District Revenue Commissioner, representative from the EPC Contractor(s).

8.0 Conclusions and Recommendations

10. The proposed strengthening of sub-transmission system subprojects is well within the existing GSS"s and ROW of transmission lines. Therefore no additional encroachment, landscape or impacts associated with physical disfiguration of the urban cityscape or rural landscape are expected from construction. The transformer that is replaced will not be wasted but will be removed and transferred to at another BSPTCL facility where it will be reconditioned, stored and eventually transferred to another GSS to be reused. There is no foreseeable significant disturbance outside the substations /ROW of transmission lines; and construction related waste disposal should not be a significant consideration if routine environmental management procedures and engineering controls are implemented thoroughly. The reliability and stability of power supply resulting from the project is expected to improve the quality of life and the pace of economic development in the State of Bihar

1.0 INTRODUCTION

1. In order to strengthen the transmission network, Government of Bihar (GoB) has undertaken various transmission network capacity addition, augmentation and improvement projects in the power sector with funding from development partners like the Asian Development Bank (ADB) for achieving its objective of making available reliable power across the State. The Bihar Power System Improvement Project was approved for ADB financing in October 2010 for an amount of US \$132.2 million to part finance transmission and distribution system investments as well as capacity development component. The GoB unbundled and restructured the Bihar State Electricity Board (BSEB) with effect from 1st November, 2012. The generation, transmission and distribution businesses of the erstwhile BSEB are transferred to four successor companies - Bihar State Power Generation Company Limited, Bihar State Power Transmission Company Limited, North Bihar Power Distribution Company Limited and South Bihar Power Distribution Company Limited. Bihar State Power (Holding) Company Limited (BSPHCL) is the holding company.

1.1 Overview

2. The state of Bihar is experiencing a rapid load growth; the total demand is expected to rise from 2,393 MW in 2012 to about 5,620 MW by 2016-17. To cope up with the demand growth, the state is taking up a number of generation capacity addition programs as well as allocation of power from other central/private sector generation projects. In view of the same, a comprehensive study has been carried out to plan the future transmission network in Bihar in order to meet the load growth envisaged by the year 2016-17. Besides creation of different 400 kV and 220 kV systems, the study has suggested optimum utilization of our existing 132/33 kV grid sub-stations by enhancing their transformer capacity and creation of additional 33 kV bays to supply power to load centers. As a first step towards implementation of suggested works, the BSPHCL intends to utilize loan savings to (i) augment seven existing sub-stations; (ii) re-conductor 1011.30 km existing 220 kV and 132 kV transmission lines; (iii) supply and install enterprise resource program (ERP) software at the headquarters and field offices and (iv) construct 33 kV line bays in form of indoor VCB/GIS panel at 83 nos. AIS sub-stations, and replace 10 nos. of lower capacity transformers by higher capacity (80 MVA) at 5 grid sub-stations of BSPTCL. .

1.1.1 Impact and Outcome

3. In Bihar, without the extensive transmission and distribution system expansion, additional supply to consumer loads cannot be reached. Thus, any increase in consumer load demand would only add to already significant unmet demand, resulting in more power cuts and widespread load shedding in power deficit areas. The existing transmission network in Bihar cannot meet the current demands with the specified systemic parameters and criteria, and requires sustained investment given the increase in projected loads. The proposed augmentation schemes at 220/132/33 kV GSS at Madhepura, Bihta, Fatuha and 132/33 kV GSS at Jamui, Naugachiya, Arah, Vaishali, Gangwara, Jandaha, Nalanda, Ekangarsarai and at 83 AIS sub-stations are essential for making the available power satisfy the projected load growth. The augmentation of GSS's and transmission lines will scale up the supply to the distribution loads in future. The installation of ERP software packages at about 120 field offices will help streamline and improve efficiency at working

level of the operations.

4. The proposed investments will also enhance the reliability of power supply and improve the voltage profile in the areas being catered to by these sub-stations. Therefore, the benefits of improving the sub-transmission power network in Bihar are manifold. These network improvement measures will ensure more reliable power supply that will support the infrastructure such as healthcare, education, transportation, service provision in all public amenities that suffer the most from erratic, low voltage and unreliable power supply. Developing power availability in power deficit areas will benefit households, cottage industries, agriculture, commercial and industrial sectors and improve employment opportunities.

1.1.2 Outputs

5. The proposed works under the scope of this IEE comprise the four component : (i) augmentation of seven existing sub-stations; (ii) re-conductoring 1011.30 km existing 220 kV and 132 kV transmission lines; (iii) supply and installation of enterprise resource program (ERP) software at the headquarters and about 120 field offices and (iv) construction of 33 kV line bays in form of indoor VCB/GIS panel at 83 nos. AIS sub-stations, and replacement of 10 nos. of lower capacity transformers (20 and 50 MVA) by higher capacity (80 MVA) at 5 grid sub-stations of BSPTCL. The work will facilitate better connectivity to PSS, cater to future load and strengthen the distribution network resulting in enhancement of the distribution companies' revenues.

1.1.3 Financing Plan and Implementation Arrangement

6. ADB has already sanctioned a loan of USD 132.2 million under Loan No. 2681-IND in 2010 towards improvement of Bihar's power transmission and distribution sector. All packages - A, B, C, and D for distribution and G, H, I, and J for transmission works have been awarded. About USD 40 million is balance after award of works (including contingencies). BSPHCL intends to utilize the balance of the ADB loan proceeds for funding these additional works. This project would be constructed on basis of all ex-factory prices of supply, all construction and erection works, testing and commissioning, and contingencies which are paid by ADB whereas as all taxes and duties, freight and insurance, including interest during construction (IDC) shall be paid by the GoB.

1.2 The Need for an Initial Environmental Examination

1.2.1 National Requirements

6. In September 2006, the MOEFCC issued an Environmental Impact Assessment notification that excluded power transmission projects from obtaining environmental clearances. Therefore, no environmental clearances for the proposed sub-projects will be required from the MOEFCC. The permissions and consents may have to be obtained from the state pollution control board.

1.2.2 Requirements of Asian Development Bank

7. The Safeguard Policy Statement 2009 (SPS 2009) of ADB sets out the requirements for environmental safeguard that applies to all ADB-financed projects. Under SPS 2009, projects that require financing from ADB are screened and categorized based on their potential environmental impacts. The proposed works have been categorized as of environment category B. The Category B projects required developing an initial environmental examination (IEE) report. Following the requirements of SPS 2009, this draft IEE is prepared covering the components of the proposed project on power transmission and system improvement.

1.2.3 Objectives of the IEE

8. The objectives in undertaking an IEE are:
 - (i) to assess the environmental impacts – positive and negative associated with the proposed project if any ;
 - (ii) to identify the corresponding mitigation and/or enhancement measures for the management of environmental impacts; and,
 - (iii) to ensure that all applicable environmental statutory requirements for the project such as Acts, rules and regulations, clearances required (if any), etc. have been considered to ensure compliance.

1.2.4 Scope and Methodology

9. All the augmentation projects covered in this IEE will only involve work within an existing sub-station or within the ROW of transmission line to (i) augment seven existing sub-stations; (ii) re-conductor 1011.30 km existing 220 kV and 132 kV transmission lines; (iii) supply and install enterprise resource program (ERP) software at the headquarters and field offices and (iv) construct 33 kV line bays in form of indoor VCB/GIS panel at 83 nos. AIS sub-stations, and replace 10 nos. of lower capacity transformers by higher capacity (80 MVA) at 5 grid sub-stations of BSPTCL. These projects involve work within existing sub-stations and transmission lines to improve the network performance. The scope of the IEE covers the general environmental profile of Bihar, an assessment of the potential environmental impacts on physical, ecological, economic, and social and cultural resources within the project's corridor of impact during design, pre-construction, construction, and operation stages. Stakeholder consultation, development of EMP, and environmental monitoring plan are integral part of the IEE.
10. Field visits were done in the month of August 2014 & May 2015 to conduct ocular inspection and to assess the existing condition of the physical and biological environment of selected subproject sites and to undertake stakeholder consultations.

1.3 Structure of the Report

11. The IEE report has the following contents:
 - Executive Summary-This section briefly describes the critical facts, significant findings,

and recommended actions.

- Introduction-Describes the overview of the project, environmental requirements, objectives and scope of the study, approach and methodology.
- Policy, Legal, and Administrative Framework -Discusses the national and local legal and institutional framework within which the environmental assessment is carried out.
- Description of the Existing Environment - Describes the relevant physical, biological, and socioeconomic conditions within Bihar as the subprojects covered in the proposed project are spread all over the state.
- Project Description- Provides an overview of the proposed project; its objectives and major components including maps showing the project's location
- Anticipated Environmental Impacts and Mitigation Measures- Provides an assessment of the potential environmental impacts and corresponding mitigation measures. The environmental impacts and mitigation measures including the environmental monitoring are summarized in the environmental management plan and environmental monitoring plan.
- Information Disclosure, Consultation, and Participation- Describes the process of engaging stakeholders and information disclosure.
- Grievance Redress Mechanism-This section describes the grievance redress framework and setting out the time frame and mechanisms for resolving potential complaints and/or issues if any.
- Environmental Management Plan- Describes the set of mitigation and management measures to be taken for each identified environmental impact during project design, construction and operation. This section also includes monitoring and reporting procedure as well as institutional implementation arrangements.
- Conclusion and Recommendation

2.0 POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

2.1 ADB Safeguard Policy Statement 2009

12. ADB requires the consideration of environmental issues in all aspects of its operations, and the requirements for environmental assessment are described in its SPS 2009. The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature and magnitude of its potential impacts, and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impact, and are assigned environment category namely A, B, or C.

2.2 Applicable National and State Legislation

13. The implementation of the project and subprojects will be governed by the environmental acts, rules, regulations, and standards of India at the national, state and local levels. These regulations impose restrictions on activities to minimize and/or mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure subprojects are consistent with the policy and compliant with all legal frameworks across all hierarchy - national, state, municipal and local.

2.3 National and State Environmental Assessment Requirements

14. In September 2006, the MoEFCC issued a notification that excluded power transmission projects from obtaining environmental clearances. Therefore, no environmental clearances for the proposed augmentation sub-projects will be required from the MoEFCC. Some permissions from the Bihar State Pollution Control Board (BSPCB) may be required.
15. Some of the applicable national and state acts/rules are detailed in Appendix 1. Compliance with legislations (acts/rules) is mandatory at all stages of project implementation.

3.0 DESCRIPTION OF THE ENVIRONMENT

3.1 Physical Resources

3.1.1 Topography, Geology, and Soils

16. The project and augmentation subprojects of BSPTCL are located in various geographic locations across the Bihar State, which lies between 24°20'10" and 27°31'15"N latitude and 82°19'50" and 88°17'40"E longitude 83°-30' to 88°-00' longitude. Bihar, the land locked state, lies in the eastern part of the country. The state shares its international border with Nepal in the North and state borders with Jharkhand in the South, West Bengal in the East and Uttar Pradesh in the West. The River Ganga flows from west to east through the state and divides the plains of Bihar into two unequal halves. The state (old Bihar state) was bifurcated in the year 2000 into the present Bihar and Jharkhand state. The total area of the state is 94,163sqkms, out of which around 98% is rural and only 2% is urban area. Administratively the state is divided into 9 divisions and 38 districts.(Fig.1)
17. The State of Bihar is divided into three physiographic regions: 1) the north Bihar plains, 2) the south Bihar plains, and 3) Chhota Nagpur and SanthalParaganas plateau. North Bihar plains consist of fifteen districts and is spread over 5.4 million hectares. The topography of this area is practically leveled with a slope towards south-east. Southern plains of Bihar consist of nine districts, and cover an area of about 4.0 million hectares. Its topography slopes towards north and most of the streams flow northward and join the Ganges as tributaries. Chhota Nagpur and SanthalParaganasplateau, though consist of only seven districts, cover the largest geo- graphical area of about 8.0 million hectares.
18. Based on soil characterization, rainfall, temperature and terrain, four main agro-climatic zones in Bihar have been identified. These are: Zone-I, North West Alluvial Plain, Zone-II, north East Alluvial Plain, Zone-III A South East Alluvial Plain and Zone-III B, South West Alluvial Plain, each with its own unique prospects. Zones I and II are flood prone whereas zone III is drought prone. The proposed works under this IEE are located in all zones. Potential wise all three agro climatic zones have vast untapped potential for increasing the productivity of food grain crops. Across the state soil texture varies from sandy loam to heavy clay. However the majority type belongs to loam category which is good for crop cultivation. The

natural precipitation varies from 990 to 1700 mm. Most of the precipitation is received during the month of July to September. Soil pH varies from 6.5 to 8.4. There are three crop seasons- Kharif, Rabi and Zaid. Rice, wheat and pulses are grown in all the districts however the choice of the crop and crop rotation varies across the agro climatic zone.

3.1.2 Meteorology and Climate

19. Bihar lies in the tropical to sub-tropical region. Rainfall here is the most significant factor in determining the nature of vegetation. Bihar has a monsoon climate with an average annual rainfall of 1200 mm. The climatic conditions of state vary with its physiographic set-up. Broadly the state can be divided into three climate zones.

- (a) The Sub-Himalayan zone
- (b) The Ganga plains zone and
- (c) The parts of Chotanagpur plateau zones of South Bihar.

(a) The Sub-Himalayan zone : The Sub-Himalayan zone in the northern part of the state has mean maximum temprature is 43°C and the mean minimum temperature is 4°C. The following proposed re-conductoringof 220 kV and 132 kV Transmission line works fall in this region: (a) 132 kV S/C Motihari-Bettiah (b) 132 kV S/C Ramnagar-Valmikinagar-Surajpuraand (c) 132 kV S/C Forbesganj-Kataiya (KOSI).

(b) The Ganga plains: The Ganga plains zone forms an excessive bowl of warm air, especially during day time. The mean maximum daily temperature even the coldest month (January) nowhere falls below 21 °C. Hot season in the zone covers the period from April to June, May being the hottest month in the greater part of the area. West of Gaya the daily mean maximum temperature in May rises to 40°C and above, the mean daily maximum air temperature being as high as 41.3°C at Gaya. The following proposed works fall in this region: (1) Augmentation of GSS- Madhepura, Bihta, Naugachiya, Arah, Vaishali, Gangwara(2)Re-conductoring of 220 kV and 132 kV Transmission lines -220 kV D/C Fatuha-Khagaul Transmission Line , 132 kV S/C Ara-Dumraon Transmission Line , 132 kV D/C Dehri-Dumraon Transmission Line (Old Ckt.) only one Ckt. , 132 kV S/C Hathidah-Sheikhpura Transmission Line , 132 kV S/C Lakhisarai-Jamalpur Transmission Line , 132 kV Jahanabad GSS to looping point of 132 kV D/C Patna-Sipara , 132 kV S/C Samastipur-Hajipur-ShitalpurLilo point-Chapra , 132 kV S/C Purnea-Saharsa , 132 kV S/C Forbesganj-Purnea.

