Environmental Monitoring Report

Project Number: 44427-013
May 2017
Period: July 2016 – December 2016

IND: Chhattisgarh State Road Sector Project

Subproject : Group A Roads

Submitted by

Public Works Department, Government of Chattisgarh, Raipur

Asian Development Bank

pw5

for logging pls

GM/Prabhasha Sahu

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Date: 02/07/2017 07:34 PM
Subject: ADB Loan 2981 – IND: Submission of Environment Monitoring Report July – December, 2016, Group – A,B & C Roads.

Dear Sir(s),

Please find attached herewith Environment Monitoring Report July – December, 2016, Group – A,B & C Roads for half year ending July – December, 2016.

With regards,

D.K. Agrawal

Project Director

CSRSP, ADB Project

PWD, Raipur (CG.)

Environment Report (July to Dec 2016).zip

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LOAN NUMBER – 2981 IND

Environmental Safeguards Monitoring Report

Reporting Period: From July 2016 to December 2016

IND: Chhattisgarh State Road Sector Project

Group 'A' Roads – (Package 1-6)

Prepared by Public Works Department, Government of Chhattisgarh for the Asian Development Bank.

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ABBREVIATIONS

ADB	Asian Development Bank
BOD	Biological Oxygen Demand
CGPWD	Chhattisgarh Public Works Department
Ch.	Chainage
COD	Chemical Oxygen Demand
CSC	Construction Supervision Consultant
CSRSDP	Chhattisgarh State Roads Sector Development Project
CSRSP	Chhattisgarh State Road Sector Project
CTE	Consent to Establish
Cum	Cubic meter
DFO	Divisional Forest Officer
DPR	Detailed Project Report
EA	Executing Agency
EARF	Environmental Assessment and Review Framework
EHS	Environment Health Safety
EMP	Environmental Management Plan
GoCG	Government of Chhattisgarh
GPS	Global Positioning System
GRC	Grievance Redressal Cell
GRM	Grievance Redress Mechanism
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome
HMP	Hot Mix Plant
IEE	Initial Environmental Examination
IPP	Indigenous Peoples Plan
IPPF	Indigenous Peoples Planning Framework
IRC	Indian Road Congress
JV	Joint Venture
Km	Kilometre
LHS	Left Hand Side
M.T.	Metric Tonne
MDR	Major District Road
MoEF&CC	Ministry of Environment Forest & Climate Change
MoRTH	Ministry of Road Transport Highways
NPK	Nitrogen Phosphorus, Potassium
NABET	National Accreditation Board for Education and Training
NO_X	Oxides of Nitrogen
PIU	Project Implementation Unit
PM_{10}	Particulate Matter < 10 micron
$PM_{2.5}$	Particulate Matter < 2.5 micron
PUC	Pollution Under Control
PWD	Public Works Department
RF	Resettlement Framework
RHS	Right Hand Side
ROW	Right of Way
RMC	Ready Mix Concrete
RP	Resettlement Plan
SH	State Highway
SO_2	Sulphur dioxide
SPS	ADB Safeguard Policy Statement, 2009
TPH	Tonnes Per Hour
WMM	Wet Mix Macadam

1.0 INTRODUCTION

Government of Chhattisgarh has applied a loan through Government of India from the Asian Development Bank (ADB) for the Chhattisgarh State Roads Sector Development Project (CSRSDP) for the improvement of about 1539 kms state roads in Chhattisgarh.

Chhattisgarh State Roads Sector Development Project (CSRSDP) has taken up civil works for road up-gradation and rehabilitation, Consultancy services have been engaged for advisory and construction supervision, institutional strengthening, social rehabilitation and resettlement, environmental mitigation and road safety measures.

The Government of Chhattisgarh (GoCG) plans to improve the state road network under Chhattisgarh State Roads Sector Development Project (CSRSDP) with the assistance of Asian Development Bank. The Chhattisgarh Public Works Department (CGPWD), Government of Chhattisgarh is the Executing Agency (EA) for the project.

The Consultancy services for Construction Supervision for the project roads to be developed are divided into three Groups (Group A, Group B and Group C). The Chhattisgarh Public Works Department has employed SMEC International Pty. Ltd. In JV with SMEC India Pvt. Ltd. to undertake Consultancy services for Construction Supervision of Rehabilitation and Upgrading of Group "A" Road (Contract Package 1 to 6) Contract Agreement No.11 of 2014-2015 Raipur Dated 03.03.2015. The objectives of the Consultancy services are to ensure that high quality construction is achieved and to ensure that all work is carried out in full compliance with the Engineering design, technical specifications and other documents as well as promoting technology transfer by employment of local/PWD staff and on the job training.

1.1 PROJECT DESCRIPTION

This project comprises of widening and strengthening of state highways and major district roads. Under Group A roads, there are 6 packages -1, 2,3,4,5 & 6 of about 273.30 km road network. The details of road package, name of the road and length under each package are given below in **Table 1.0** while details of Contractors for each package are given in **Table 2.0**. Project location Map is given in **Figure 1.0**

Table 1.0: Road Packages under Implementation

S. No.	Package	Name of the Road	Length(km)	District
1.	Package 1	Raipur – Bhaisa (SH-9)	36.50	Raipur
2.	Package 2	Bhaisa – Baloda Bazar (SH-9)	35.58	Raipur & Baloda Bazar
3.	Package 3	Nandghat – Baloda Bazar (SH-10)	42.19	Baloda Bazar
4.	Package 4	Baloda Bazar - Gidhori (SH- 9)	49.04	Baloda Bazar
5.	Package 5	Simga – Arang(Gullu) (SH- 20)	57.15	Raipur
6.	Package 6	Arang (Gullu) – Kurud (SH-20 / MDR)	52.84	Raipur & Dhamtari
		Total Length in km	**273.30**	

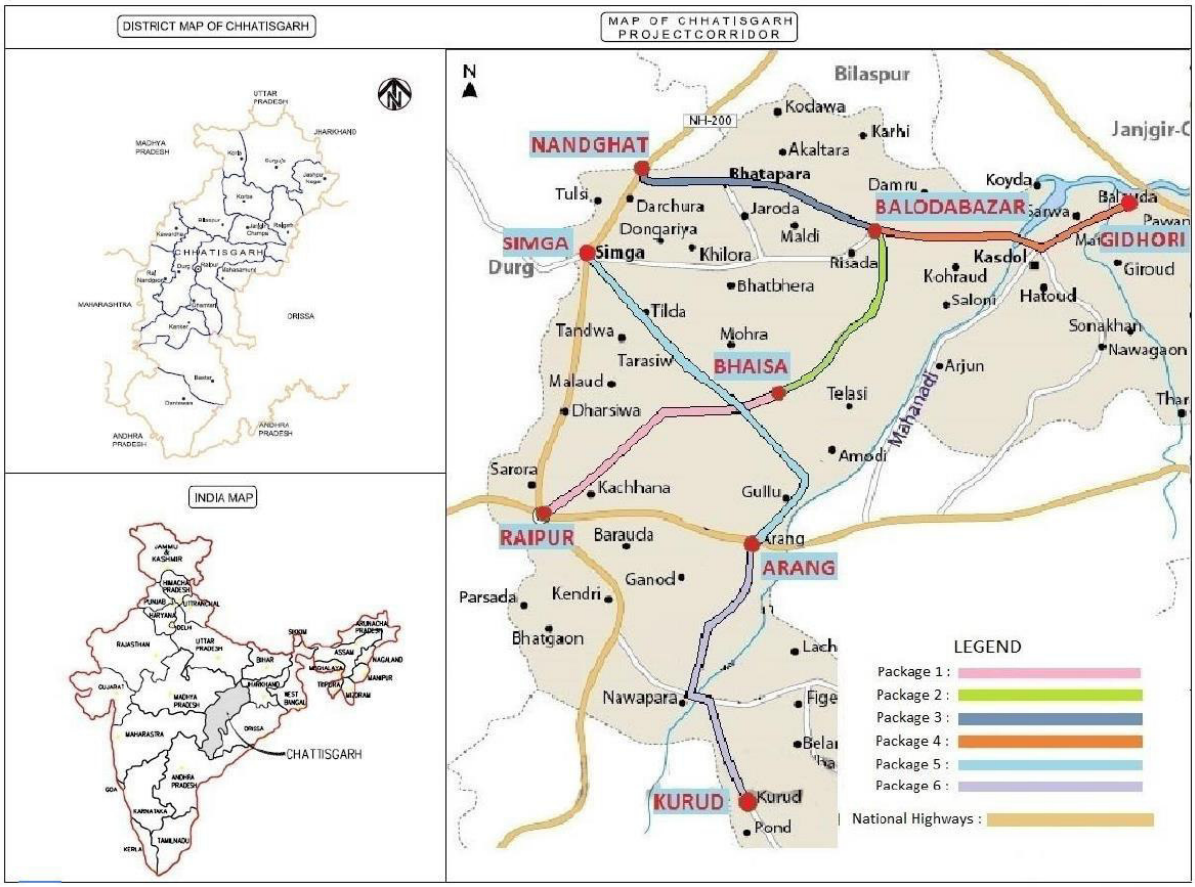

Figure 1.0: Project Location Map

Table 2.0: Details of Contractors under each Road Packages

S. No.	Package	Name of Road	Length (km)	Contractors
1.	Package 1	Raipur – Bhaisa (SH-9)	36.50	Barbrik Project Ltd
2.	Package 2	Bhaisa – Baloda Bazar (SH-9)	35.58	Shrikishan-Barbrik JV
3.	Package 3	Nandghat – Baloda Bazar (SH-10)	42.19	Agrawal Infrabuild Pvt. Ltd.
4.	Package 4	Baloda Bazar - Gidhori (SH- 9)	49.04	Vinod Kumar Jain – Path (JV)
5.	Package 5	Simga – Arang(Gullu) (SH- 20)	57.15	Gayatri Projects Ltd
6.	Package 6	Arang (Gullu) – Kurud (SH-20 / MDR)	52.84	Arcons Infrastructures & Constructions Pvt. Ltd

1.2 PACKAGE WISE DETAILS

1.2.1 Package 1: Raipur – Bhaisa (SH-9)

The project activities involve widening of existing roads to 2 – lane carriageway, within available ROW. The Contract Agreement (No. 9/2014/15) amounting Rs. 102.89 Crores Rehabilitation and Up gradation of Raipur - Bhaisa Road (SH-9) from Ch. 11+500 to Ch.

48+000 (Package – 1) in the state of Chhattisgarh having construction period of 24 months along with 365 days defect notification period signed on 25th February 2015 between Project Director, Public Works department, Government of Chhattisgarh represented by the Project Director Chhattisgarh Road Sector Project (CSRSP) and Barbrik Project Ltd, Raipur. The salient features of package 1 are given below in **Table 3.0**:

Table 3.0: Salient Features of Package 1

S.No.	Description	
Name of the work: Rehabilitation and Upgrading of Raipur-Bhainsa Road (SH-9) From Ch. 11+500 to Ch. 48+000 (36.50 km)		
1	Implementing Agency	PWD, Project Director(ADB) Project, Raipur Government of Chhattisgarh
2	DPR Consultant	URS Scott Wilson.
3	Supervision Consultant	SMEC International Pty Ltd.
4	Contractor	Barbrik Project Ltd
5	Contract Agreement no.	09/2014- 2015 Dated 27/02/2015
6	Total Project Cost as per Contract Agreement	Rs. 102.89 crores
7	Date of Commencement	14th April, 2015
8	Cumulative Physical Progress (%) As on 31 December,2016	Scheduled = 96.62% Achieved = 41.99%
9	Construction Period	24 Month
10	Completion Date	13st April, 2017
11	Major Bridge	02 Nos.
12	Minor Bridge	02Nos.
13	No. of Slab Culverts	28 Nos.
14	No. of Pipe Culverts	25 Nos.
15	Major and Minor Junction	41 Nos.

1.2.2 Package 2: Bhaisa – Baloda Bazar (SH-9)

The Contract Agreement (No. 5/2014/15) amounting Rs. 93.79 Crores Rehabilitation and Up gradation of Bhainsa - Balodabazar Road (SH-9) from Ch. 48+000 to Ch. 83+580 (Package – 2) in the state of Chhattisgarh having construction period of 24 months along with 365 days defect notification period signed on 25th February 2015 between Project Director, Public Works department, Government of Chhattisgarh represented by the Project Director Chhattisgarh State Road Sector Project (CSRSP) and Shrikishan - Barbrik JV, Raipur. The salient features of package 2 are given below in **Table 4.0**:

Table 4.0: Salient Features of Package 2

S.No.	Description	
Name of the work: Rehabilitation and Upgrading of Bhaisa – Baloda Bazar (SH-9) From Ch. 48+000 to Ch. 83+580 (35.58 km)		
1	Implementing Agency	PWD, Project Director(ADB) Project, Raipur Government of Chhattisgarh
2	DPR Consultant	URS Scott Wilson.
3	Supervision Consultant	SMEC International Pty Ltd.
4	Contractor	SHRIKISHAN BARBRIK JV
5	Contract Agreement no.	05/2014- 2015 Dated 12/02/2015
6	Total Project Cost as per Contract Agreement	Rs. 93.79 crores

S.No.	Description	
7	Date of Commencement	14th April, 2015
8	Cumulative Physical Progress (%) As on 31 December,2016	Scheduled = 83.16% Achieved = 54.42%
9	Construction Period	24 Month
10	Completion Date	13th April, 2017
11	Major Bridge	01 Nos.
12	Minor Bridge	03 Nos.
13	No. of Slab Culverts	35 Nos.
14	No. of Pipe Culverts	15 Nos.
15	Major and Minor Junction	31 Nos

1.2.3 Package 3: Nandghat – Baloda Bazar (SH-10)

The Project is rehabilitation and strengthening of SH-10 from km 0+000 to 43+840. The Contract Agreement (No. 8/2014/15) amounting Rs. 122.64 Crores Rehabilitation and Upgrading of Nandghat- Bhatapara -Balodabazar Road (SH-10) from Ch 0+000 to Ch 43+840 (Package – 3) in the state of Chhattisgarh having construction period of 24 months along with 365 days defect notification period signed on 28th February 2015 between Project Director, Public Works department, Government of Chhattisgarh represented by the Project Director Chhattisgarh State Road Sector Project (CSRSP) and M/s Agrawal Infrabuild Pvt. Ltd., Bilaspur. The salient features of package 3 are given below in **Table 5.0**:

Table 5.0: Salient Features of Package 3

S.No.	Description	
Name of the work: Rehabilitation and Upgrading of Nandghat – Baloda Bazar(SH10) From Ch. 0+000 to Ch. 43+840 (42.19 km)		
1	Implementing Agency	PWD, Project Director(ADB) Project, Raipur Government of Chhattisgarh
2	DPR Consultant	URS Scott Wilson.
3	Supervision Consultant	SMEC International Pty Ltd.
4	Contractor	Agrawal Infrabuild Pvt. Ltd.
5	Contract Agreement no.	08/2014- 2015 Dated 28/02/2015
6	Total Project Cost as per Contract Agreement	Rs. 122.62 crores
7	Date of Commencement	14th April, 2015
8	Cumulative Physical Progress (%) As on 31 December,2016	Scheduled = 90.30% Achieved = 49.23%
9	Construction Period	24 Month
10	Completion Date	13st April, 2017
11	Major Bridge	01Nos.
12	Minor Bridge	03Nos.
13	No. of Slab Culverts	13 Nos.
14	No. of Pipe Culverts	48 Nos.
15	Major Intersections	4 Nos.
16	Minor Intersections	5 Nos.