(c) The parts of Chota Nagpur plateau: The maximum summer temperature ranges from 46°C in the western part to 42°C in the east, the annual rainfall ranges from 800 mm in the western part to 600 m in the eastern part.The following proposed works fall in this region: (1)augmentation of GSS- Jamuiand (2) re-conductoringof 220 kV and 132 kV Transmission lines - 132kV Bodhgaya-Chandauti Transmission Line Ckt. I,II,III & IV, 132 kV S/C Bodhgaya-Wazirgunj-Nawada, 132 kV S/C Dehri-Sasaram-Kudra-Karmnasa Transmission Line, 132 kV D/C Sonenagar-Garhwa Transmission Line up to Bihar border near Nabinagar, Biharsharif-Barhi 132 kV D/C Line from Biharsharif to Loc. No. Near Manpur (Gaya)with addition of 31 nos angle tower for strengthening .

3.1.3 Air Quality and Noise

20. The ambient air quality of Bihar is monitored by BSPCB at different locations of Patna city. The summary of air quality monitoring done at Gandhi Maidan & Beltron Bhawan during 2010-14 data from BSPCB is presented in Table 4. Table indicates that the NO_x and SO₂ of the ambient air at Gandhi Maidan & Beltron Bhawan, Patna are not within the permissible limits for most of the time. The level of SO₂, NO₂, SPM & RSPM are the contribution of the emission from automobiles. There is no official/published air quality data available for the other locations. The baseline data on ambient air quality will be generated by the contractor before commencement of construction works.

Table 4. Ambient Air Quality at Patna (Mean Values)

Sampling Point	Financial Year	Annual mean of SO ₂	Annual mean of NO ₂	Annual mean of SPM	Annual mean of RSPM
Gandhi Maidan	2010-11	9.2	65.6	778	217
Beltron Bhawan	2010-11	6.4	27.5	339	162
Annual Average of Patna 2010-11		7.8	46.6	559	190
Gandhi Maidan	2011-12	8.1	69.2	623	202
Beltron Bhawan	2011-12	6	28.1	259	132
Annual Average of patna 2011-12		7.1	48.7	441	167
Gandhi Maidan	2012-13	11.9	53.2	631	233
Beltron Bhawan	2012-13	6.6	27.0	315	153
Annual Average of Patna 2012-13		9.3	40.1	473	193
Gandhi Maidan	2013-14	9.1	33.8	601	186
Beltron Bhawan	2013-14	7.2	18.9	228	118
Annual Average of patna 2012-13		8.2	26.4	415	152
Standards for industrial residential rural & other areas (annual average) after 18.11.2009 (vide notification no.- 217 dt. 18.11.2009)		50	40	40	60

Source: Bihar State Pollution Control Board.

21. The movements of heavy trucks, buses, trains, jet-planes, three wheeler tempos motorcycles, scooters, mopeds, jeeps falls under the list whose cumulative sound outcome is the noise pollution. The typical ambient noise level at some of the locations at Patna, monitored during May & June of 2014 by BSPCB is presented in the Table 5. There is no official/published ambient noise levels data available for the other locations. The baseline data on ambient noise levels will be generated by the contractor before commencement of construction works.

**Table.5 Typical Ambient Noise Level Monitoring Report of Patna
(May-2014 & June-2014)**

S.No.	Sampling Location	Zone	Day time Standards	Night Standard
1.	BeltronBhawan	Residential	55	45
2.	Hindustan Coca Cola	Industrial	75	70
3.	IGSC Planeterium	Commercial	65	55
4.	Patna Junction Golamber	Commercial	65	55
5.	PMCH Ashok Raj Path	Silence	50	40

All Detail Data is attached as appendix.

3.1.4 Water Resources

22. Bihar is richly endowed with water resources, both the ground water resource and the surface water resources. Not only by rainfall but it has considerable water supply from the rivers which flow within the territory of the State. Besides lakes, ponds and other water bodies also supply water to some population. Ganga is the main river in the state which receives tributaries like Saryu, Gandak, Budhi-Ganda, Kamla-Balan, Mahananda, etc. These rivers join the Ganges from the north. While other rivers like Sone, UttariKoyal, Punpun, Panchane and Karmnasha start from the plateau area and meet in Ganges or its associate rivers from the south. River in the state is the source of water for domestic, irrigation, industries and hydro-thermal power production. Also, it is a medium for water transport, a source of livelihood for fishery industry and recharges the underground water. There is no official/published water quality data available for sub-project locations. Some transmission lines in the proposed works are crossing the rivers in the state. The following proposed re-conductoring of 220 kV and 132 kV Transmission line works cross the rivers 132 kV S/C Lakhisarai-Jamalpur Transmission Line (Kuil river), 132 kV S/C Samastipur-Hajipur-Shitalpur Lilo point-Chapra (Gandak river), and 132 kV S/C Forbesganj-Kataiya (Koshi river). The EMP shall provide mitigation measures. The baseline data on water quality will be generated by the contractor before commencement of construction works.

3.2 Ecological Resources

23. In case of Bihar, the diversity of fauna and flora is noticeable in the backdrop of changing physiographic and climatic zonations and its remarkable longitudinal changes across the Ganga basin. A rich variety of flora and fauna, around the western Chota Nagpur plateau where thick forest, sufficient hydrological input, natural abode and food were the essential components of ecosystem, available.

24. Flora -Only about 6.87% of the geographical area (6473 sq km) of the state of Bihar is under forests. This consists of 76 sq km of very dense forests, 2951 sq km of dense forests and 2531 sq km of open forest. The forests of Bihar are of three types: Dry deciduous forest, Wet deciduous forest and Sub Himalayan and Tarai forest.

25. Fauna- The jungles of Bihar abound in wildlife, though some of the notable game animals and birds like tiger, deer, buffalo, duck etc. In order to prevent the extinction of any species and to preserve them and maintain their balance with nature, thirteen wildlife sanctuaries have been set up.
26. None of the proposed sub-projects under the scope of this IEE are located within or near to or passing through any environmentally and ecologically sensitive protected areas (such as national parks, sanctuaries, bio-reserves, reserved forests) or monuments of historical /archeological importance protected under the law. At some locations three lines from re-conductoring of 220/132 kV transmission line are crossing the Kiul, Gandak, Koshi rivers.

3.3 Socio-economic Profile

27. Bihar is the third most populous state in India after Uttar Pradesh and Maharashtra. According to the provisional population by census 2011, the population of the Bihar is 10.38 crore, out of which around 5.3 crore are males and 4.96 crore are females. A slight decrease in the percentage decadal growth from 1991-2001 to 2001-2011 was observed i.e. the decadal population growth was 28.6% and 25.1% in 1991-2001 and 2001-2011 respectively.
28. The total literate population in the state is 5.4 crore out of 10.38 crore in 2011, out of which 3.2 crore men and 2.1 crore females are literate. The literacy rate in the state has shown improvements over the past decade. In 2001, out of the total population only 47% people were literate which has increased to 63.82% in 2011. The percentage of males and females literate has also increased over the same period. In 2001, 59.68% males and 33.12% females were literate which has increased to 73.39% males and 53.33% females respectively. The sex ratio of Bihar state has slightly decreased from 921 in 2001 to 916 in 2011. The statistics shows an increase in the population density from 881 to 1102 from 2001 to 2011 respectively. (Source: Census of India, 2011). According to 2001 census, total population of Bihar (8,29,98,509). According to 2011 census, total population of Bihar (103,804,637). According to "The Economic Census 2005", there were total 22.69 lakh workers working in 12.25 lakh establishments of the state. The number of total workers grew by only 1.62% in 2005 over 1998. Out of total workers, 61.90 per cent were in rural areas, while 38.10% were in urban areas. There were 63.0 thousand workers in Agricultural establishments and 22.06 lakh workers in Non-Agricultural establishments. (Economic Survey, 2011-12, Government of Bihar)
29. The economy of Bihar grew at an annual rate of 11.36 percent during the period 2004-05 to 2010-11. During the period 2004-05 to 2010-11, the sectors reporting a growth rate of more than 15 percent are registered manufacturing (23.30 percent), construction (19.61 percent), communications (27.23 percent) and trade, hotels and restaurant (20.22 percent). (Economic Survey, Government of Bihar, February 2012)

4.0 STRENGTHENING OF SUB-TRANSMISSION SYSTEM

4.1 Project Description

Table.6

SNo.	Description	Details
1	Year	Start date: 2014-15 COD: 2016-17
2	State	Bihar
3	Executing Agency	Bihar State Power Holding Company Limited, Patna
4	Name of work	Strengthening of sub-transmission system from ADB financing
5	Major Head	ADB loan No. 2681-IND
6	Supervision	Chief Engineer, Transmission, Bihar State Power Transmission Company Limited
A.	132 K V Transformer Capacity Augmentation	7 GSS locations within Bihar state
a	Estimated ADB cost	USD 7.87 million (Rs. 47.23 crores)
b	Estimated BSPHCL cost	USD 1.16 million (Rs. 6.91 crores)
c	Estimated Total value	USD 9.03 million (Rs. 54.14 crores)
B	Re-conductoring of 220kV & 132kV transmission line works	17 nos. Transmission lines within Bihar state
a	Estimated ADB cost	USD 22.0843 million (Rs. 132.5072 crores)
b	Estimated BSPHCL cost	USD 3.7645 million (Rs. 22.5873 crores)
c	Estimated Total value	USD 25.8488 million (Rs. 155.0945 crores)
C	Supply and installation of ERP software packages	At BSPTCL headquarters and about 120 field offices within Bihar state
a	Estimated ADB cost	\$ 3.54 million (Rs. 21.284 crores)
b	Estimated BSPHCL cost	\$ 0.57 million (Rs. 3.406 crores)
c	Estimated Total value	\$ 4.11 million (Rs. 24.69 crores)
D	Construction of 33 kV indoor panels at 83 sub-stations and replacement of transformers at 5 GSS	All 88 sub-stations within Bihar state
a	Estimated ADB cost	USD 42.34 million (Rs. 254.04 crores)
b	Estimated BSPHCL cost	USD 14.07 million (Rs. 84.42 crores)
c	Estimated Total value	USD 56.41 million (Rs. 338.459 crores)

3.3 .1 Objectives and Benefits

30. The proposed augmentation scheme at the existing 220/132/33 kV & 132/33 kV substations and 220 kV & 132 kV transmission lines is essential for making the available power satisfy the projected load growth. The augmentation of GSS"s will scale up the supply to the distribution loads in future.

4.1.2 Location and Components

30. This additional augmentation project is divided into 4 components (i) augment seven existing sub-stations; (ii) re-conductor 1011.30 km existing 220 kV and 132 kV transmission lines; (iii) supply and install enterprise resource program (ERP) software at the headquarters and field offices and (iv) construct 33 kV line bays in form of indoor VCB/GIS panel at 83 nos. AIS sub-stations, and replace 10 nos. of lower capacity transformers by higher capacity (80 MVA) at 5 grid sub-stations of BSPTCL. These components are proposed to be augmented at the locations present in the Table 7,8, 9 & 10.

Table.7 Component description – Augmentation of seven existing sub-stations

SNo.	Name of work	Location	Transmission Circle
1	One no. of addition of 50 MVA Transformer with associated bays at 220/132/33 kV GSS	Madhepura	Muzaffarpur
2	Two no. of addition of 50 MVA Transformer with associated bays at 220/132/33 kV GSS Bihta	Bihta	Patna
3	One no. of addition of 50 MVA Transformer with associated bays at 220/132/33 kV GSS Jamui	Jamui	Dehri on sone
4	One no. of addition of 50 MVA Transformer with associated bays at 220/132/33 kV GSS Naugachiya	Naugachiya	Bhagalpur
5	One no. of addition of 50 MVA Transformer with associated bays at 220/132/33 kV GSS Arah	Arah	Dehri on sone
6	One no. of addition of 50 MVA Transformer with associated bays at 220/132/33 kV GSS Vaishali	Vaisali	Muzaffarpur
7	One no. of addition of 50 MVA Transformer with associated bays at 220/132/33 kV GSS Gangwara	Gangwara	Muzaffarpur

Table.8 Component description -Re-conductor 1011.30 km existing 220 kV and 132 kV transmission lines

SNo.	Name of work(Re-conductoring of 220 & 132 kV lines)	Length km
1	220 kV D/C Fatuha-Khagaul Transmission Line	37.39
2	132 kV Bodhgaya-Chandauti Transmission Line Ckt. I,II,III & IV	18.10

3	132 kV S/C Bodhgaya-Wazirgunj-Nawada	63.87
4	132 kV S/C Ara-Dumraon Transmission Line	54.17
5	132 kV D/C Dehri-Dumraon Transmission Line (Old Ckt.) only one Ckt.	81.46
6	132 kV S/C Dehri-Sasaram-Kudra-Karmnasa Transmission Line	90.62
7	132 kV D/C Sonenagar-Garhwa Transmission Line up to Bihar border near Nabinagar	17.74
8	132 kV S/C Hathidah-Sheikhpura Transmission Line	28.31
9	132 kV S/C Lakhisarai-Jamalpur Transmission Line	44.37
10	132 kV Jahanabad GSS to looping point of 132 KV D/C Patna-Sipara	47.50
11	Biharsharif-Barhi 132 kV D/C Line from Biharsharif to Loc. No. Near Manpur (Gaya)with addition of 31 nos angle tower for strengthening	76
12	132 kV S/C Motihari-Bettiah	43.04
13	132 kV S/C Ramnagar-Valmikinagar-Surajpura	75.18
14	132 kV S/C Samastipur-Hajipur-ShitalpurLilo point-Chapra	121.00
15	132 kV S/C Purnea-Saharsa	101.34
16	132 kV S/C Forbesganj-Kataiya (KOSI)	39.79
17	132 kV S/C Forbesganj-Purnea	71.42

Table.9 Component description - Supply and installation of enterprise resource program (ERP) software at the headquarters and field offices

Existing GSS Below:

SL.NO.	NAME OF GRID SUB-STATIONS	DISTRICT	BLOCK
1	Forbeshganj	Araria	Forbeshganj
2	Sonenagar	Aurangabad	Barun
3	Rafiganj	Aurangabad	Rafiganj
4	Aurangabad	Aurangabad	Aurangabad
5	Goh	Aurangabad	Goh
6	Begusarai	Begusarai	Barauni
7	Buxar	Buxar	Itarhi
8	Dumraon	Buxar	Dumraon
9	Sabour	Bhagalpur	Sabour
10	Sultanganj	Bhagalpur	Sultanganj
11	Kahalgaon	Bhagalpur	Kahalgaon
12	Naugachhia	Bhagalpur	Bhagalpur
13	Ara	Bhojpur	Ara
14	Banka	Banka	Banka