1.2.4 Package 4: Baloda Bazar - Gidhori (SH- 9)

The Project is rehabilitation and strengthening of SH-9 from km 43+840 to km 92+881. The Contract Agreement (No. 1/2015/16)) amounting Rs. 124.07 Crores Rehabilitation and

Upgrading of Baloda Bazar - Gidhori Road (SH-9) from Ch 43+840 to Ch 92+881 (Package – 4) in the state of Chhattisgarh having construction period of 24 months along with 365 days defect notification period signed on 14th July 2015 between Project Director, Public Works department, Government of Chhattisgarh represented by the Project Director Chhattisgarh State Road Sector Project (CSRSP) and M/s Vinod Kumar Jain – Path (JV), Jashpur Nagar Chhattisgarh. The salient features of package 4 are given below in **Table 6.0**:

Table 6.0: Salient Features of Package 4

S.No.	Description	
Name of the work: Rehabilitation and Upgrading of Baloda Bazar - Gidhori (SH- 9) From Ch. 43+840 to Ch. 92+881(49.041 km)		
1	Implementing Agency	PWD, Project Director(ADB) Project, Raipur Government of Chhattisgarh
2	DPR Consultant	URS Scott Wilson.
3	Supervision Consultant	SMEC International Pty Ltd.
4	Contractor	M/s Vinod Kumar Jain – Path (JV)
5	Contract Agreement no.	1/2015- 16 Dated 14/07/2015
6	Total Project Cost as per Contract Agreement	Rs. 124.07 crores
7	Date of Commencement	8th August, 2015
8	Cumulative Physical Progress (%) As on 31 December,2016	Scheduled = 54.60% Achieved = 21.83%
9	Construction Period	24 Month
10	Completion Date	6th August, 2017
11	Major Bridge	Nil
12	Minor Bridge	02Nos.
13	No. of Slab Culverts	22 Nos.
14	No. of Pipe Culverts	27 Nos.
15	Major Intersections	4 Nos.
16	Minor Intersections	4 Nos.

1.2.5 Package 5: Simga – Arang(Gullu) (SH- 20)

The Project is rehabilitation and strengthening of SH-20 from km 0+000 to 60+300. The Contract Agreement (No. 15/2014-15) amounting Rs. 136.95 crores, Rehabilitation and Upgrading of Simga – Tilda – Kharora – Arang (SH-20) (Package – 5) in the state of Chhattisgarh having construction period of 24 months signed on 20th March 2015 between Project Director, Public Works department, Government of Chhattisgarh represented by the Project Director Chhattisgarh State Road Sector Project (CSRSP) and Gayatri Projects Ltd, Hyderabad. The salient features of package 5 are given below in **Table 7.0**:

Table 7.0: Salient Features of Package 5

S.No.	Description	
Name of the work: Rehabilitation and Upgrading of Simga – Arang(Gullu) (SH- 20) From Ch. 0+000 to Ch. 60+300 (57.15 km)		
1	Implementing Agency	PWD, Project Director(ADB) Project, Raipur Government of Chhattisgarh
2	DPR Consultant	URS Scott Wilson.
3	Supervision Consultant	SMEC International Pty Ltd.
4	Contractor	Gayatri Project Ltd

S.No.	Description	
5	Contract Agreement no.	15/2014- 2015 Dated 20/03/2015
6	Total Project Cost as per Contract Agreement	Rs. 136.95 crores
7	Date of Commencement	14th April, 2015
8	Cumulative Physical Progress (%) As on 31 December,2016	Scheduled = 81.65% Achieved = 51.99%
9	Construction Period	24 Month
10	Completion Date	13st April, 2017
11	Minor Bridge	09 Nos.
12	No. of Slab Culverts	14 Nos.
13	No. of Pipe Culverts	77 Nos.
14	Junctions	21 Nos

1.2.6 Package 6: Arang (Gullu) – Kurud (SH-20 / MDR)

The Project is Rehabilitation and Upgradation of Arang (Gullu)-Nayapara-Kurud Road from Km 60+300 to 121+740. The Contract Agreement (No. 13/2014-15) amounting Rs. 132.98 Crores Rehabilitation and Upgrading of Arang (Gullu)-Nayapara-Kurud Road from Km 60+300 to km 121+740 (Package – 6) in the state of Chhattisgarh having construction period of 24 months along with 365 days defect notification period signed on 4th March 2015 between Project Director, Public Works department, Government of Chhattisgarh represented by the Project Director Chhattisgarh State Road Sector Project (CSRSP) and M/s Arcons Infrastructures & Constructions Pvt. Ltd, Chhindwara Madhya Pradesh. The salient features of package 6 are given below in **Table 8.0**:

Table 8.0: Salient Features of Package 6

S.No.	Description	
Name of the work: Rehabilitation and Upgrading of Arang (Gullu) – Kurud (SH-20 / MDR) From Ch. 60+300 to Ch. 121+740 (52.84 km)		
1	Implementing Agency	PWD, Project Director(ADB) Project, Raipur Government of Chhattisgarh
2	DPR Consultant	URS Scott Wilson.
3	Supervision Consultant	SMEC International Pty Ltd.
4	Contractor	Arcons Infrastructures & Constructions Pvt. Ltd
5	Contract Agreement no.	13/2014- 2015 Dated 04/03/2015
6	Total Project Cost as per Contract Agreement	Rs. 132.98crores
7	Date of Commencement	14th April, 2015
8	Cumulative Physical Progress (%) As on 31 December,2016	Scheduled = 91.94% Achieved = 31.91%
9	Construction Period	24 Month
10	Completion Date	13st April, 2017
11	Major Bridge	NIL
12	Minor Bridge	12
13	No. of Slab Culverts	08 Nos.
14	No. of Pipe Culverts	113 Nos.
15	Major Intersections	06 Nos.
16	Minor Intersections	13 Nos.

1.3 PROJECT PROGRESS STATUS AND IMPLEMENTATION SCHEDULE

A. Progress Status of Pre-Construction Activities

The preconstruction activities like mobilization of plants and equipment's, construction of camps, construction of laboratories, erection and commissioning of plants under progress. Marking of centreline, checking of GPS pillars, benchmarks are also in progress based on the topographic survey.

a) Construction Camps

The following Construction camps are being established under each construction package:

Package 1: At Km 29+900 (LHS) of SH-9 near Bangoli Village
Package 2: At Km 57+000 (RHS) of SH-9 near Kodva Village
Package 3: At Km 23+100(LHS) on SH-10 at Rajadhar Village and At Km.34+000(RHS) on SH-10 at Mudipar Village
Package 4: At Km 73+700 (LHS) on SH- 9 at Chharched Village
Package 5: At Km 30+500 (LHS) of SH-20 at Moharenga. Village
Package 6: At Km 107+000 (LHS) of SH-20 near Katholi Village

b) Tree Cutting Status

The roads under package 1- 6 do not pass through any forest land. However, in order to up-grades the roads tree cutting is inevitable. The details of trees required to be cut under each package and permission obtained from competent authority is provided below in **Table 9.0**.

Table 9.0: Details of Tree Cutting

Package No.	Permission Obtained from Collector for cutting of Trees	Actual No. of Trees to be Cut	No. of Trees Cut As on 31st December 2016	Balance No. of Trees to be cut
1	1074	830	808	22
2	4170	3350	3350	0
3	2549	1949	1809	140
4	3434	3340	3090	250
5	1525	775	775	0
6	3303	3303	3303	0

Source: Office of Project Director, CSRSP, ADB Project, PWD, Raipur

For each tree to be cut for the road up gradation, the concerned authority in their permission letters have imposed condition that 10 times the trees should be planted preferable near to the existing roads as compensatory plantation. The details of payment made to State Forest Department under each package for tree cutting and compensatory plantations are provided in **Table 10.0**.