15	Darbhanga	Darbhanga	Bahadurpur
16	Motihari	East Champaran	Motihari
17	Dhaka	East Champaran	Dhaka
18	Raxaul	East Champaran	Raxaul
19	Bodh Gaya	Gaya	Bodh Gaya
20	Chandauti	Gaya	Gaya
21	Belaganj	Gaya	Belaganj
22	Tekari	Gaya	Tekari
23	Wazirganj	Gaya	Wazirganj
24	Gopalganj	Gopalganj	Gopalganj
25	Jamui	Jamui	Jamui
26	Jehanabad	Jehanabad	Jehanabad
27	Hulashganj	Jehanabad	Hulashganj
28	Katihar	Katihar	Katihar
29	Khagaria	Khagaria	Khagaria
30	Kishanganj	Kishanganj	Kishanganj
31	Mohania	Kaimur	Mohania
32	Karmnasa	Kaimur	Durgawati
33	Lakhisarai	Lakhisarai	Lakhisarai
34	Udakishanganj	Madhepura	Udakishanganj
35	Muzaffarpur	Muzaffarpur	Muzaffarpur
36	Jamalpur	Munger	Jamalpur
37	Madhubani	Madhubani	Rahika
38	Pandaul	Madhubani	Pandaul
39	Jainagar	Madhubani	Jainagar
40	Phulparas	Madhubani	Phulparas
41	Nawadah	Nawadah	Nawadah
42	Biharsharif	Nalanda	Biharsharif
43	Baripahari	Nalanda	Biharsharif
44	Rajgir	Nalanda	Rajgir
45	Ekangarsarai	Nalanda	Ekangarsarai
46	Fatuah	Patna	Fatuah
47	Khagaul	Patna	Danapur
48	Jakkanpur	Patna	Patna Sadar
49	Masaurhi	Patna	Masaurhi
50	Bihta	Patna	Bihta
51	Gayghat	Patna	Patna City
52	Mithapur	Patna	Patna City
53	Katra	Patna	Patna Sadar
54	Hathidah	Patna	Mokamah
55	Barh	Patna	Barh
56	Purnea	Purnea	Purnea East
57	Dehri-On-Sone	Rohtas	Dehri
58	Sasaram	Rohtas	Sasaram

59	Bikramganj	Rohtas	Surajpur
60	Banjari	Rohtas	Bangari
61	Sitamarhi	Sitamarhi	Dumra
62	Chapra	Saran	Chapra
63	Sheetalpur	Saran	Sheetalpur
64	Siwan	Siwan	Siwan
65	Samastipur	Samastipur	Samastipur
66	Dalsingsarai	Samastipur	Dalsingsarai
67	Supaul	Supaul	Supaul
68	Kataiya (Birpur)	Supaul	Basantpur
69	Saharsa	Saharsa	Kahra
70	Shekhpura	Shekhpura	Shekhpura
71	Hajipur (220)	Vaishali	Hajipur
72	Vaishali	Vaishali	Vaishali
73	Bettiah	West Champaran	Bettiah
74	Ramnagar	West Champaran	Ramnagar
75	Karpi (Ataula)	Arwal	Karpi
76	Musrakh	Siwan	Musrakh
77	Harnaut	Nalanda	Harnaut
78	Digha	Patna	Digha
79	Sherghati	Gaya	Sherghati
80	SKMCH	Muzaffarpur	SKMCH
81	Jagdishpur	Bhojpur	Jagdishpur
82	Runni Saidpur	Sitamarhi	Runni Saidpur
83	Nalanda	Nalanda	Nalanda
84	Sipara (Gaurichak)	Patna	Gaurichak
85	Hajipur	Vaishali	Hajipur
86	Madhepura	Madhepura	Madhepura
87	Karbigahiya	Patna	Karbigahiya
88	Ekma	Saran	Ekma
89	Kudra	Kaimur	Kudra
90	Sonebarsa	Saharsa	Sonebarsa
91	Tehta	Jahanabad	Tehta
92	Jandaha	Vaishali	Jandaha
93	Imamganj	Gaya	Imamganj
94	Kusheshwarsthan	Darbhanga	Kusheshwarsthan

GRIDS UNDER CONSTRUCTION

SL.NO.	NAME OF GRID SUB-STATIONS	DISTRICT	Block
1.0	Bihta	Patna	Bihta
2.0	Pusouli	Kaimur	Kudra
3.0	Sonenagar	Aurangabad	Barun
4.0	Samastipur	Samastipur	Ujiarpur

5.0	Mushahari	Muzaffarpur	Mushahari
6.0	Motipur	Muzaffarpur	Motipur
7.0	Supaul	Supaul	Bishunpur
8.0	Kishanganj	Kishanganj	Kochadam
9.0	Gangwara	Darbhanga	Darbhanga
10.0	Sheohar	Sheohar	Sheohar
11.0	Dhanaha	West Champaran	Thakrahan
12.0	Kochas	Rohtas	Kochas

The scope of this sub-project covers procurement of ERP application software and necessary licenses, associated hardware and supporting system software, and services of the ERP software provider for project management and requisite capacity building of the staff from BSPTCL.

Table.10 Component description - Construction of 33 kV line bays in form of indoor VCB/GIS panel at 83 nos. AIS sub-stations, and replacement of 10 nos. of lower capacity transformers by higher capacity (80 MVA) at 5 grid sub-stations

Component A: 33 kV Bay extensions at 220 & 132 kV GSS's

SNo.	Name of work	Nos. of 33 KV bay extension
North Bihar - In the form of Indoor VCB Panel		
1	03 Nos. 33 kV bay extension at 132/33 kV GSS Dalsinghsarai.	3
2	05 Nos. 33 kV bay extension each at 132/33 kV GSS Begusarai, Kusheshwarsthan, Gangwara, Raxaul, Khagaria, Kishanganj, Madhepura, Udakishanganj, Madhubani, Jhanjharpur, Pandaul, Jainagar, Phulparas, Kataiya and Sonebarsa	5
3	06 Nos. 33 kV bay extension each at 132/33 kV GSS Shitalpur, Samastipur and Ramnagar	6
4	07 Nos. 33 kV bay extension each at 132/33 kV GSS Mushrakh, Jandaha and Supaul	7
5	08 Nos. 33 kV bay extension at 132/33 kV GSS Forbeisganj, Motihari, Dhaka, Hazipur and Bettiah	8
6	10 Nos. 33 kV bay extension each at 132/33 kV GSS Gopalganj, Sitamarhi and Saharsa	10
7	12 Nos. 33 kV bay extension at 132/33 kV GSS Siwan.	12
South Bihar - In the form of Indoor VCB Panel		
8	05 Nos. 33 kV bay extension each at 132/33 kV GSS Ataulah, Sonenagar, Rafiganj, Jagdishpur, Buxar, Dumraon, Sabour, Kahalgau, Chandauti, Belaganj, Tekari, Wazirganj, Imamganj, Sherghati, Jehanabad, Hulasganj, Tehta, Mohania, Kochas, Nawada, Baripahari, Rajgir, Ekangarsarai, Harnaut and Dehri-on-Sone	5
9	06 Nos. 33 kV bay extension at 132/33 kV GSS Goh	6

10	07 Nos. 33 kV bay extension each at 132/33 kV GSS Sultanganj, Karmnasa, Kudra and Bikramganj	7
11	08 Nos. 33 kV bay extension at 132/33 kV GSS Ara, Banka, Sasaram and Naugachia	8
12	10 Nos. 33 kV bay extension each at 132/33 kV GSS Aurangabad, Bodhgaya, Jamui, Lakhisarai, Jamalpur, Nalanda and Sheikhpura	10
Patna- In the form of Indoor GIS Panel		
13	05 Nos. 33 kV bay extension each at 132/33 kV GSS Fatuha, Jakkampur, Masaurhi and Bihta	5
14	07 Nos. 33 kV bay extension at 132/33 kV GSS Barh, Meethapur and Katra	7
15	10 Nos. 33 kV bay extension at 132/33 kV GSS Khagaul, Gaighat, Digha and Sipara	10

Table 11: Component B: Replacement of 50 MVA and 20 MVA Transformer by 80 MVA Transformer

SNo.	Name of work	Nos. of transformers of 20 MVA/50 MVA
1	At 132/33 KV Power Transformer with associated bays at Fatuha GSS	2 X 50 MVA
2	Replacement of 02 X 20 MVA by 2 X 80 MVA 132/33 KV Power Transformer with associated bays at Jandaha GSS	2 X 20 MVA
3	Replacement of 02 X 20 MVA by 2 X 80 MVA 132/33 KV Power Transformer with associated bays at Vaishali GSS	2 X 20 MVA
4	Replacement of 02 X 20 MVA by 2 X 80 MVA 132/33 KV Power Transformer with associated bays at Nalanda GSS	2 X 20 MVA
5	Replacement of 02 X 20 MVA by 2 X 80 MVA 132/33 KV Power Transformer with associated bays at Ekangarsarai GSS	2 X 20 MVA

4.2 Anticipated Environmental Impacts and Mitigation Measures

4.2.1 Pre-construction and Design Phase

4.2.1.1 Project Location Impact Assessment and Mitigation

37. The strengthening of sub-transmission system subprojects is well within the existing GSS"s and therefore no additional encroachment, landscape or impacts associated with physical disfiguration of the urban cityscape or rural landscape are expected from construction. In some cases the augmentation sub-projects have a few sensitive receivers (SR) within the GSS in the form of some office building part (e.g. Rajgir), vegetation (e.g. Begusarai) etc. The augmentation sub-projects will replace an existing

transformer in an existing GSS with a transformer of a higher capacity (augmentation). The transformer that is replaced will not be wasted but will be removed and transferred to at another BSPTCL facility where it will be reconditioned, stored and eventually transferred to another GSS to be reused. There is no foreseeable significant disturbance outside the substations and construction related waste disposal should not be a significant consideration if routine environmental management procedures and engineering controls are implemented thoroughly.

4.2.1.2 General Approach to Mitigation

38. The location and scale of the works are very important in predicting the environmental impacts. This process of impact prediction is the core of the IEE process and it is critical that the recommendations and mitigation measures are carried out with reference to the conditions on the ground in the affected areas in the spirit of the environmental assessments process. In this section the potential environmental impacts are reviewed. If impacts are predicted to be significant enough, mitigation is proposed in order to reduce residual impact to acceptable levels and achieve the expected outcomes of the project being implemented. Therefore, it is essential that a proper analysis is carried out during the project planning period. In this regard, the impact prediction plays a vital role as these predictions are used for developing mitigation measures and any alternative options, if appropriate. When the detailed designs are completed the impacts and mitigation measures will need to be further reviewed to take into account how the contracts are set up and in the light of any fine tuning of the sub-projects.

39. The environmental management plan (Section 4.5 and EMP matrix Table-8) has been compiled based on the available information and shall be reviewed in due course at project inception and through construction in order to feedback and provide revised mitigation for any significant unpredicted impacts. The analysis identifies the key environmental issues likely to arise from sub-project implementation, to prescribe mitigation measures to be integrated in the project design, to design monitoring and evaluation schedules to be implemented during sub-project construction and operation, and to estimate costs required for implementing sub-project mitigation measures. The EMP plan must be reviewed when the sub-projects reach the inception stage by the project management and be approved before any construction activity is initiated, to take account of any subsequent changes and fine tuning of the proposals.

40. During the construction phase the contractors must be notified and prepared to co-operate with the staff from BSPTCL, and local population in the mitigation of impacts. Furthermore the contractor must be primed through bidding stages and the contract documentation to implement the EMP in full and be ready to engage trained environmental management staff to audit the effectiveness and review mitigation measures as the project proceeds.

4.2.2 Construction Phase

41. During this phase, the activities include site preparation, setting up of temporary access tracks, setting up of materials storage areas at substation work sites, transport of material and equipment to the site, excavation for foundation, cementing/concreting of foundation, erection of the bay towers, and stringing. The EMP prepared will form part of the contract/bid documents and the contractor entrusted with the implementation of the sub-

project will be made responsible for implementing same as a contractual obligation. BSPTCL PMU will ensure that the contract of the Engineering, Construction and Procurement (EPC) Contractor(s) will also include the obligation to compensate for any temporary damage, loss or inconvenience as result of the project during the construction phase.

4.2.2.1. Encroachment, Landscape and Physical Disfiguration

42. The extent of augmentation sub-projects are proposed within the existing GSS boundary wall and therefore no additional encroachment, landscape or impacts associated with physical disfiguration of the urban cityscape or rural landscape are expected from construction.

4.2.2.2 Waste Disposal, Cut and Fill

43. The augmentation sub-projects should not require any significant cutting and filling. Mitigation measures must focus on the minimization of impacts. If surplus materials arise from the removal of the existing surfaces these can be used elsewhere on the sub-projects before additional soil rock, gravel or sand extraction is considered. The use of this immediately available material will minimize the need for additional rock based materials extraction. The extraction of raw materials should be minimized by the re-use on-site for landscaping of all rock and soil based materials extracted for excavation of foundations and all construction material would be quarried from approved sources only.
44. If off-site disposal of surplus materials becomes necessary this must also be negotiated through local authority approvals prior to the commencement of construction.
45. Contractual clauses should be included to require each contractor to produce a materials management plan (one month before construction commences) to identify all sources of cement and aggregates. The plan should clearly state the methods to be employed prior to and during the extraction of materials and all the mitigation measures to be employed to mitigate nuisances to local residents. Mitigation measures shall seek to control the impacts at source in the first place.

4.2.2.3 Ecology and Trees

46. As augmentation subprojects works are in the existing GSS there is no or less possibility of damaging the trees. If for some unforeseen reason trees do need to be removed permission should be obtained from the concerned authority after written justification.
47. A requirement shall be inserted in the contracts that no trees are to be cut in the GSS without the written permission from the relevant regulatory agencies.

4.2.2.4 Soil Erosion, Sedimentation and Hydrology,

48. Most of the augmentation sub-projects are all on flat sites and should not require any excavations and piling. Therefore there is little potential for the works to have impact on local water resources. There should be no need for erosion control and there should not be any significant runoff from stockpiles.

4.2.2.5 Air Pollution ,traffic hazard from material stock, equipment etc

49. The material (cement, sand and aggregate) requirement of a typical augmentation work are not large. There is no intermediate or bulk storage of these materials required. Similarly construction materials for the bay extension & foundation work are stored within the substation site are scheduled as per the work progress (which is staggered) , which means that at any given point in time the amount of construction material stored is not significant. The quantities of construction material required are not so large that they potentially represent a traffic hazard. The contractor will be, however, required to provide a traffic management plan before commencement of work at site .Field observations indicate that ambient air quality is generally acceptable considering the urban and urban fringe environments where the sub-projects are located. Any local emissions from powered mechanical equipment needed for the construction will to be rapidly dispersed and no impacts are expected.

4.2.2.6 Earthwork, material, transportation related Air Pollution

50. Major earthworks are not envisaged but in some cases minor excavations and piling may be required in the GSS where the new transformers are to be located and to create the footings and bunding for containment of leaked oily waste if any. Where earthworks are required they will contribute to increasing dust. However the scale of the works at any one location is not likely to cause excessive dust. Therefore dust control from works at this scale should be easy to achieve at little extra cost. In order to avoid complaints of dust nuisances the following mitigation measures should be carried out as a matter of good housekeeping:

- (i) Dust suppression facilities (hose pipe with spray or back pack water sprayer) shall be available where earth and cement works are required.
- (ii) Areas of construction (especially where the works are within 20m of the SRs if any) shall be maintained damp by watering the construction area.
- (iii) Construction materials (sand, gravel, and rocks) and spoil materials will be transported trucks covered with tarpaulins.
- (iv) Storage piles will be at least 30m downwind of the nearest human settlements if any.
- (v) All vehicles (e.g., trucks, equipment, and other vehicles that support construction works) shall be well maintained and not emit dark or smoky emissions in excess of the limits described in the CPCB norms. PUC certificates in this regard needs to be submitted.

51. Bitumen will not generally be required. But if there is any requirement for GSS approach road extension etc. Fuel wood shall not be used for heating bitumen; neither should bitumen be used as fuel.

52. Bitumen drums should be stored in a dedicated area, not scattered around the sub-project and any small accidental spills of bitumen or chemicals should be cleaned

up immediately. The waste including the top 2cm of any contaminated soil and disposed of as chemical waste to an approved landfill or approved local authority disposal site authorized to accept such waste.

4.2.2.7 Noise, Vibration and Blasting

53. As augmentation works are in the existing GSS there will be no requirement for blasting etc. At this stage the specific methods for installation of transformers with regard to supporting civil works is not known but soft ground is not generally present and piling should not be needed and would not be a preferred method for foundations in vibration sensitive GSS. Therefore noise and vibration should not be an issue during constructions of augmentation sub-projects.

4.2.2.8 Sanitation, Solid Waste Disposal, Communicable Diseases

54. The main issues of concern are uncontrolled disposal of waste by construction workers, unmanaged disposal of solid and liquid wastes into watercourses and natural drains if any. There should not be any significant amounts of waste from the works and because the works will be under close supervision of the BSPTCL authority within the GSS these issues can be controlled at source. In order to maintain proper sanitation around construction sites the workforce will be allowed to use the flush toilets in the sub-station control, facilities. Vectors such as mosquitoes should not be a significant consideration bearing in mind the type and scale of works for the augmentation sub-projects.

4.2.3 Operation Phase

4.2.3.1 Air Pollution and Noise from the Enhanced Operations

Based on observations of many different types of transformer at GSS augmentation sub-project sites, noise and vibration should not be a nuisance to any nearby SRs. Some switchgear/breaker that may be installed may contain SF₆. Typically losses of the SF₆ gas may very minor in the operational phase but it is noted that all halogenated gases can potentially accrue “greenhouse gas effects” if they are released in any significant quantities. However well installed SF₆ equipment should not leak significant amounts of gas. The maintenance of the equipment should be geared to achieve this.

1.2.1.1 Pollution from Oily Run-off, Fuel Spills and Dangerous Goods

55. Control measures will be needed for oily residues such as transformer oil and lubricants. Transformer oil is supplied in drums from an imported source and tap tanks are topped up as necessary on site. Oily residues and fuel should be captured at source and refueling and maintenance should take place in dedicated areas. No significant impacts should be allowed to arise in sub-projects.

56. If for some reason there are oily releases they should be cleaned up immediately.

The waste including the top 2cm of any contaminated soil and disposed of as chemical waste to an approved landfill or approved local authority disposal site authorized to accept such waste.

4.2.3.3 Environmental Enhancement

57. Environmental enhancements are not a major consideration within the numerous augmentation GSS sub-project sites. However it is noted that it is common practice at many such GSS sites to create some local hard and soft landscaping and successful planting of fruit trees and shrubs has been accomplished in many sites. This practice should be encouraged as far as practicable.

4.3 Information Disclosure, Consultation, and Participation

58. All the proposed sub-projects covered in this IEE involve work within existing sub-stations and transmission lines to addition of one or two of a higher capacity (augmentation), re-conductoring and second circuiting of transmission lines. No human settlements or other sensitive receptors exist next to immediate boundary and/or within the zone of influence of the proposed works.

The draft IEE report including the EMP was disclosed to local residents in local language. The sub-projects involve works within existing sub-stations and ROW of transmission lines. Initial consultations regarding environmental concerns of the local residents were done during field visits for the proposed sub-projects. These consultations covered both – the sub-station locations and the transmission line corridors. The local residents in general welcomed the efforts to improve the overall power transmission network as these would lead to improved supply of electricity. There were no major environmental, safety or health related concerns raised by the residents. The residents requested to ensure that their access to roads and agricultural fields and to their residential properties remains unaffected due to these works and they receive appropriate and adequate compensation for the damage that they might have to incur to their assets. The proposed provisions under the EMP were explained to them and they were also informed that a separate plan will be discussed with them regarding compensation for damaged assets. Therefore under ADB requirements, the need for environmental assessment process to include meaningful public consultation during the completion of the draft IEE can be considered to be satisfied by the support of local residents for their own projects.

59. Initial consultations were done during field visits for transmission system improvement with the stakeholders. Consultations were held at the 220/132/33kV substation sites in Madhepura and 132/33 KV GSS in Gangwara&Naugachiya. Consultations with project stakeholders in varying degrees will continue throughout the life of the project. The proposed consultation plan during implementation is provided in table 12 below. The draft IEE will be posted to the website of ADB as required by SPS 2009 and Public Communications Policy 2011.

Table11: List of the Some of thePersons Consulted

S.No.	Name	Designation	Location
1.	Mr. Vivek Kr. Singh	A.Ex.E	BSPTCL, 220/132/33 KV Madhepura
2.	Mr. RanapratapSingh	A.Ex.E	BSPTCL, 132/33 KV Jamui
3.	Mr. Kumar Saurav	A.Ex.E	BSPTCL, 132/33 KV Naugachiya
4.	Mr. Avinash Kumar	J.E.E	BSPTCL, 132/33 KV Naugachiya
5.	Mr. Atul Kumar Singh	A.Ex.E	BSPTCL, 132/33 KV Vaisali
6.	Mr. Vijay Baboo	J.E.E	BSPTCL, 132/33 KV Vaisali
7.	Mr. G.K. Choubey	CE/Project Manager	BSPTCL, ADB Cell Patna
8.	Mr. J P Singh	ESE/Nodal officer	BSPTCL, ADB Cell Patna
9.	Mr. Ashwini Kumar	A.Ex.E	BSPTCL, ADB Cell Patna
10.	Mr. A K Mishra	A.Ex.E	BSPTCL, ADB Cell Patna

Table 12: Public Consultation Plan during Implementation

Project Activity	Approach for Consultation	Schedule
Detailed survey (i.e., walk-over and contractor)	Informal meetings at different sub-station locations and transmission lines.	Pre-construction stage
Construction works	The IEE report in local languages will be made publicly available in the BSPTCL-PMU field and Gram Panchayat offices. Local informal meetings as needed.	Construction Stage
Operation & Maintenance	Information leaflets particularly on safety issues in local languages and in English. Press releases as and when needed Response to public inquiries	Operation Stage

4.4 Grievance Redress Mechanism

61. To ensure that public grievances and/or complaints on environmental issues are addressed during the implementation of the proposed works, the PMU would utilize the existing grievance redress mechanism (GRM) set-up for on-going works.

62. The GRM shall provide an accessible platform for receiving and facilitating resolution of grievances of affected persons related to the subprojects being implemented. According to SPS 2009, the GRM will address concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally

appropriate and readily accessible to the affected persons at no costs and without retribution. The aggrieved person(s) and parties are free to approach the judicial system at any time to resolve their grievances. GRM is normally incorporated in the compensation process due to land acquisition and temporary damages to crops and lands during construction if any but will also cover issues that may be raised due to environmental impacts such as increased level of dust and noise causing inconvenience to local people, traffic congestion, or any other relevant issues.

63. Under the GRM, grievance redress committee (GRC) will be set up by PMU at the field office as soon as the sub-project related works commence, and will continue to function from construction to operation phase. The GRC will consist of representatives from the local Panchayat Head, a District Revenue Commissioner, representative from the EPC Contractor(s) (during construction phase), designated staff of PMU on safeguards, Manager/Director of PMU, and a witness of the complainant/affected person. PMU will ensure that there is representation of women in the GRC.

64. Minor grievances on compensation or environmental issues during construction will be resolved onsite through the EPC contractor(s) and project site engineers. The records shall be maintained by the PMU of all grievances received including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were effected, and final outcome. Documentation of the grievances filed and resolved will be summarized and included in the semi-annual monitoring reports submitted to ADB during construction stage and annually during operation stage.

4.5 Environmental Management Plan

4.5.1 Mitigation

65. The mitigation measures for the corresponding environmental impacts identified are presented in Table 13. The environmental management plan (EMP) will be updated as needed, to reflect any changes in the scope of works, locations, alignments, and technologies.

4.5.2 Monitoring

66. During the construction stage, environmental monitoring will be done to ensure that non-compliance to the EMP by the EPC Contractor(s) if any will be avoided and/or immediately addressed.

67. Monitoring and maintenance of the power transmission system during operation ensure the integrity and safety of the structures and components, thus, minimizing safety risks to the public and damage to properties. Table 14 gives a summary of the environmental monitoring plan.

4.6 Implementation Arrangements

68. Project Management and general supervision of project implementation will be done by

BSPTCL-PMU. The overall implementation of environmental safeguards including the EMP will be carried out by the ESMU under the supervision of the Head (Project Manager) PMU. A designated staff of ESMU, will be primarily responsible for ensuring that the EMP is properly implemented by the contractors and the field staff. ESMU will coordinate and interact with the PMU on compliance to ADB's requirements, relevant government agencies and local authorities on statutory clearances (as needed), update and finalize the IEE (as required), and prepare environmental monitoring reports for submission to ADB twice a year.

69. EPC Contractor(s) will be informed of their responsibility to comply with the EMP and the requirements of ADB. There are specific responsibilities for EMP compliance during construction phase that will rest with the Contractor who will be monitored by the environmental staff of the project. The associated cost is included as a part of contract cost.

Table 13: Environment Management Plan

Anticipated Environmental issues and impacts	Proposed mitigation measure	Parameter to be monitored	Measurement frequency	Institutional Responsibility		Cost
				Implementation	Supervision	
A. Pre- Construction Stage						
Project Location ImpactEncroachment into precious ecological areas - loss of precious ecological values/ damage to precious species	Finalize locations and alignments by avoiding environmentally and ecologically sensitive areas, buildings, structures, trees, etc. Pruning of branches of trees wherever possible	Alignment Floral and faunal habitats loss	Once prior to commencement of implementation	ESMU	PMU	Part of detailed siting and alignment survey /design
Temporary use of lands – causing impact to the existing environment of land used for dumping, workshop, construction material stacking etc.	Selection of lands adhering to all applicable laws and regulations and in close consultation with urban local body /gram panchayat officials Trenches, construction facilities should be placed away from water bodies, natural flow paths, drainage in residential/commercial areas	Substation locations; Ambient air quality; Surface water quality	Once prior to commencement of implementation	ESMU	PMU	Part of detailed siting and alignment survey /design

<p>Substation location and design –</p> <ul style="list-style-type: none"> • Noise generation - Exposure to noise, Nuisance to neighboring properties; • Disturbance to the adjacent lands and the people due to cut and fill operations; • Induced voltage and electromagnetic interference 	<ul style="list-style-type: none"> • Substation designed to ensure noise will not be a nuisance. • Maintain adequate clearance, construction of retaining structures, minimise cut and fill operations adjoining to the dwellings • Cables to comply with the design parameters of design induced voltage in equipment and cables that would limit electromagnetic interference. 	<ul style="list-style-type: none"> • Expected noise emissions based on substation design, noise levels • Proximity to houses and other structures • Measurement of induced voltage in cables and equipment 	Once prior to commencement of Implementation	ESMU	PMU	Part of detailed siting and alignment survey
Loss of amenity (Aesthetics, property value)	Ensure the design of the system should not have any impact on visual aesthetics	Sub-stations and transmission lines	Once prior to commencement of Implementation	ESMU	PMU	Part of detailed siting and alignment survey

<p>Transmission and distribution line alignment and design</p> <p>Exposure to safety related risks</p> <p>Impact on water bodies / land/ residences</p> <p>Induced voltage and electromagnetic interference</p>	<p>Setback of dwellings to underground cable route designed in accordance with permitted level of depth and distances available from adjoining houses etc. and supervision at sites.</p> <p>Consideration of site location at where they could be located to avoid water bodies or drainage as much as possible.</p> <p>Careful site selection to avoid existing settlements.</p> <p>Cables to comply with the design parameters of design induced voltage that would limit electromagnetic interference.</p>	<p>Cable alignment selection with respect to nearest dwellings, water and/or drains land.</p> <p>Site location away from water bodies,</p> <p>Cable alignment selection</p> <p>Measurement of induced voltage in cables.</p>	Once prior to commencement of Implementation	ESMU	PMU	Part of detailed siting and alignment survey.
<p>Equipment specifications and design parameters - Release of chemicals and harmful gases in receptors (air, water, land)</p>	<p>Battery, transformer oils, SF₆ stored at substation sites with appropriate care.</p> <p>Non CFC and PCB equipment procurement may please be added here.</p>	Compliance with National Environmental Act	Once prior to commencement of Implementation	ESMU	PMU	Part of detailed siting and alignment survey.

Encroachment into private land – houses /commercial establishments causing loss of income	<p>Use existing ROW as much as possible.</p> <p>Avoid laying underground cables, if any, under houses, farmland etc. as much as possible.</p> <p>Inhabitants compensated for any loss of income.</p>	<p>Substation location and line alignment selection</p> <p>Design of Implementation of mitigatory measures (based on affected area)</p>	Once prior to commencement of Implementation	ESMU	PMU	Part of detailed siting and alignment survey.
Damage of vegetation	Alignment to be finalized to avoid or minimize vegetation loss.	Alignment	Once prior to commencement of Implementation	ESMU	PMU	Part of detailed siting and alignment survey
Impact on existing drainage system and flood prone areas. - Temporary flooding hazards	<p>Finalize alignment avoiding blockage of drainage system.</p> <p>Design should ensure protection of existing drainage system. Proper diversion of drainage system.</p> <p>Locate the equipment and machinery above high flood levels.</p>	<p>Design documents</p> <p>Site location and line alignment selection</p>	Once prior to finalization of design.	ESMU	PMU	Part of detailed siting and alignment survey /design
Explosions and Fire - Hazards to life	<p>Provision of firefighting equipment to be located close to transformers, power equipment.</p> <p>Tender document to mention detailed specifications.</p>	Substation design compliance with fire prevention and control codes	Once prior to finalization of design.	ESMU	PMU	Part of detailed siting and alignment survey /design)

Escape of polluting materials	<p>Transformers designed with oil spill containment systems, and purpose-built oil, lubricant and fuel storage system, complete with spill cleanup equipment.</p> <p>The transformers specifications will be selected as per internationally adopted standards</p> <p>Transformers / capacitors should be free from polychlorinated biphenyl (PCBs).</p> <p>Transformers / other equipment should not contain any chemical causing GHG emission.</p>	Specifications of plant and equipment	Once prior to inviting bids	ESMU	PMU	Part of detailed siting and alignment survey /design
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Contract clauses	<p>Ensure requirements and recommendations of environmental assessment (environmental management and monitoring plans) are included in the contracts.</p> <p>Include EMP Matrix in tender document and make contractors responsible to implement mitigation measures by reference to EIA/IEE including EMP in the contract document.</p>	Inclusion of EMP in bid and contract documents.	During preparation of the bid and contract document	ESMU	PMU	Part of detailed siting and alignment survey /design
B. Construction Stage						
Orientation for contractor and workers	<p>Awareness of workers on the environmental, health, and safety requirements and their responsibility. Create awareness of sexually- transmitted diseases including that for HIV/AIDS.</p> <p>Understanding of EPC Contractor(s) of their responsibility in implementing the EMP including associated monitoring, maintaining records, and reporting. Also making contractors aware of their obligations under environmental and labor regulations at national, state and local levels. Identify critical areas to be monitored and therequired mitigation measures.</p>	Number and frequency of these meetings.	Before starting the work	Contractor	ESMU	Part of Construction Cost
Removal or disturbance to other public utilities- Public inconvenience	<p>Advance notice to the public about the time and the duration of the utility disruption.</p> <p>Use of well trained and experienced machinery operators to reduce accidental damage to the public utilities.</p> <p>Restore the utilities immediately to overcome public inconvenient.</p>	Disruption other commercial and public activities / Public complaints	Once in a week during construction	Contractor	ESMU	Part of construction Cost