Table 10.0: Details of Payment to Forest Department

Package No.	Payments Done to Forest Department As on 31st December, 2016 (Rs. in Lacs)		Forest Division
	For Cutting of Trees	Compensatory Plantation	
1	16.14	93.50	DFO Raipur
Sub Total	**16.14**	**93.50**	

Package No.	Payments Done to Forest Department As on 31st December, 2016 (Rs. in Lacs)		Forest Division
2	29.20	105.86	DFO Balodabazar
Sub Total	**29.20**	**105.86**	
3	26.80	43.91	DFO Balodabazar
Sub Total	**26.80**	**43.91**	
4	37.60	101.02	DFO Balodabazar
Sub Total	**37.60**	**101.02**	
5	19.56	276.60	DFO Raipur
	3.50	0.00	DFO Balodabazar
Sub Total	**23.06**	**276.60**	
6	33.65	86.33	DFO Raipur
	3.54	25.00	DFO Dhamtari
Sub Total	**37.19**	**111.33**	

Source: Office of Project Director, CSRSP, ADB Project, PWD, Raipur

B. Progress Status of Construction Stage

a) Tree Plantation Status

The Contractors have under taken tree plantation along the road side within the available ROW. Number of saplings planted under each package during this reporting period is provided below in **Table 11.0**.

Table 11.0: Details of Tree Plantation

Package No.	Plantation undertaken along Road Side		
	LHS	**RHS**	**Total**
1	1117	913	2030
2	1110	890	2000
3	1837	2273	4110
4	1791	1832	3623
5	2312	2883	5195
6	2014	2186	4200

Some site photographs showing tree planation being undertaken by contractors along road side are shown below:

(Package 2)


(Package 3)


(Package 5)


(Package 6)

b) Borrow Areas Details

The details of borrow areas which have been identified under each construction package are provided in **Table 12.0**.

Table 12.0: Details of Borrow Areas

S.No.	Borrow Area No.	Chainage	LHS/RHS	Gram Panchayat	Qty. (Cum)
Package 1					
1	2	26+500	RHS	Adsena	9900
2	3	20+000	LHS	Jaroda	8500
3	4	34+020	LHS	Math	10000
Package 2					
1	1	57+100	L.H.S	Sundari	14010
2	2	43+240	L.H.S	Parshada	20655
3	3	54+650	L.H.S	Kumhari	33750
4	4	76+000	R.H.S	Kanjee	18500
5	5	82+000	R.H.S	Chhuiha	17820
6	3A	54+650	L.H.S	Sandi	17820
Package 3					
1	2	22+167	RHS	Alesur	45144
2	1	24+800	LHS	Khairi	16875
3	3	33+000	RHS	Khairtal	24300
4	4	24+800	RHS	Gurra	11613
5	5	24+750	RHS	Gurra	28161
6	6	24+750	RHS	Gurra	27966
7	16	28+560	LHS	Khamariya	20625
8	14	27+440	LHS	Khamariya	15000
9	15	27+440	LHS	Hasda	21000
10	20	7+723	RHS	Koliha	20424
11	19	12+100	RHS	Tarenga	20000
12	21	7+500	RHS	Rahara	21000
13	22	7+472	RHS	Rahara	17977
14	25	7+706	RHS	Rahara	22500
15	26	28+500	LHS	Khamariya	20800
16	23	7+723	RHS	Koliha	8,645
Package 4					
1	1	49+780	LHS	Sudela	12000
2	2	49+780	LHS	Sudela	15000
3	3	56+900	LHS	Kasiyara	15000
4	4	47+500	LHS	Bahmanmundi	18000
5	5 & 6	70+500	LHS	Bahmanmundi	15000
6	7	83+200	LHS	Kot	15000
7	8	83+200	RHS	Derbdhi	18000
Package 5					
1	1	34+900	RHS	Nagted	30000
2	2	25+000	LHS	Chicholi	11000
3	3	36+900	RHS	Mats	6000
4	5	29+400	RHS	Moranga	30000
5	6	18+400	LHS	Srwiy	30000
6	7	27+100	RHS	Tarasi	9000
7	11 Extn.	3+600	LHS	Kamta	12000
8	13 Extn.	57+000	LHS	Ranisagar	12000

S.No.	Borrow Area No.	Chainage	LHS/RHS	Gram Panchayat	Qty. (Cum)
9	16	50+375	LHS	Bana	9000
Package 6					
1	1	110+650	RHS	Kukudi	30000
2	3	103+000	LHS	Dulna	8000
3	10	82+900	RHS	Torla	6000
4	18	107+700	LHS	Mori	6000
5	21	106+620	LHS	Katholi	6000
6	19	113+900	RHS	Bhesmundi	6000
7	9	101+450	RHS	Dulna	3000
8	20	106+400	RHS	Katholi	6000
9	24	85+350	LHS	Torla	12000
10	31	84+250	LHS	Torla	12000
11	15	85+350	LHS	Torla	9000
12	17	108+050	RHS	Mori	6000
13	8	103+000	RHS	Dulna	3000
14	18 A	107+700	LHS	Mori	9000
15	20 A	106+400	RHS	Katholi	12000
16	17 A	108+050	RHS	Mori	12000
17	35	113+050	RHS	Bhesmundi	12000
18	24 A (Area Extension)	83+350	LHS	Torla	18000
19	7	102+420	RHS		4000
20	29	117+500	RHS	Kuhkuha	18000
21	31 A	84+520	LHS	Torla	12000
22	37	110+650	RHS	Kokdi	12000
23	41	108+150	RHS	Goji	18000
24	42	57+000	LHS	Ranisagar	12000
25	40	92+800	RHS	Nawagaon	14850
26	36	60+400	RHS	Gullu	6000
27	45	108+050	RHS	Goji	9000
28	30	81+750	RHS	Tamashivni	6000
29	48	82+000	RHS	Tamashivni	9000
30	10A	82+900	RHS	Tamashivni	9000
31	34	75+600	RHS	Bhilai	15000
32	53	117+700	RHS	Dahdaha	12000
33	55 (Hard Shoulder)	80+700	LHS	Tamashivni	9000
34	54	80+700	RHS	Tamashivni	18000
35	44	99+300	RHS	Nawapara	15000
36	46 (Hard Shoulder)	117+500	RHS	Kuhkuha	9000
37	56	90+500	LHS	Jaunda	15000

c) ADB Loan Review Mission

A Special Project Administration Mission was undertaken by ADB from 21-23 September 2016 to review the progress of Loan 2981-IND: Chhattisgarh State Road Sector Project. Compliances with regards to Environmental Safeguards Corrective Action Plan as suggested by ADB earlier during ADB Review Mission 8-12 February 2016 was discussed during the mission.

d) Environmental Review Meetings

Environmental safeguards review meetings was conducted by Environmental Expert of Construction Supervision Consultant with representatives of Contractors and staff of Construction Supervision Consultant on 19th September, 2016. The objectives of the meetings were to guide contractors and review their progress with regards to environmental safeguards. The following points were discussed in detail during the meetings:

- Status of Compliances with Statutory Environmental Regulations
- Strengthening of Civil Works Contractors
- Status of Environmental Monitoring Reports
- Status of Compliance to Environmental Management Plan (EMP)
- Issues related to Environmental Health and Safety (EHS)
- Issues related to record management
- Status of Environmental Monitoring Reports
- Public Consultation Conducted