Impact due to transport of labor and materials- Nuisance to the general public	<p>The vehicles and machineries used shall comply with the statutory emission and noise standards.</p> <p>All vehicles, equipment and machineries shall be regularly serviced and well maintained.</p> <p>Transport loading and unloading of construction materials should not cause nuisance to the people by way of noise, vibration and dust</p> <p>Avoid storage of construction materials beside the road, around water bodies, residential or public sensitive locations</p> <p>Construction materials should be stored in covered areas to ensure protection from dust, emissions and such materials should be bundled in environment friendly and nuisance free manner</p>	<p>Compliance with Statutory Norms - Water and air quality</p> <p>Maintenance of vehicles</p>	Once in a week during construction	Contractor	ESMU	Part of construction Cost
Temporary outage of the electricity - Loss of power supply to the local community when distribution lines are switched off for works.	<p>Advance notice to the public about the time and the duration of the utility disruption.</p> <p>Restore the utilities immediately to overcome public inconvenience.</p>	Houses and commercial premises of power disruption	Regular monitoring during the period of strengthening the conductors	Contractor	ESMU and BSPTCL	Part of Construction Cost

Loss of vegetation due to site clearance, trimming/cutting of trees within RoW (fire hazard)	<p>Marking of vegetation to be removed prior to clearance, and strict control on clearing activities to ensure minimal clearance.</p> <p>Trees trimmed within the RoW to maintain adequate clearances as per the regulations.</p> <p>Statutory clearances as applicable shall be obtained prior to commencing these works.</p>	Vegetation marking, site Clearance and tree trimming /cutting activities, Faults due to tripping in network	Once in two weeks during construction	Contractor	ESMU	Part of Construction Cost
Acquisition of lands for temporary facilities etc. - Loss of agricultural productivity	<p>Avoid rainy season wherever possible for the project activities.</p> <p>Ensure existing drainage facilities in the area are maintained in working condition</p> <p>Protect /preserve topsoil and reinstate after construction completed</p> <p>Repair /reinstate damaged drains etc. after construction is completed</p>	<p>Usage of existing utilities</p> <p>Status of facilities (earthwork in m³)</p> <p>Implementation of soil conservation measures</p>	Once in a week during construction	Contractor	ESMU	Part of Construction Cost

Substation construction - Loss of soil and water pollution	<p>Fill for the substation foundations obtained by creating or improving local drain system and raising floor height.</p> <p>Construction activities involving significant ground disturbance not undertaken during the monsoon season.</p>	<p>Burrow area sighting (area of site in m² and estimated volume in m³)</p> <p>Seasonal start and finish of major earthworks (pH, BOD, COD, Suspended solids, other)</p>	Once in a week during construction	Contractor	ESMU	Part of Construction Cost
Construction schedules – Noisenuisance to neighbouring properties;	Construction activities only undertaken during the day and local communities informed of the construction schedule.	Timing of construction noise emissions, [dB(a)]),	Once in a week during construction	Contractor	ESMU	Part of Construction Cost
Vibration nuisance to neighboring properties	Selection of construction techniques and machinery to minimize ground disturbance.	construction techniques	Once in a week during construction	Contractor	ESMU	Part of Construction Cost
Nuisance to neighboring properties if drains get clogged due to soil.	<p>Proper stacking and disposal of excavated soil.</p> <p>Complete restriction of construction work during rainy season in highly populated areas.</p>	construction techniques	Once in a week during construction	Contractor	ESMU	Part of Construction Cost

Silt run off from construction activities	Protection of unstable soil surface from high velocity runoff with interception drains and stabilization; proper siting and protection of construction materials; construction wastes disposal practice, etc.	Implementation of Construction Site Management Plan	Once in a week during construction	Contractor	ESMU	Part of Construction Cost
Nuisance from vehicles, plants and equipment	<p>The vehicles, plants and machineries used for construction shall comply with the statutory norms with regard to noise and emission levels.</p> <p>Noisy construction works will be carried out only during daytime (between 0600 hours to 2200 hours). All vehicles and equipment used in construction shall be fitted with exhaust silencers. During routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to be defective shall be replaced. Monitoring of sound levels at construction sites will be done once in three months at locations finalized by environment staff of ESMU.</p> <p>Develop and implement Construction Site Management Plan covering the above.</p>	Monitoring of sound levels at construction site	Once in a Month	Contractor	ESMU	Part of Construction Cost

Impact from work in flood prone areas	Precautions shall be taken to avoid blocking of drainage path by construction activities. Avoid storing materials, chemicals and other items of work in areas where those can be washed away by the floods.	Stocking of materials and construction activities	Once in a week	Contractor	ESMU	Part of Construction Cost
Air Pollution - Loose dust might blow in the area causing dusty conditions.	Damping of dust by sprinkling of water within the work area and stack the loose soil and contain it with covers if required. Dust curtains at work sites near sensitive receptors may be installed if unsafe for residents in the vicinity.	Soil stacking locations, access roads, substation site, national ambient air quality standards of 2009.	Each day – twice a day or more as per site conditions Testing of air quality parameters once in a quarter at sites where construction activities are on-going.	Contractor	ESMU	Part of Construction Cost

Impact on water environment	<p>Adopt water and energy saving construction practices and conduct training of construction workers to minimize the discharge of wastewater and solid waste.</p> <p>Ensure that pollution of natural watercourses, ponds, tanks and reservoirs is avoided. Prevent the wastewater produced in construction from entering directly into streams, water bodies or the irrigation systems.</p> <p>Labor camps (temporary or permanent in nature) if any shall not be located within 200m from waterways, within any environmentally sensitive or protected areas or near to sites of religious, cultural or archaeological importance.</p> <p>Labour camps if any shall be provided withadequate and appropriate facilities for water supply, sanitation, disposal of sewerage and solid waste, health and safety in line with statutory requirements and good labor management practices.</p> <p>Oil and fuel spills from construction equipment will be minimized by good O&M practices. Vehicles /machinery and equipment serving and maintenance work shall be carried out. All vehicles and machinery will comply with emission norms stipulated by the regulatory agencies.</p>	Construction site	Once in a week	Contractor	ESMU	Part of Construction Cost
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Public and worker safety - Injury and sickness of workers and members of the public	<p>Comply with requirements for the safety of the workmen (safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe movement) as per the existing national /state /local regulations.</p> <p>All workers shall be insured in accordance with statutory provisions.</p> <p>Contract provisions specifying minimum setback requirements for construction camps from water bodies, reserved areas etc.</p> <p>Contractor to prepare and implement a health and safety plan and health and safety awareness and training programs. This plan will be approved by ESMU.</p> <p>Contractor to prepare Emergency Response Plan. Availability of ambulance or medical facility at work site both for workers and public should be kept by contractor.</p> <p>Supply all necessary safety appliances such as safety goggles, helmets, masks, shoes, belts, ropes, gloves, rescue kits, etc. to the workers and staff.</p> <p>Adequate precautions will be taken to prevent danger of electrocuting from electrical equipment and power supply lines including distribution boards, transformers, etc.</p> <p>Contractors will make available stretcher, splinters, and an ambulance at the worksite where the works are being carried out at heights at existing transmission towers to respond to any emergency. Further the contractor shall ensure that a registered</p>	<p>Implementation of health and safety measures.</p> <p>Contract clauses (number of incidents and total lost-work days caused by injuries and sickness)</p>	Once in a week	Contractor	ESMU	Part of Construction Cost
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	<p>Measures such as danger signboards, danger /red lights, fencing and lights will be provided to protect the public and workers.</p> <p>All electric power driven machines to be used in the construction shall be free from defect, beproperly maintained and kept in good working order</p>					
<p>Provision of facilities for construction workers - Contamination of receptors (land, water, air)</p>	<p>Construction workforce facilities to include proper sanitation, water supply and waste disposal facilities.</p> <p>Adequate insurance cover and enrollment to state basedlabor welfare schemes.</p>	Amenities for Workforce facilities	Once in a week	Contractor	ESMU	Part of Construction Cost
Borrowing of earth	Collect the required materials from approved borrow area having all valid statutory clearances. After completion of works, the borrow area shall be redeveloped as per the agreements.	Statutory approvals for borrow areas	Once before starting construction	Contractor	ESMU	Part of Construction Cost
Maintain existing roads for accessibility - increase in airborne dust particles and increased land requirement for temporary accessibility	<p>Existing roads and tracks used for construction and maintenance access to the site wherever possible.</p> <p>Restoration of road is must after completion of the works.</p>	<p>Planning diversion in traffic for access roads, routes (length and width)</p> <p>Road Repair</p>	Once in a week	Contractor	ESMU	Part of Construction Cost

Loss of vegetation and deforestation due wood/vegetation harvesting by workers	Construction workers shall be prohibited from harvesting wood in the project area during their employment, (apart from locally employed staff continuing current legal activities).	Complaints by local people or other evidence of illegal harvesting	Once in a Month	Contractor	ESMU	Part of Construction Cost
C. Operation stage						
Maintenance of transmission /distribution lines and substations - Exposure to electromagnetic interference and Leakage of SF ₆	Substation design and transmission/distribution line cables to comply with the design induced voltage Functioning of SF ₆ leakage alarm panels and instrumentation in GIS substation	Voltage measurement, and instrumentation	As per Technical Specifications			
Noise generation - Nuisance to the community around the site	Provision of noise barriers	Noise levels	Once in a Month	BSPTCL	BSPTCL	Part of O &M cost
Oil spillage - Contamination of land/nearby water bodies	Sub-station transformers to be located within secure and impervious bunded areas with a storage capacity of at least 100% of the capacity of oil in transformers and associated reserve tanks. Oil traps will be provided to reclaim the oil from the storm water drains and from the bunded areas.	Substation bounding ("as-built" diagrams) Bounding capacity and permeability	Once in a month	BSPTCL	BSPTCL	Part of O &M cost
Staff/workers	Adequate precautions to prevent danger of	Health and	Once in month	BSPTCL	BSPTCL	Part of O &

health and safety during operations	<p>electrocuting from electrical equipment and power supply lines including distribution boards, transformers, etc. shall be provided, and periodically inspected for their functioning.</p> <p>Measures such as danger signboards, danger /red lights, fencing and lights will be provided to protect the staff and workers.</p> <p>All workers employed in hazardous activities shall be provided with necessary protective gears and equipment.</p> <p>At every workplace, first aid kit shall be readily available including an adequate supply of sterilized dressing materials, medicines and appliances in accordance with the regulations. The worksites shall also be provided with appropriate and adequate fire protection measures.</p> <p>All workers and staff will be given training/awareness programs on safety measures to be followed during the operation and maintenance of the system.</p>	safety practices				M cost
Management of Waste Generated	<p>The transformer that is replaced will not be wasted but will be removed and transferred to at another BSPTCL facility where it will be reconditioned, stored and eventually transferred to another GSS to be reused. If there is any possibility replaced equipment i.e. transformers, capacitors, conductors, meters, batteries, transformer oil and other electrical equipment to be collected and disposed of through registered recycling/reprocessing units or handed over to the manufacturers/dealers as per the provisions of the Hazardous Waste(Management and Handling) Rules 1989 and the Batteries (Management and Handling)</p>	Disposal of wastes	Once in a month	BSPTCL	BSPTCL	Part of O & M cost
Electric shock	Security fences around sub-stations	Report on	Once in two	BSPTCL	BSPTCL	Part of O &

hazards	Barriers to prevent climbing on/dismantling of towers Appropriate warning signs on facilities Electricity safety awareness raising in project areas	training and accident Proper maintenance of fences and sign boards Number of programmes and percent of staff /workers covered	weeks			M cost
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Table 13. Environmental Monitoring Plan

Project stage	Indicators	Location	Frequency	Responsibility
Preconstruction	Minimization of vegetation loss by best alignment	Sub-station and transmission sites	One-off before design approval	ESMU/PMU
	Inclusion of EMP matrix in tender documentation	Sub-station and transmission sites	One off before finalization of contract	ESMU/PMU
	Carrying out testing of environmental parameters	Sub-station and transmission sites	One prior to commencement of construction	Contractor
Construction stage	Preparation of construction management plan	Sub-station and transmission sites	One-off before start of construction	ESMU/PMU
	Implementation of mitigation measures	Sub-station and transmission sites	During Construction	ESMU/PMU
	Carrying out testing of environmental parameters	Sub-station and transmission sites	Once in a quarter during Construction	Contractor

Operation BSEB and maintenance	Implementation of Operation manuals and training to workers and staff	Sub-station and transmission sites	Once in three months	BSPTCL
	Disposal of wastes	Sub-station site	Once in six month	BSPTCL

The budget for carrying out testing of environmental parameters at 7 sub-stations (28 sets of ambient air and noise levels and water quality as applicable @ Indian Rupees 20000 per set), and carrying out environmental mitigation measures (such as training of agency staff, tree cutting and replantation carried out by other government agencies, travel of agency's environment staff for field inspections, etc.), that are not a part of contract cost is estimated at \$ 200,000.

Performance Indicators

The reports will table all indicators measured with the monitoring plan of EMP including performance monitoring indicators Table 22 below.

Table 14. Performance Monitoring Indicators for Project

No.	Major Environmental Component	Key Indicator	Performance Objective	Data Source
Pre-construction Phase				
1	Public Consultation and Disclosure	Affected public and stakeholders	Meetings with public stakeholders contacted during IEE, introduce grievance mechanism	Minutes of meeting, and participants list
2	Bid Documents	Incorporation of requirements of EMP ¹	EMP appended to bidding documents with clear instructions to bidders for EMP	Bid documents
3	Air, Noise, Water, Soil Quality baseline development	Requirements of EMoP	Develop baseline for the project and then review periodically against the baseline	Test reports by an accredited laboratory hired by EA for the tenure of project
Construction Phase				
1	Affected water quality	TSS, oil and grease, BOD, TDS, TP, TN,	CPCB environmental standards and criteria met	Monitoring by PMU
2	Air quality	dust, CO, NOx, SOx, noise	CPCB standards and levels never exceed pre-construction baseline levels	PIU and contractor monitoring reports

¹ EMP in attached to the contractor bidding document

3	Soil quality	Solid and liquid waste	Collection and storage all waste from construction camps and sites as per waste management rules.	PIU and contractor monitoring reports
4	Hazardous materials and waste	Oil, gasoline, grease	Program of procedures to manage and store all waste from construction camps and sites practiced.	PIU and contractor monitoring reports
5	Public and worker safety	Frequency of injuries	Adherence to GOI Health and Safety regulations ²	Contractor reports

EMP: Environment Management Plan, EMOP: Environment Monitoring Plan

5.0 Conclusions and Recommendations

70. The proposed subprojects are well within the existing GSS"s and the ROW of transmission lines. Therefore no additional encroachment, landscape or impacts associated with physical disfiguration of the urban cityscape or rural landscape are expected from construction. The transformer that is replaced will not be wasted but will be removed and transferred to at another BSPTCL facility where it will be reconditioned, stored and eventually transferred to another GSS to be reused. There is no foreseeable significant disturbance outside the substations and the ROW of transmission lines, and construction related generation of debris and associated waste disposal should not be a significant consideration if routine environmental management procedures and engineering controls are implemented thoroughly.

71. None of the proposed sub-projects under the scope of this IEE are located within or near to or passing through any environmentally and ecologically sensitive protected areas (such as national parks, sanctuaries, bio-reserves, reserved forests) or monuments of historical /archeological importance protected under the law. None of the subprojects are expected to cause significant adverse environmental impacts during construction and also during operation. However, vegetation and land clearing within the substation sites and within ROW of transmission lines may be required which can be easily mitigated by proper planning, consultation, and best practices in construction engineering. The mitigation measures are included in the environmental management plan and environmental parameters for monitoring have been identified in the environmental monitoring plan.

72. Initial consultations with local public were done during field visits while this IEE report was being prepared. The draft IEE report including the proposed environmental management and monitoring plan in local language was made available to local public for their information and additional inputs, if any. The consultations with project stakeholders in varying degrees will continue throughout the life of the project. A grievance redress mechanism will be in place prior to commencement of works to properly address complaints and issues that may arise during implementation.

² IFC World Bank EHS (2007)-under revision

73. This IEE will be publicly disclosed at the ADB website as required by SPS 2009 and Public Communications Policy 2011. The IEE shall also be prepared in local language and made available to the public at the PMU-field offices, Gram Panchayat offices, or the place where it can be easily accessible. The reliability and stability of power supply resulting from the project is expected to improve the quality of life and the pace of economic development in the State of Bihar.

Appendix 1- List of Acts, Rules and Notifications

No.	Act/Rule/Notification	Brief	Last Amd.	Trigger	Weblink for updates	Sec. Head
1.	Environmental Impact Assessment Notification, 2006	The Notification imposes restrictions and prohibitions on new projects or activities and also on the expansion or modernization of existing projects or activities based on their potential environmental impacts.	2009	All projects/activities being conceptualized, developed, implemented or funded should take cognizance of the Schedule of Activities requiring Environmental Clearance under this Notification and if applicable, required clearances from MoEF / State Environmental Impact Assessment Authority should be taken	http://moef.nic.in/mo- dules/rules-and- regulations/envirom ent-protction/	Environ ment
2.	The Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008	It provides for regulation and control of indiscriminate disposal of Hazardous waste; and its sound management to reduce risks to environmental and human health	2010	All activities being implemented, operational and/or funded that deal with generation/ handling/storage/processing of hazardous waste should take cognizance of the provisions/schedules of these Rules and obtain authorization from the prescribed Authority/State Pollution Control Board/ Committee	http://www.moef.nic.i n/legis/hsm.htm	Environ ment
3	The Noise Pollution (Regulation and Control) Rules, 2000	It provides for regulations to control ambient noise levels in public places from sources such as industries/construction works/community events, etc.	2010	All projects/activities/ being constructed, operational and/or funded that deal with sound emitting equipments while operational or during construction should take cognizance of the provisions/standards of these Rules and ensure compliance	http://moef.nic.in/mo- dules/rules-and- regulations/envirom ent-protction/	Environ ment
4	The Ozone Depleting Substances (Regulation & Control) Rules, 2000	It provides for regulatory measures so as to ensure progressive phasing out of domestic production and imports of ozone depleting Substances	2000	All activities being implemented, operational and/or funded that involve the use/ processing/ imports/ exports of Ozone depleting substances should take cognizance and comply with the provisions/schedules of these Rules	http://moef.nic.in/mo- dules/rules-and- regulations/envirom ent-protction/	Environ ment
5	The Batteries (Management & Handling) Rules, 2001	It provides for regulations towards proper management & handling of Lead Acid Batteries so as to avoid, mitigate, minimize adverse impact on environment and human health	2001	All activities being implemented/ operational and/or funded that involve the manufacture, handling, purchase and use of batteries should take cognizance of the provisions and comply with the provisions of these Rules	http://www.moef.nic.i n/legis/hsm.htm	Environ ment
6	Central Ground Water	It provides for regulation and control	2010	All projects being developed, implemented or	http://www.cgwb.gov	Environ

No.	Act/Rule/Notification	Brief	Last Amd.	Trigger	Weblink for updates	Sec. Head
	Authority, Notification, 1997	of ground water development and management.		funded that are dependent on Ground water as a source of water, should take cognizance of the provisions of this Notification/Guidelines and require to obtain permission from the Central Ground Water Board/Regional Office/Prescribed Authority	.in/gwregulation.html	ment
7	Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996	It regulates the employment and conditions of service of building and other construction workers and provides for their safety, health and welfare	1996	All projects/activities being implemented and/or funded where cost of construction is more than Rs. 10 lakhs should take cognizance of the provisions of this Act, register establishments and provide for the construction workers in accordance with this Act	http://labour.nic.in/clc/welcome.html#leg	Health & Safety
8	Building and Other Construction Workers Welfare Cess Act, 1996 and Rules, 1998	An Act to provide for the levy and collection of a cess on the cost of construction incurred by employers.	1998	All projects/activities being implemented and/or funded where cost of construction is more than Rs. 10 lakhs should take cognizance and comply with the provisions of this Act and pay cess accordingly		Health & Safety
9	Workmen Compensation Act, 1923	It provides for payment of compensation by employers to their employees for injury by accident i.e. personal injury or occupational disease	2009	All projects/activities that are operational and/or funded that employ workmen for activities that are hazardous and have health and safety risks should take cognizance of this Act and ensure due compensation to employees in case of any injury	http://labour.nic.in/ss/Notification.html	Health & Safety
10	The Child Labour (Prohibition & Regulation) Act, 1986	It prohibits employment of children in certain specified hazardous occupations and processes and regulates the working conditions in others.	1986	All project/activities that are being implemented, operational and/or funded should refrain from employment of children. In case employed should take cognizance and comply with the provisions of this Act.	http://labour.nic.in/cwl/ChildLabour.htm	Health & Safety
11	Indian Electricity Rules, 1956	It provides for regulating the supply, transmission, generation, and use of electricity which includes precautionary measures to be adopted in construction, installation and maintenance of transmission, distribution, generation and use of electricity.	2000	All projects/ activities establishments being developed, implemented, operational and/or funded that deal with generation, transformation, transmission, conversion, distribution or use of energy should take cognizance and comply with the provisions of these Rules and obtain required authorization	http://powermin.nic.in/acts_notification/electricity_act2003/primary.htm	Health & Safety

No.	Act/Rule/Notification	Brief	Last Amd.	Trigger	Weblink for updates	Sec. Head
12	The Biodiversity Act, 2002	In order to help in realizing the objectives of CBD, India has enacted	2002	It recognizes the sovereign rights of States to use their own Biological Resources.	http://www.envfor.nic.in/divisions/csurv/nba act.htm	Environment

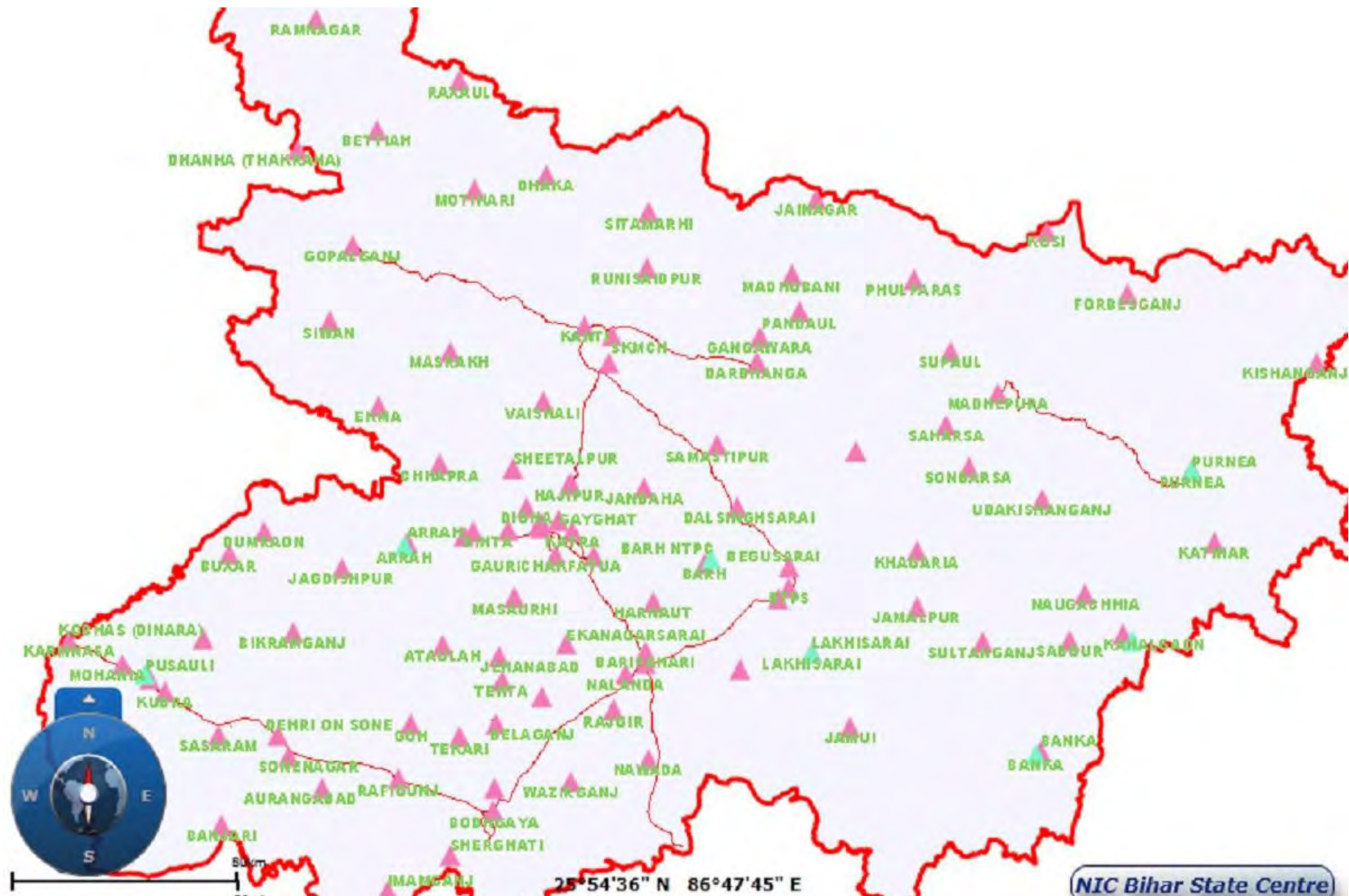
	an umbrella legislation called the biological Diversity Act 2002(No.18 of 2003) aimed at conservation of biological resources and associated knowledge as well as facilitating access to them in a sustainable		
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Fig.1 Bihar District Map



Combined map of 132 KV & 220 KV existing transmission line with GSS
(Blue line shows 132 KV transmission line and triangle symbol shows GSS)

Fig - 3



Photos of line crosses the different rivers in the proposed work

(1) 132 KV Forbesganj- Kataiya (Kosi) crosses the Koshi river- (fig no.-4)



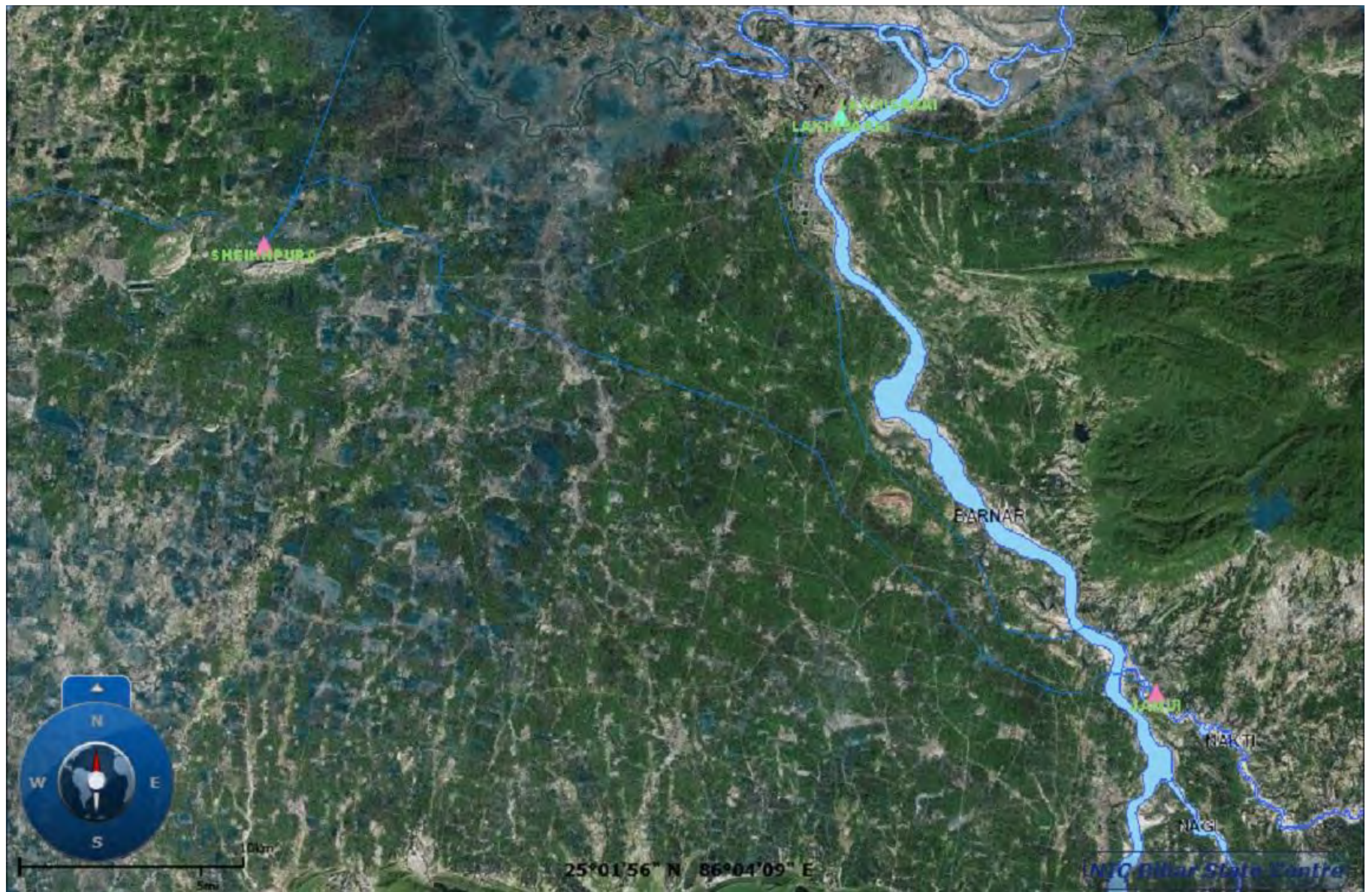
(2) 132 KV Lakhisarai- Jamalpur line crosses the Kuil river- (fig no.-5)