Environmental Review Meeting
19 September 2016

e) Training Programmes

Training programs on awareness about HIV/AIDS was conducted by Contractor of Package 4 in August 2016 through NIDAN Society, Bhilai, a partner agency of Lakshya Foundation. Similar training programme was conducted for other 5 Packages in June 2016 and details were provided in environmental Safeguard Monitoring Report (Jan. – June. 2016). The details during this reporting period are provided below in **Table 13.0.**

Table 13.0: Details of HIV/AIDS Training Programme

Package No.	Name of the Package	Training Date	No. of Participants
4	Balodabazar to Gidhori Road	31.08.2016	78

Source: Lakshya Foundation

The training programmes covered a brief about HIV AIDS, how it is transmitted, who are covered under high risk group and what are the precautionary measures etc. Few photographs of the training programme conducted by Package 4 are shown below:

Training Programme on HIV AIDS at Kasdol
31 August 2016

f) Health Check-up Camps

A Health Check-up Camp was organised by Contractor of Package 4 at Kasdol in September 2016 where a local Doctor from Balodabazar visited the camp site and checked general health parameters of staff, workers and nearby residents. About 112 persons were checked by the Doctor. Few photographs of Health Check-up Camp conducted by Package 4 are shown below:

Health Check-up Camp at Kasdol
01 September 2016

g) Public Consultations

Public Consultation meeting was held in Package 5 at village Kharora on 10 September 2016 with local people residing along the road. Issue related to drain construction were discussed in detail. People were informed about the arrangement with regards to access to shops and schools being planned, safety measures which shall be adopted during construction, provision of water sparkling to supress dust and provision of environmental monitoring to be conducted during construction period. General issues related to safety, accessibility and dust were raised by the local community which contractor has proposed in their action plan to follow during construction. Few photographs of Public Consultation conducted by Package 5 are shown below:

Public Consultation at Kharora
10 September 2016

C. Implementation Schedule

The project is to be implemented within two years from the date of commencement of works with respect to each construction package. Site photographs of each package is Annexed as **Annexure - 1**

2.0 COMPLIANCE TO NATIONAL / STATE / LOCAL REGULATIONS

S. No.	Permits/Approvals	Compliance Status (As on 31 December 2016)					
		Package 1	**Package 2**	**Package 3**	**Package 4**	**Package 5**	**Package 6**
1	**Consent to Establish (CTE) / Consent to Operate (CTO)** for following: - Hot Mix Plant (HMP) - Stone Crushers - Batching Plant - Wet Mix Macadam (WMM)	CTE obtained from Regional Office C.G. Environment Conservation Board, Raipur vide letter No. 2951 & 2952 / RO / TS / CECB / 2016 dated 18.01.2016 for followings: **Hot Mix Plant** – 95,000 M.T./Year CTE obtained from Regional Office C.G. Environment Conservation Board, Raipur vide letter No. 3527 & 3528 /RO/TS /CECB/2015 dated 10.02.2016 for followings: **Concrete Mix** – 1,25,000 M.T. per year **Wet Mix Macadam** (WMM) - 1,25,000 M.T. per year	CTE obtained from Regional Office C.G. Environment Conservation Board, Raipur vide letter No. 3510 & 3511 / RO / TS / CECB / 2016 dated 09.02.2016 for followings: **Hot Mix Plant** – 60,000 M.T./Year CTE obtained from Regional Office C.G. Environment Conservation Board, Raipur vide letter No. 1862 & 1864 / RO / TS / CECB/2015 dated 28.09.2015 for following: **Cement Concrete Mix** (RMC) – 60,000 M.T/Year **Wet Mix Macadam** (WMM) - 60,000 M.T/Year	CTE obtained from Regional Office C.G. Environment Conservation Board, Raipur vide letter No. 541 & 543 /RO /TS / CECB/2015 dated 23.05.2015 for following: **Hot Mix Plant** – 7,20,000 M.T. per year **Stone Crusher** – 6,00,000 M.T. per year **Wet Mix Macadam** (WMM) - 7,20,000 M.T. per year	CTE obtained from Regional Office C.G. Environment Conservation Board, Raipur vide letter No. 2481 & 2483 / RO / TS / CECB/2015 dated 26.11.2015 for followings: **Hot Mix Plant** – 120 TPH **Batch Mix** – 60 Cum/Hr **Wet Mix Macadam** (WMM) – 160 TPH	CTE obtained from Regional Office C.G. Environment Conservation Board, Raipur vide letter No. 3041 & 3042 / RO / TS / CECB / 2016 dated 25.01.2016 for followings: **Hot Mix Plant** – 120 TPH Contractor has applied for renewal of consent for Hot Mix Plant and has also applied for consent for WMM and Batch Mix Plant on 16.12.2016.	CTE obtained from Regional Office C.G. Environment Conservation Board, Raipur vide letter No. 2386 & 2388/RO/TS/ CECB/2015 dated 09.11.2015 for followings: **Stone Crusher** – 150,000 Cum/Year CTE obtained from Regional Office C.G. Environment Conservation Board, Raipur vide letter No. 2390 & 2392 /RO/TS /CECB/2015 dated 09.11.2015 for followings: **Batch Mix (Bitumen)** – 47,000 Cum **Ready Mix Concrete** – 11,566 Cum **Wet Mix Macadam** (WMM) - 95,000 Cum

S. No.	Permits/Approvals	Compliance Status (As on 31 December 2016)					
		Package 1	**Package 2**	**Package 3**	**Package 4**	**Package 5**	**Package 6**
		Validity – 12 months from first day of the month of commissioning of the plant	Validity – 12 months from first day of the month of commissioning of the plant. Contractor advised to renew Consent to Operate Certificates for HMP, RMC and WMM Plant and submit the renewed certificate.	Validity – 12 months from first day of the month of commissioning of the plant. Contractor advised to renew Consent to Operate Certificates for HMP, Stone Crusher and WMM Plant and submit the renewed certificate.	Validity – 12 months from first day of the month of commissioning of the plant Contractor advised to renew Consent to Operate Certificates for HMP, Batching Plant and WMM Plant and submit the renewed certificate.	Validity – 12 months from first day of the month of commissioning of the plant	Validity – 12 months from first day of the month of commissioning of the plant. Contractor advised to renew Consent to Operate Certificates for Batch Mix (Bitumen), RMC, WMM and Stone Crusher Plants and submit the renewed certificates.
2	Permission to withdraw water for construction from Surface Water sources	Permission to withdraw Surface Water (30 Lac litters/ month) from Pandit Lakhanlal Mishra Jalashya obtained from Water Resource Department vide letter No. 373/No. 11 dated 17.06.2015	Permission to withdraw Surface Water (10 Lac liters/month) from Khorsi Nalla obtained from Water Resource Department vide letter No. 3052 /rajsb /2015/Kasdol dated 03/08/2015	Permission to withdraw Surface Water (5 Lac liters/month) from Jamunia Nalla obtained from Water Resource Department vide letter No. 347 /rajsb /2016/Kasdol dated 27/01/2016	Permission to withdraw Surface Water (3 Lac litters /month) from Mahanadi River obtained from Water Resource Department vide letter No. 957 /rajsb/2016/Kasdol dated 11/03/2016	Contractor has certified and given an undertaking that there is no surface water source in the package from which water can be taken for construction purpose.	Permission to withdraw Surface Water (10,000 litters/day) from Katholi Nalla obtained from Water Resource Department vide letter No. 1136 / works /2016 / Rudhri dated 08/02/2016
3	Permission to withdraw water for construction from Ground Water sources	NOC to extract water from Bangoli Village (Khasra No 410/11) obtained from Public Health Engineering Department vide letter No. 154 dated	Permission to Extract 2000 Liters per day from Kodva Village obtained from Water Resource Department vide letter No. 3050/ rajsb/ 2015/ Kasdol	Permission to Extract 150000 Liters per month from Rajadhar Village obtained from Water Resource Department vide letter No. 345/ rajsb/ 2016/	Permission to Extract 2 Lac Liters per month from Babat Village 2btained from Water Resource Department vide letter No. 955/ rajsb/	Permission to extract 10 Lac litres / month made to Executive Engineer, Irrigation Department vide letter No. GPL/RPR/ADB/P - 05 / 87 Dated	Permission to Extract 2000 Liters per day from Bore well at Katholi Camp obtained from Water Resource Department vide letter No. 1138 / works

S. No.	Permits/Approvals	Compliance Status (As on 31 December 2016)					
		Package 1	**Package 2**	**Package 3**	**Package 4**	**Package 5**	**Package 6**
		23.06.2015.	dated 03/08/2015	Kasdol dated 27/01/2015	Kasdol dated 11/03/2016	11.09.2015. Approval awaited Contractor advised to follow it up with concerned agency and submit the approval letter.	/2016 / Rudhri dated 08/02/2016
4	PUC for vehicles for construction under Central Motor and Vehicle Act 1988	PUC Certificates received for 24 vehicles/ machinery. **Validity till 07.11.2016** Contractor advised to renew PUC Certificates. Additional PUC Certificates received for 16 vehicles. **Validity till 19.02.2017**	PUC Certificates received for 3 vehicles Validity till 29.12.2015. Additional PUC Certificates received for 47 vehicles/ machinery. **Validity till 04.01.2017** Contractor advised to renew PUC Certificates.	PUC Certificates received for 38 vehicles/ machinery. **Validity till 19.07.2016** Additional PUC Certificates received for 13 vehicles/ machinery. **Validity till 04.10.2016** Contractor advised to renew PUC Certificates.	PUC Certificates received for 16 vehicles/ machinery. Validity till 29.06.2016. Additional PUC Certificates received for 35 vehicles/ machinery. **Validity ranging between 10.12.2016 to 27.12.2016** Contractor advised to renew PUC Certificates.	PUC Certificates received for 8 vehicles Validity till 31.12.2015. Additional PUC Certificates received for 23 vehicles Validity till 30.06.2016. Additional PUC Certificates received for 23 vehicles/ machinery. Validity till 31.12.2016. Additional PUC Certificates received for 23 vehicles/ machinery. **Validity till 30.06.2017**	PUC Certificates received for 38 vehicles/ machinery Validity till 19.07.2016. Additional PUC Certificates received for 46 vehicles/ machinery. **Validity till 19.03.2017**
5	Quarry Lease Deed and Quarry License from State Department of Mines and Geology	The Contractor has taken the quarry on lease for two years from M/s Maha Maya Stone Pvt. Ltd starting	The Contractor has taken the stone quarry on lease for two years from M/s Khyati Stone Crusher starting	The Contractor has taken the stone quarry on lease for 2 years from M/s R. Verma w/o Rakesh Verma	The quarry material is being sourced through Licensed quarry. Lease agreement with	The Contractor is procuring Stone and Boulders from M/s Maha Maya Stone Pvt. Ltd. and from M/s	Mining permission for 2 years from, Collector (Mining Branch), Dhamtari, dated 06.08.2015 submitted

S. No.	Permits/Approvals	Compliance Status (As on 31 December 2016)					
		Package 1	**Package 2**	**Package 3**	**Package 4**	**Package 5**	**Package 6**
		07.07.2015. Mining permission obtained for 10 years from, Collector (Mining Branch), Raipur, vide letter No. 539 dated 10.09.2009. M/s Maha Maya Stone Pvt. Ltd has obtained CTO from Regional Office C.G. Environment Conservation Board, Raipur vide letter No. 1117/ RO / TS / CECB / 2013 dated 24.08.2013 with validity up to 30.06.2016. M/s Maha Maya Stone Pvt. Ltd has applied for renewal of CTO on 22.06.2016 Contractor advised to submit the renewed certificate.	07.07.2015. Mining permission obtained from, Collector (Mining Branch), Baloda Bazar – Bhatapara, dated 12.07.2012. M/s Khyati Stone Crusher has obtained CTO from Regional Office C.G. Environment Conservation Board, Raipur vide letter No. 2865 & 2866 / RO / TS / CECB / 2016 dated 25.01.2012 with validity up to 30.09.2015. M/s Khyati Stone Crusher has obtained renewed CTO from Regional Office C.G. Environment Conservation Board, Raipur vide letter No. 1866 & 1867 / RO / TS / CECB / 2015 dated 29.09.2015 for	starting 20.02.2015. Mining permission obtained for 10 years from, Collector (Mining Branch), Baloda Bazar – Bhatapara, dated June 2007. Quarry Licence valid till 31/05/2017	3 crusher owners has been submitted. Mining permission obtained for 10 years from, Collector (Mining Branch), Janjgir – Champa. Validity till 31 May 2019. M/s Shankar Minerals has obtained CTO from Regional Office C.G. Environment Conservation Board, Bilaspur vide letter No. 132 & 133 / RO / TS / CECB / 2015 dated 23.04.2015 with validity up to 30.04.2018.	Vishwabharti Minerals. (Lease Deed with both firms Submitted). Mining permission obtained for 10 years from, Collector (Mining Branch), Raipur by M/s Maha Maya Stone Pvt. Ltd. vide letter No. 539 dated 10.09.2009 and by M/s Vishwabharti Minerals vide letter No. 258 dated 10.02.2010 Further the Contractor has signed a lease agreement with M/s Ramdoot Stone Pvt. Ltd. and with M/s Vishwabharti Minerals for operating the crusher plant. M/s Ramdoot Stone Pvt. Ltd. Obtained permission for 3 years from, Collector (Mining Branch), Raipur, vide dated 26.02.2015. Further M/s Ramdoot Stone Pvt. Ltd. has obtained CTO from Regional Office C.G.	by contractor. Contractor advised to submit more evidence/documents related to this.

S. No.	Permits/Approvals	Compliance Status (As on 31 December 2016)					
		Package 1	**Package 2**	**Package 3**	**Package 4**	**Package 5**	**Package 6**
			next 3 years with validity up to 30.09.2018.			Environment Conservation Board, Raipur vide letter No. 2363 & 2365 / RO / TS / CECB / 2014 dated 03.02.2014. Further M/s Vishwabharti Minerals has obtained CTO from Regional Office C.G. Environment Conservation Board, Raipur vide letter No. 2433 & 2434 / RO / TS / CECB / 2014 dated 10.02.2014 with validity up to 31.10.2016. M/s Vishwabharti Minerals has applied for renewal certificate on 15.11.2016. Approval awaited. Contractor advised to submit the renewed CTO certificates of M/s Ramdoot Stone Pvt. Ltd. and of M/s Vishwabharti Minerals.	
6	Labour License	Obtained vide letter No. 5770/RPR/2015 dated 23.05.2015.	Obtained vide letter No. 18/BBZ/2015 dated 27.08.2015.	Obtained vide letter No. 21/BBZ/2015 dated 24.09.2015.	Obtained vide letter No. 20/BBZ/2015 dated 24.09.2015.	Obtained vide letter No. 5784/RPR/2015 dated 15.06.2015.	Obtained vide letter No. 303/DMT/2015 dated 03.08.2015.