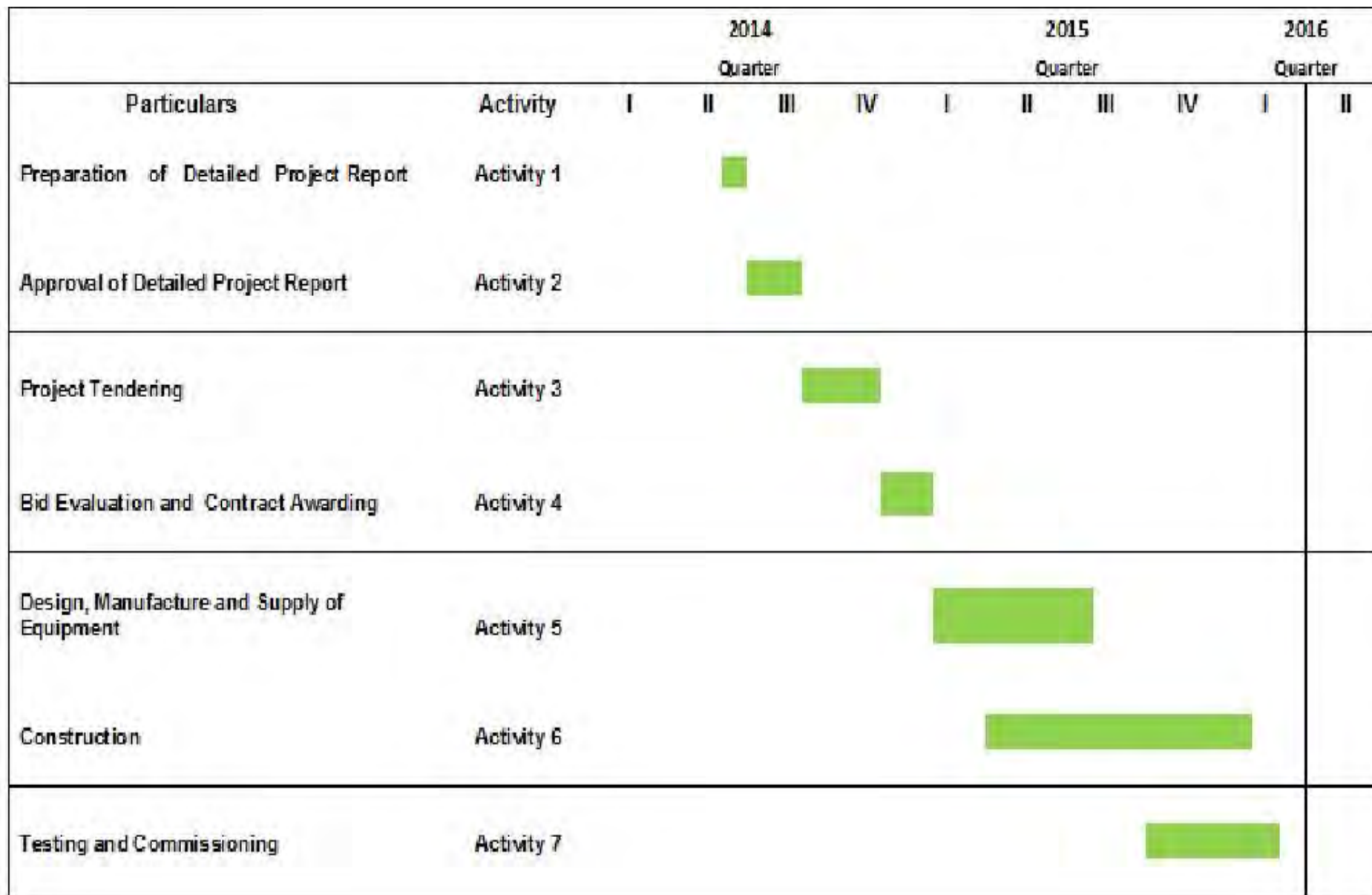
(3) 132 KV Samastipur-Hajipur-ShitalpurLilo point- Chapra crosses the Gandak river-(fig no.-6)



(4) 132 KV Jamui-Shekhpora line crosses the Kuil river-(fig no.- 7)



**Bar chart depicting activities for Project Implementation of reconductoring of 220 & 132 KV Transmission line-(fig no.-
8)**



Bar chart depicting activities for Project Implementation of Augmentation of Existing GSS- (fig no.- 9)

PROPOSED PROJECT IMPLEMENTATION SCHEDULE FOR UNUTILIZED 40 MILLION APPROX USD

Particulars	Activity	2013-14 Quarter				2014-15 Quarter				2015-16 Quarter				2016-17 Quarter			
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Preparation of Detailed Project Report	Activity 1	■															
Approval of Detailed Project Report	Activity 2	■	■														
Project Processing	Activity 3		■														
Pretendering	Activity 4		■														
Tendering and Contract Awarding	Activity 5		■	■													
Manufacture and Delivery of Equipments	Activity 6				■	■	■	■	■	■	■	■	■	■	■	■	■
Construction and Commissioning	Activity 7					■	■	■	■	■	■	■	■	■	■	■	■
Completion Report	Activity 8											■	■				

BIHAR STATE POLLUTION CONTROL BOARD, PATNA

AMBIENT AIR QUALITY DATA FOR THE YEAR 2012 - 2013

Location:- At Gandhi Maidan – Patna

Month	SULPHUR DIOXIDE				NITROGEN OXIDE				S.P.M.				R.S.P.M.			
	MIN.	MAX.	MEAN	N	MIN.	MAX.	MEAN	N	MIN.	MAX.	MEAN	N	MIN.	MAX.	MEAN	N
April'12	6.2	13.1	9.3	6	37.3	168.4	103.6	6	597	1231	863	3	195	365	264	3
May'12	4.5	68.5	15.7	66	14.2	165.7	48.3	66	163	2199	905	33	88	632	274	33
June'12	4.5	28.3	10.1	72	10.3	97.7	38	72	242	1668	697	36	80	438	200	36
July'12	4.5	21.8	9.1	68	9.3	263.4	36.9	68	100	825	359	36	57	329	118	36
Aug'12	4.5	50	12	75	9.6	75.3	28.4	75	121	611	303	37	29	221	101	37
Sept'12	4.6	20.9	9.4	44	9.8	145.1	35.9	71	69	1111	335	36	31	332	111	36
Oct'12	Chemical not available				17.6	115.3	46.1	60	127	2832	628	30	50	1248	227	30
Nov'12	4.6	52.6	19.1	20	10.6	102.2	50.1	36	132	1190	744	24	86	416	298	24
Dec'12	4.8	24	10.4	58	21.3	157.4	65.8	59	253	1923	669	30	173	558	324	30
Jan'13	4.5	24.9	9.5	60	9.7	130.8	47.3	60	291	1289	624	30	161	647	322	30
Feb'13	8	29.5	13.5	6	38.6	118.2	81.6	6	443	761	544	4	189	359	256	4
Mar'13	4.5	57.3	12.6	45	23	146	56.2	45	508	1442	897	23	193	579	300	23
Annual	4.5	68.5	11.9	520	9.3	263.4	53.2	624	69	2832	630.7	322	29	1248	232.9	322
<div> <div>STANDARDS FOR INDUSTRIAL, RESIDENTIAL, RURAL & OTHER AREAS (ANNUAL AVERAGE) After 18.11.2009 (note Notification No.-217 dt.18.11.2009)</div> <div>50</div> <div>40</div> <div>140</div> <div>60</div> </div>																

Note: Units are in $\mu\text{g}/\text{m}^3$; N – number of observations.

BIHAR STATE POLLUTION CONTROL BOARD, PATNA

AMBIENT AIR QUALITY DATA FOR THE YEAR 2013 - 2014

Location:- At Gandhi Maidan - Patna

Month	SULPHUR DIOXIDE				NITROGEN OXIDE				S.P.M.				R.S.P.M.			
	MIN.	MAX.	MEAN	N	MIN.	MAX.	MEAN	N	MIN.	MAX.	MEAN	N	MIN.	MAX.	MEAN	N
April'13*																
May'13	4.5	73.5	11.9	67	9.4	147.8	33.6	67	173	2161	628	34	56	510	142	34
June'13	4.6	16.9	7.1	60	9.1	166.9	27.8	60	96	809	321	30	25	206	96	30
July'13	4.5	11.3	5.8	77	10.8	72.8	31.6	77	77	1418	381	39	45	235	94	39
Aug.'13	4.5	13.9	5.5	74	9.1	45.1	23.3	76	74	732	329	38	45	167	89	38
Sept.'13	4.5	26.7	6.7	68	9.3	75.5	33.2	68	55	790	434	33	32	280	135	33
Oct.'13	4.5	46.5	0.7	76	14.6	82.1	34.7	76	76	1145	389	38	29	376	123	38
Nov.'13	4.5	35.9	1.3	60	9.5	68.3	24.7	60	107	1590	901	30	170	648	358	30
Dec.'13	4.5	28.1	9.1	70	11.7	135	54.6	70	171	2001	805	36	80	556	323	33
Jan.'14	4.3	8.6	5.6	60	28.6	54.2	40.9	6	126	954	494	30	86	421	207	30
Feb.'14	4.6	41.5	4.5	58	Sulphanilamide not available				228	1392	803	27	60	426	208	27
Mar.'14	4.5	24.4	0.5	66	Sulphanilamide not available				336	2172	1125	32	80	473	272	32
Annual	4.3	73.5	9.1	736	9.1	166.9	33.8	560	55	2172	600.9	367	25	648	186.1	364
STANDARD LIMITS FOR SULPHUR DIOXIDE, NITROGEN DIOXIDE & OTHER GASES				50	40				*****				60			

Note Units are in $\mu\text{g}/\text{m}^3$, N - number of observations. * RDS out-of-order

Note : Oct. & Nov 2010 Data not available due to RJS was out of order.

BIHAR STATE POLLUTION CONTROL BOARD, PATNA

AMBIENT AIR QUALITY DATA FOR THE YEAR 2011-2012

Location:- At Beltron Bhawan - Patna

Month	SULPHUR DIOXIDE			NITROGEN OXIDE			SUSPENDED PARTICULATE			R.S.P.M.		
	MIN.	MAX.	MEAN	N	MIN.	MAX.	MEAN	N	MIN.	MAX.	MEAN	N
April'11												
May'11												
June'11	4.7	11	6.7	63	7.1	52.3	17.1	63	58	497	206.6	33
July'11	4.7	8.9	5.9	57	9.7	48.3	16.9	57	44.1	227.7	129.1	31
Aug.'11	4.5	12.1	6	34	9.6	44.4	18.4	34	44.8	204.8	119.3	20
Sept.'11	4.6	8.3	5.7	53	9.3	65.6	16.6	53	25	253	100.7	33
Oct.'11	4.8	12.3	6.3	48	11.1	72.3	24.7	48	84.6	601	208.3	24
Nov.'11	4.5	9.6	5.6	66	13.8	103	36.5	66	182.8	655.6	355	33
Dec.'11	4.5	19.5	7.4	73	12.9	110.4	38.7	73	155.1	1468.6	368.5	37
Jan.'12	4.5	5.6	4.9	41	9.8	63.9	19.7	41	159.6	563.7	299	26
Feb.'12	4.5	9.1	5.8	60	18.1	135.3	57.2	60	123.3	899	389.1	35
Mar.'12	4.5	12.4	6.1	71	8.1	119	35.1	71	109.2	889.8	410.9	35
Annual	4.5	19.5	6.0	566	7.1	135.3	28.1	566	25	1468.6	258.7	307
STANDARDS FOR INDUSTRIAL, RESIDENTIAL, RURAL & OTHER AREAS (ANNUAL AVERAGE) After 18.11.2009 (vide Notification No-217 dt. 18.11.2009)	50			40			140			60		

Note: Units are in $\mu\text{g}/\text{m}^3$; N – number of observations.

Note : April & May 2011 Data not available due to unavailability of Filter Paper.

BIHAR STATE POLLUTION CONTROL BOARD, PATNA

AMBIENT AIR QUALITY DATA FOR THE YEAR 2012-2013

Location:- At Beltron Bhawan – Patna

Month	SULPHUR DIOXIDE				NITROGEN OXIDE				SUSPENDED PARTICULATE				R.S.P.M.			
	MIN.	MAX.	MEAN	N	MIN.	MAX.	MEAN	N	MIN.	MAX.	MEAN	N	MIN.	MAX.	MEAN	N
April'12	4.5	8.1	5.5	60	10.9	77.7	28.8	60	135	116	404	30	64	234	131	30
May'12	4.5	18.9	6.8	65	9.8	99.8	25.5	65	89	941	523	36	27	272	151	36
June'12	4.7	11.6	6.6	68	9.6	69	18.4	68	146	1245	532	34	67	334	167	34
July'12	4.5	8.7	6	51	9.5	42	15.5	51	66	414	177	28	22	180	84	28
Aug.'12	4.5	9.8	5.3	64	9.5	34.8	16	64	40	174	85	33	21	220	51	33
Sept.'12	Chemical not available				9.6	48.9	21.4	72	25	195	91	36	11	133	46.6	36
Oct.'12	Chemical not available				905	49.6	18.4	72	55	311	152	36	9	192	84.5	36
Nov.'12	4.5	20.2	7.7	48	12.3	58.6	29.4	48	124	407	285	35	27	349	178	35
Dec.'12	4.5	15.8	7	75	12.1	71.4	29.8	75	68	573	314	39	121	481	224	39
Jan.'13	4.5	14.3	7.1	70	9.8	83.8	31.9	70	129	552	388	35	108	504	269	35
Feb.'13	4.6	10.9	5.9	12	22.1	115	59	12	313	511	429	6	235	328	279	6
Mar.'13	4.5	50.6	8.3	58	8.3	85	30.2	58	159	1196	399	29	60	334	165	29
Annual	4.5	50.6	6.6	571	8.3	115	27.0	715	25	1245	314.9	377	9	504	152.5	377
STANDARDS FOR INDUSTRIAL, RESIDENTIAL, RURAL & OTHER AREAS (ANNUAL AVERAGE) As per E.I.I. 2009 (vide Notification No-217 dt. 18.1.2009)				50	40				140				60			

Note: Units are in $\mu\text{g}/\text{m}^3$; N – number of observations.