S. No.	Permits/Approvals	**Compliance Status** (As on 31 December 2016)					
		Package 1	**Package 2**	**Package 3**	**Package 4**	**Package 5**	**Package 6**
		Valid till 31.12.2015 License Renewed **Valid till 31.12.2016** Contractor advised to further renew the license and submit the same.	Valid till 31.12.2015 License Renewed **Valid till 31.12.2016** Contractor advised to renew the license and submit the same.	Valid till 31.12.2015 License Renewed **Valid till 31.12.2016** Contractor advised to renew the license and submit the same.	Valid till 31.12.2015 License Renewed **Valid till 31.12.2016** Contractor advised to renew the license and submit the same.	Valid till 31.12.2015 License Renewed **Valid till 31.12.2016** Contractor advised to renew the license and submit the same.	Valid till 31.12.2015 License Renewed **Valid till 31.12.2016** Contractor advised to renew the license and submit the same.
7	Contractors All Risk Insurance Policy/ Workmen Compensation Insurance	Contractors All Risk Insurance Policy is in place. **Valid till 23.03.2017** Workmen Compensation Insurance from TATA AIG is in place for 20 Skilled and 40 Unskilled. **Valid till 25.06.2017**	Contractors All Risk Insurance Policy is in place. **Valid till 29.05.2017** Workmen Compensation Insurance from ICICI Lombard is in place for 150 Skilled, 100 semiskilled and 150 Unskilled. **Valid till 25.08.2017**	Contractors All Risk Insurance Policy is in place. **Valid till 13.04.2017** Workmen Compensation Insurance from The New India Assurance Co. Ltd.is in place for 15 Skilled, 45 semiskilled and 40 Unskilled. **Valid till 26.05.2017**	Contractors All Risk Insurance Policy is in place. **Valid till 06.08.2017** Employee Compensation Liability Policy from United India Insurance Co. Ltd.is in place for 20 Skilled, 20 semiskilled and 100 Unskilled. **Valid till 08.11.2017**	Contractors All Risk Insurance Policy is in place. **Valid till 11.06.2017** Workmen Compensation Insurance from The New India Assurance Co. Ltd.is in place for 50 semiskilled and 38 Unskilled. **Valid till 12.01.2017**	Contractors All Risk Insurance Policy is in place. **Valid till 29.05.2019** Workmen Compensation Insurance from The Oriental Insurance Co. Ltd.is in place for 20 skilled & unskilled. **Valid till 19.11.2016** Contractor advised to renew Workmen Compensation Insurance policy and submit the same.

S. No.	Permits/Approvals	Compliance Status (As on 31 December 2016)					
		Package 1	**Package 2**	**Package 3**	**Package 4**	**Package 5**	**Package 6**
9	Permission / agreement with regards to use of Borrow areas	3 Borrow Areas identified for which Consent obtained from Gram Panchayat. Contractor advised to obtain necessary Clearance from MOEF&CC as applicable	6 Borrow Areas identified for which Consent obtained from Gram Panchayat Contractor advised to obtain necessary Clearance from MOEF&CC as applicable	16 Borrow Areas identified. Contractor advised to obtain necessary Clearance from MOEF&CC as applicable	8 Borrow Areas identified. Contractor advised to obtain necessary Clearance from MOEF&CC as applicable	9 Borrow Areas identified. Contractor advised to obtain necessary Clearance from MOEF&CC as applicable	37 Borrow Areas identified. Contractor advised to obtain necessary Clearance from MOEF&CC as applicable.

3.0 STATUS OF COMPLIANCE WITH SAFEGUARDS LOAN COVENANTS

Safeguards Covenants	Description	Status of Compliance / Remarks
Schedule 5 Para No. 4	The Borrower shall ensure or cause the EA to ensure that the preparation, design, construction, implementation, operation and decommissioning of the Project, and all Subprojects' facilities comply with (i) all applicable laws and regulations of the Borrower and the State relating to environment, health, and safety; (ii) the Environmental Safeguards; (iii) the EARF; and (iv) all measures and requirements set forth in the respective IEE and EMP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.	All points are being complied with. All environment safeguards requirements being implemented in accordance with relevant policies and regulations of the Government of India, State Government of Chhattisgarh and the ADB Safeguard Policy Statement, 2009 (SPS). All measures and requirements set forth in the respective EMPs are being implemented accordingly.
Schedule 5 Para No. 5	The Borrower shall ensure or cause the EA to ensure that all land and all rights-of way required for the Project, and all Project/Subproject facilities are made available to the Works contractor in accordance with the schedule agreed under the related Works contract and all land acquisition and resettlement activities are implemented in compliance with (i) all applicable laws and regulations of the Borrower and the State relating to land acquisition and involuntary resettlement; (ii) the Involuntary Resettlement Safeguards; (c) the RF; and (d) all measures and requirements set forth in the respective RP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.	The details covered under Social Safeguards Monitoring Report.
Schedule 5 Para No. 6	Without limiting the application of the Involuntary Resettlement Safeguards, the RF or the RP, the Borrower shall ensure or cause the EA to ensure that no physical or economic displacement takes place in connection with any Subproject until: (a) compensation and other entitlements have been provided to affected people in accordance with the RP; and (b) a comprehensive income and livelihood restoration program has been established in accordance with the RP.	The details covered under Social Safeguards Monitoring Report.
Schedule 5 Para No. 7	In the event of any Subproject involving indigenous peoples, the Borrower shall ensure or cause the EA to ensure that the preparation, design, construction, implementation and operation of the Project, each Subproject and all	The details covered under Social Safeguards Monitoring Report.

Safeguards Covenants	Description	Status of Compliance / Remarks
	Project/Subproject facilities comply with (a) all applicable laws and regulations of the Borrower and the State relating to indigenous peoples; (b) the Indigenous Peoples Safeguards; (c) the IPPF; and (d) all measures and requirements set forth in the respective IPP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.	
Schedule 5 Para No. 8	(a) The Borrower shall ensure or cause the EA to ensure that all necessary budgetary and human resources to fully implement the EMP, the RP and the IPP as required, are made available. (b) The EA shall designate at least one expert each to supervise implementation of the EMPs and RPs.	All necessary budgetary and human resources required to implement the EMP is made available. One Environmental Expert and One Social Expert placed in PIU (H.Q.) to supervise implementation of the EMPs and RPs respectively.
Schedule 5 Para No. 9	The Borrower shall ensure or cause the EA to ensure that all bidding documents and contracts for Works contain provisions that require contractors to: (a) comply with the measures and requirements relevant to the contractor set forth in the IEE, the EMP, the RP and the IPP (to the extent they concern impacts on affected people during construction), and any corrective or preventative actions set out in a Safeguards Monitoring Report; (b) make available a budget for all such environmental and social measures; (c) provide the CGPWD with a written notice of any unanticipated environmental, resettlement or indigenous peoples risks or impacts that arise during construction, implementation or operation of the Project/Subproject that were not considered in the IEE, the EMP, the RP or the IPP; (d) adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction; and (e) fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.	It is being complied. a) The project falls under category B and IEE for the subprojects has been prepared accordingly. EMP is part of contractor's agreement. b) Shall be complied c) Shall be complied with if situation arises d) Shall be complied with during execution of work e) Shall be complied with after the completion of construction works
Schedule 5 Para No. 10	The Borrower shall ensure or cause the EA to ensure the following: (a) submit semi-annual Safeguards Monitoring Reports to ADB and disclose	a) Shall be complied.