BIHAR STATE POLLUTION CONTROL BOARD, PATNA

AMBIENT AIR QUALITY DATA FOR THE YEAR 2013-2014

Location:- At Beltror Biawan – Patna

Month	SULPHUR DIOXIDE			NITROGEN OXIDE			SUSPENDED PARTICULATE			R.S.P.M.		
	MIN.	MAX.	MEAN	N	MIN.	MAX.	MEAN	N	MIN.	MAX.	MEAN	N
April'13	4.5	9.7	5.3	71	6.6	17.5	20.5	71	129	1493	393	36
May'13	4.5	21.8	6.7	70	9	138.8	19.7	70	85	809	316	35
June'13	4.5	15.6	6.8	63	9.1	15.5	13	63	42	709	172	32
July'13	4.5	24.6	7.7	76	9.1	14.4	12.8	76	32	216	111	42
Aug'13	4.5	152.	6.9	58	9.1	11.8	15.8	58	16	146	76	30
Sept'13	4.5	31.3	6.6	66	9	12.8	13.3	66	39	286	129	34
Oct'13	4.5	26	9.6	54	9.3	14.4	18.2	54	45	252	117	27
Nov'13	4.6	11.4	7.2	52	9.6	10.7	25.1	52	147	734	319	26
Dec'13	4.5	22.5	7.6	72	9.1	16.6	28.4	72	185	1027	394	36
Jan'14	4.5	15	7.4	66	10.3	15.4	22.1	12	108	652	257	33
Feb'14												
Mar'14												
Annual	4.5	31.3	7.2	643	6.5	108.8	18.9	594	16	1493	228.4	331
STANDARDS FOR INDUSTRIAL, RESIDENTIAL, RURAL & OTHER AREAS (ANNUAL AVERAGE) After 18.11.2009 vide Notification No.217 dt.18.11.2009				50	40			*****			60	

Note: Units are in $\mu\text{g}/\text{m}^3$; N – number of observations.



BIHAR STATE POLLUTION CONTROL BOARD
BELTRON BHAWAN, SHASTRI NAGAR, PATNA- 800 023.

AMBIENT NOISE MONITORING REPORT

Location : Beltron Bhawan Sashtri Nagar, Month : May 2014

Date	Average Noise Level Leq, dB	
	Day	Night
	6:00 AM to 10:00 PM	10:00PM to 6:00 AM
1-May-14	56.5	62.8
2-May-14	59.2	55
3-May-14	57.7	56.9
4-May-14	56.6	53.5
5-May-14	59.5	53.9
6-May-14	59.2	57
7-May-14	64.8	55.6
8-May-14	58	54.8
9-May-14	58	59.9
10-May-14	56.1	53.2
11-May-14	57.5	53.5
12-May-14	56.7	54.5
13-May-14	57.9	53.6
14-May-14	55.6	55.6
15-May-14	58.7	56.6
16-May-14	58.1	56.6
17-May-14	55.7	58.8
18-May-14	54.4	55.8
19-May-14	58	58.8
20-May-14	58.2	54.3
21-May-14	58.7	58
22-May-14	69.7	53.1
23-May-14	78.6	62.4
24-May-14	59	54.1
25-May-14	57.5	54.9
26-May-14	59.7	56.1
27-May-14	61.1	60
28-May-14	60.4	56.5
29-May-14	63.3	56.6
30-May-14	60.5	56
31-May-14	58.5	57.9
Category Residential	Limit in dB	
	Day	Night
	55	45



BIHAR STATE POLLUTION CONTROL BOARD
BELTRON BHAWAN, SHASTRI NAGAR, PATNA- 800 023.

AMBIENT NOISE MONITORING REPORT

Location : Hindustan Coca Cola, Month : May 2014

Date	Average Noise Level Leq, dB	
	Day	Night
	6:00 AM to 10:00 PM	10:00PM to 6:00 AM
1-May-14	64.8	70.7
2-May-14	71.3	71.4
3-May-14	71	72.4
4-May-14	69.9	70.6
5-May-14	71.6	71.2
6-May-14	71.3	71
7-May-14	70.5	73.6
8-May-14	71.5	71.3
9-May-14	71.1	70.5
10-May-14	72.1	71.2
11-May-14	70.6	71
12-May-14	71.5	71.7
13-May-14	71.3	78.6
14-May-14	71.4	72.1
15-May-14	71.4	70.8
16-May-14	71.2	71.1
17-May-14	73.7	82.7
18-May-14	71.1	71.8
19-May-14	71	66.8
20-May-14	71.1	71.3
21-May-14	71.2	71
22-May-14	71.4	71.4
23-May-14	71.5	71.9
24-May-14	71.5	69.8
25-May-14	71.1	72.7
26-May-14	72.2	72.8
27-May-14	72.6	72.1
28-May-14	73.1	70.9
29-May-14	72.2	70.3
30-May-14	72.7	70.8
31-May-14	72.1	69.3
Category Industrial	Limit in dB	
	Day	Night
	75	70



BIHAR STATE POLLUTION CONTROL BOARD
BELTRON BHAWAN, SHASTRI NAGAR, PATNA- 800 023.

AMBIENT NOISE MONITORING REPORT

Location : IGSC Planetarium, Month : May 2014

Date	Average Noise Level Leq, dB	
	Day	Night
	6:00 AM to 10:00 PM	10:00PM to 6:00 AM
1-May-14	..	73.5
2-May-14	75.3	67.8
3-May-14	74.3	67.7
4-May-14	73.3	67.3
5-May-14	74	67.5
6-May-14	74.2	69.1
7-May-14	73.4	66.5
8-May-14	72.9	67.1
9-May-14	73.2	66.1
10-May-14	72.6	66
11-May-14	70.9	..
12-May-14	74.7	..
13-May-14	73.8	66.8
14-May-14	73.3	67.7
15-May-14	73.9	67.6
16-May-14	72.2	66.8
17-May-14	73.6	66.8
18-May-14	72.9	67.8
19-May-14	73.7	67.4
20-May-14	73.7	66.9
21-May-14	73.9	67
22-May-14	74.1	67
23-May-14	73.2	67.4
24-May-14	74.6	78
25-May-14	72.2	..
26-May-14	75.2	67.2
27-May-14	74.5	66
28-May-14	74.6	67.2
29-May-14	74.7	68
30-May-14	74.2	67.2
31-May-14	74.6	67.3
Category Commercial	Limit in dB	
	Day	Night
	65	55



BIHAR STATE POLLUTION CONTROL BOARD
BELTRON BHAWAN, SHASTRI NAGAR, PATNA- 800 023.

AMBIENT NOISE MONITORING REPORT

Location : Patna Jun. Golamber, Month : May 2014

Date	Average Noise Level Leq, dB	
	Day 6:00 AM to 10:00 PM	Night 10:00PM to 6:00 AM
1-May-14	78.9	79
2-May-14	77.7	79.6
3-May-14	79.6	79.8
4-May-14	78.9	81.1
5-May-14	79.8	81.3
6-May-14	79.4	78.9
7-May-14	79.1	76.1
8-May-14	81.3	80.9
9-May-14	79.7	76.4
10-May-14	79.1	76.9
11-May-14	78.1	74.5
12-May-14	77.8	75.2
13-May-14	80.6	76.5
14-May-14	79.1	76.8
15-May-14	79.2	76.8
16-May-14	78.4	75.9
17-May-14	80.4	77.9
18-May-14	79.9	77.7
19-May-14	78.9	76.5
20-May-14	80.1	77
21-May-14	79	76.4
22-May-14	79.8	77.4
23-May-14	78.7	79.2
24-May-14	79.4	77.7
25-May-14	79.4	77.6
26-May-14	80.4	76.8
27-May-14	81.4	77.7
28-May-14	80.5	76.6
29-May-14	80.5	76.9
30-May-14	79.3	77.4
31-May-14	81.2	77.6
Category	Limit in dB	
	Day	Night
	65	55



BIHAR STATE POLLUTION CONTROL BOARD
BELTRON BHAWAN, SHASTRI NAGAR, PATNA- 800 023.

AMBIENT NOISE MONITORING REPORT

Location : Beltron Bhawan Sashtri Nagar, Month : June 2014

Date	Average Noise Level Leq, dB	
	Day	Night
	6:00 AM to 10:00 PM	10:00PM to 6:00 AM
1-Jun-14	56.5	62.2
2-Jun-14	58.4	56
3-Jun-14	60.3	56.2
4-Jun-14	58	..
5-Jun-14	59.5	53.9
6-Jun-14	..	..
7-Jun-14	58.1	57.5
8-Jun-14	56.8	61.4
9-Jun-14	59	55.4
10-Jun-14	60.2	55.7
11-Jun-14	58	57
12-Jun-14	59.7	58.2
13-Jun-14	58.2	87.4
14-Jun-14	83.5	57.4
15-Jun-14	56.1	55.6
16-Jun-14	58.6	59.7
17-Jun-14	58.8	55.1
18-Jun-14	60.2	53.3
19-Jun-14	60	54.9
20-Jun-14	60	...
21-Jun-14	58.7	58
22-Jun-14	59.7	53.1
23-Jun-14	58.6	62.4
24-Jun-14	61.4	64.9
25-Jun-14	60.4	55.8
26-Jun-14	59.8	59.4
27-Jun-14	59.6	55.7
28-Jun-14	59.9	59.3
29-Jun-14	60.5	60.5
30-Jun-14	59.6	55.9
	Limit in dB	
	Day	Night
	55	45



BIHAR STATE POLLUTION CONTROL BOARD
BELTRON BHAWAN, SHASTRI NAGAR, PATNA- 800 023.

AMBIENT NOISE MONITORING REPORT

Location : Hindustan Coca Cola, Month : June 2014

Date	Average Noise Level Leq, dB	
	Day	Night
	6:00 AM to 10:00 PM	10:00PM to 6:00 AM
1-Jun-14	64.8	70.6
2-Jun-14	71.3	71.4
3-Jun-14	..	..
4-Jun-14	69.9	70.6
5-Jun-14	78.6	71.2
6-Jun-14	...	...
7-Jun-14	70.5	73.6
8-Jun-14	71.5	71.3
9-Jun-14	..	71.8
10-Jun-14	71.2	71.4
11-Jun-14	70	71.8
12-Jun-14	72.2	74.2
13-Jun-14	73.9	72.9
14-Jun-14	72.5	72.2
15-Jun-14	71.3	72.1
16-Jun-14	72.1	71.8
17-Jun-14	72.8	...
18-Jun-14	...	...
19-Jun-14	...	...
20-Jun-14	...	...
21-Jun-14	71.2	71
22-Jun-14	71.4	71.4
23-Jun-14	71.5	71.9
24-Jun-14	71.6	72
25-Jun-14	67.6	65.8
26-Jun-14	70.9	72.4
27-Jun-14	72.1	72.1
28-Jun-14	72.2	72.1
29-Jun-14	72.3	72.3
30-Jun-14	72.7	...
Limit in dB		
	Day	Night
	75	70



BIHAR STATE POLLUTION CONTROL BOARD
BELTRON BHAWAN, SHASTRI NAGAR, PATNA- 800 023.

AMBIENT NOISE MONITORING REPORT

Location : IGSC Planetarium, Month : June 2014

Date	Average Noise Level Leq, dB	
	Day	Night
	6:00 AM to 10:00 PM	10:00PM to 6:00 AM
1-Jun-14	...	...
2-Jun-14	74.2	66.8
3-Jun-14	76.6	66.9
4-Jun-14	73.7	67.3
5-Jun-14	74	67.5
6-Jun-14	...	...
7-Jun-14	73.4	66.5
8-Jun-14	...	...
9-Jun-14	..	...
10-Jun-14	..	...
11-Jun-14	71.5	74.4
12-Jun-14	71.3	74.2
13-Jun-14	71.5	74.3
14-Jun-14	73.1	73
15-Jun-14	71.4	75
16-Jun-14	71.6	75.3
17-Jun-14	71.4	74.8
18-Jun-14	72	74.9
19-Jun-14	71.8	75
20-Jun-14	...	...
21-Jun-14	73.9	67
22-Jun-14	74.1	67
23-Jun-14	73.2	67.4
24-Jun-14	74.3	68
25-Jun-14	74.4	67.6
26-Jun-14	74.3	67.6
27-Jun-14	74.5	67.2
28-Jun-14	74.9	67.9
29-Jun-14	75.8	67.7
30-Jun-14	74.4	...
	Limit in dB	
	Day	Night
	65	55



BIHAR STATE POLLUTION CONTROL BOARD
BELTRON BHAWAN, SHASTRI NAGAR, PATNA- 800 023.

AMBIENT NOISE MONITORING REPORT

Location : Patna Jun. Golamber, Month : June 2014

Date	Average Noise Level Leq, dB	
	Day	Night
	6:00 AM to 10:00 PM	10:00PM to 6:00 AM
1-Jun-14	78.9	79
2-Jun-14	80	76.7
3-Jun-14	81.3	76.3
4-Jun-14	80.8	..
5-Jun-14	79.8	81.3
6-Jun-14	...	...
7-Jun-14	81.4	76.6
8-Jun-14	79.8	83
9-Jun-14	79.2	74.8
10-Jun-14	80.1	77.3
11-Jun-14	80.1	78.4
12-Jun-14	79.9	75.9
13-Jun-14	80.2	75.4
14-Jun-14	80.7	75.6
15-Jun-14	79.2	75.4
16-Jun-14	86	76.1
17-Jun-14	81.5	76.9
18-Jun-14	80.2	76.5
19-Jun-14	79.7	77
20-Jun-14	80.2	..
21-Jun-14	79.3	76.4
22-Jun-14	79.8	77.4
23-Jun-14	78.7	79.2
24-Jun-14	81.5	75.6
25-Jun-14	80.2	76
26-Jun-14	80	75.8
27-Jun-14	79.4	...
28-Jun-14	80.5	76.6
29-Jun-14	80.5	76.9
30-Jun-14	77.9	79.1
Category	Limit in dB	
	Day	Night
	65	55



BIHAR STATE POLLUTION CONTROL BOARD
BELTRON BHAWAN, SHASTRI NAGAR, PATNA- 800 023.

AMBIENT NOISE MONITORING REPORT

Location : PMCH Ashok Raj Path, Month : June 2014

Date	Average Noise Level Leq, dB	
	Day	Night
	6:00 AM to 10:00 PM	10:00PM to 6:00 AM
1-Jun-14	...	...
2-Jun-14	...	...
3-Jun-14	...	...
4-Jun-14	64.1	61.9
5-Jun-14	...	...
6-Jun-14	...	...
7-Jun-14	...	...
8-Jun-14	...	...
9-Jun-14	...	...
10-Jun-14	...	...
11-Jun-14	62.9	56.4
12-Jun-14	62	58.5
13-Jun-14	61.1	58.1
14-Jun-14	61.4	67.9
15-Jun-14	60.9	58.9
16-Jun-14	60.8	62.7
17-Jun-14	63.1	58.8
18-Jun-14	63.2	56.6
19-Jun-14	62.4	56.5
20-Jun-14	...	...
21-Jun-14	...	...
22-Jun-14	...	...
23-Jun-14	...	...
24-Jun-14	62.3	63.3
25-Jun-14	61.2	63.5
26-Jun-14	61.9	62.7
27-Jun-14	61.7	62.4
28-Jun-14	61	62.2
29-Jun-14	62.9	64
30-Jun-14	62.7	64.4
Category Silence	Limit in dB	
	Day	Night
	50	40



Naugachiya GSS









Gangwara GSS



Madhepura GSS

Proposed Schedule for implementation of ERP in BSPTCL

		2015			2016				2017
		Quarter			Quarter				Quarter
Particulars	Activity	II	III	IV	I	II	III	IV	IV
Preparation of Detailed Project Report for ERP	Activity 1								
Approval of Detailed Project Report	Activity 2								
Preparation of Bid documents (RFP)	Activity 3								
Bid Evaluation and Contract Awarding i.e Procurement of a suitable ERP solution and a competent Implementation Agency	Activity 4								
Implementation of the ERP solution	Activity 5								
Stabilization Test(s) and Final Acceptance	Activity 6								

Bar Chart for Replacement of Transformers