Safeguards Covenants	Description	Status of Compliance / Remarks
	relevant information from such reports to affected persons promptly upon submission; (b) if any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project/Subproject that were not considered in the IEE, the EMP, the RP or the IPP as applicable, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan; and (c) no later than three months from the commencement of RP implementation of the first Subproject, engage qualified and experienced external experts or qualified nongovernmental organizations under a selection process and terms of reference acceptable to ADB, to verify information produced through the project monitoring process for resettlement, environment and indigenous peoples (if any), and facilitate the carrying out of any verification activities by such external experts; (d) report any breach of compliance with the measures and requirements set forth in the EMP, the RP or the IPP promptly after becoming aware of the breach.	b) Shall be complied with if such situation arises c) External Monitoring Experts shall be engaged and finalized in consultation with ADB d) Shall be complied with if such situation arises
Schedule 5 Para No. 11	The Borrower shall ensure or cause the EA to ensure that no proceeds of the Loan under the Project are used to finance any activity included in the list of prohibited investment activities provided in Appendix 5 of ADB's Safeguard Policy Statement (2009).	EA ensures that no part of the Loan under the Project shall be used to finance any activity included in the list of prohibited investment activities provided in Appendix 5 of ADB's Safeguard Policy Statement (2009).
Schedule 5 Para No. 12	The EA shall ensure that Works contracts under the Project follow all applicable labor laws of the Borrower and the State and that these further include provisions to the effect that contractors; (i) carry out HIV/AIDS awareness programs for labor and disseminate information at worksites on risks of sexually transmitted diseases and HIV/AIDS as part of health and safety measures for those employed during construction; and (ii) follow and implement all statutory provisions on labor (including not employing or using children as labor, equal pay for equal work), health, safety, welfare, sanitation, and working conditions. Such contracts shall also include clauses for termination in case of any breach of the stated provisions by the contractors.	EA ensures that all the works contracts under the Project shall follow all applicable National/ State labor laws of the Borrower and the State;

4.0 COMPLIANCE TO SAFEGUARDS MANAGEMENT PLAN

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
A. Design and Pre - Construction Stage							
1. Design Considerations							
Legislative approvals	Considering the proposed project activities the following legislative approvals shall be required in advance: 1. Obtain permission from forest or district authorities as applicable for cutting of trees 2. Obtain concurrence from Gram Panchyats for shifting or demolition of community structure 3. Obtain permission from concerned authorities for shifting of utilities (like electric pole, telephone lines, hand pumps) 4. Obtain connect to establish Hot Mix plant, batching plant, quarry operation if new quarry to be opened, and setting up construction 5. Obtain permission for withdrawal of ground water as applicable	Legislative requirements	As identified in DPR for the location of respective activity.	Part of construction costs	Activity 1 to 3 concerned Nodal officer of PWD and activity 4 & 5 contractor	ADB PIU PWD	1) Tree cutting permissions being obtained from concerned district authority. 2) Shifting of community structure being undertaken in consultation with concerned Gram Panchayat 3) Shifting of utilities (like electric poles, telephone lines, hand pumps) being undertaken after obtaining permission from concerned authorities. 4) All the Contractors have obtained consent to establish for Hot Mix Plant, Batching Plant and Crusher Plants where applicable. 5) Contractors of Package 1, 2, 3, 4 and 6 have obtained permission for extraction of surface/ ground water from competent authority. Contractor of package 5 have applied for obtaining the required consent for extracting ground water. Overall compliance Satisfactory
Utility Relocation	Utilities relocation will be reasonably completed before	Design requirement	As per widening plan	Included in construction cost	Design Consultant	ADB PIU PWD	Utility shifting being undertaken in consultation with concerned

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
	construction starts and without affecting any essential supplies to habitat like water supply.						authorities, without affecting the essential water supplies.
Shifting of Community Structure	Community structures, like, religious structures will be shifted appropriately, if required.	Design requirement	As per widening plan	Included in construction cost	Design Consultant	ADB PIU PWD	Shifting of community structure being undertaken in consultation with concerned Gram Panchayat
Climate Change and Removal of trees	No climate Change induced vulnerability anticipated. As per IEE Report approx. following numbers of trees are required to be cut in each package for up-gradation of the project road before the commencement of construction with prior Clearance from the Forest Department/District Authorities as applicable. : Package 1: 2855 trees Package 2: 2554 trees Package 3: 2930 trees Package 4: 1885 trees Package 5: 2930 trees Package 6: 1885 trees Compensatory afforestation: Ten trees will be planted for each tree felled as per regulatory compliance. Geometric adjustment to reduce tree cutting.	Local Forest Rule	Within RoW or on Govt. Land	Covered in EMP	Through Forest Department	ADB PIU PWD	Tree cutting activity is under progress in all packages. The details of trees to be cut and permissions details obtained from district authority are provided in **Table 9.0**. Compensatory plantation Ten trees shall be planted for each tree felled as per condition imposed by the district authority. Plantation shall be undertaken by the State Forest Department for which payments have been made by CGPWD. (Ref. **Table 10.0**) Additionally plantation under Corporate Social Responsibility Scheme has been undertaken by contractors and details are provide in **Table 11.0** Overall compliance Satisfactory
Removal of Structures and acquisition of land	The project roads require very limited land acquisition except for bridge approach road in which primarily Government and agriculture land. There no project affected families.	Design requirement	Within RoW	Included in construction cost	Construction Agencies, PIU/ PWD	ADB PIU PWD	The required details being covered under Social Safeguards Monitoring Report.

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
	Only few non-title holders are affected. They will be removed as per SPS 2009 and Rehabilitation and Resettlement plan prepared separately.						
Widening Option and Pavement design and inadequate drainage provisions in habitat areas	Selection of widening option (left aligned, right aligned or centric widening) to be decided based on the least cutting of tree, minimum loss of structure and embankment design considerations. Selection of suitable pavement design in habitat areas considering alignment level and drainage requirements. Raise road level as feasible, above the nearby areas with provision of adequate side drains to evacuate the rain water and domestic discharges (drained by habitats occasionally) to prevent damage to road and rain water entry to habitats' houses. Provision of adequate no of cross drainage structures based on drainage pattern shall be made to maintain natural flow of rain water across the road.	Design requirement	All habitat areas throughout the alignment	Included in construction cost	Design Consultant	ADB PIU PWD	Majorly existing alignment is being followed and widening being undertaken so it has least impact on the loss of trees and structure.
Safety along the proposed alignment	Adequate safety provisions like crash barriers at accident prone areas, rumble strips in habitat areas to regulate speed, retro-reflective warning sign boards nears school, hospital, religious places (Preferably PCC boards with retro-reflective paints to avoid its theft) shall be made.	Design requirement	Crash barriers are proposed at sensitive locations like school, medical centers, along the project corridor	Included in construction cost	Design Consultant	ADB PIU PWD	Being complied. Contractor advised to follow safety norms strictly. Overall compliance Partial Satisfactory

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
			Rumble strips are proposed at the all the settlements and crossing points				
2. Natural Hazards							
Protection from damage from Earthquake	Adoption of relevant IS codes for design embankment/ structures suitable to withstand earthquake of highest magnitude in moderate earthquake intensity Zone (Seismic Zone II level as per Indian classification).	IRC:34 Recommendations for road construction in waterlogged area and IRC: 75 and MoRSTH guidelines for Design of High Embankments	Throughout the stretch especially bridge structures	Project preparation and construction costs Cost	Design Consultant	ADB PIU PWD	Relevant IS codes for design embankment / structures followed.
B. Construction Stage							
3. Climate and Air Quality							
Local Weather conditions	Additional Plantation on river banks, borrow areas and sensitive locations to increase the green cover and improve the aesthetics	Kyoto Protocol, Environmental Protection Act, 1986; The Air (Prevention and Control of Pollution) Act, 1981 + IRC and MORSTH Specifications for Road and Bridge works Air (P and CP) Act 1974 and Central Motor and Vehicle Act 1988	Throughout project corridor, mainly at haulage roads, earthwork, construction sites, loading areas, storage areas, transport route.	Road Side Plantations in the ratio of 1:10 (costs highlight in the following table)	Design Consultant and Contractor	CSC / ADB PIU PWD	Additional Plantation along the road side has been undertaken by contractors.
Poor air quality due to compromise in design	Road design and Pavement roughness as per IRC specifications. congestion free movement of traffic with provision of junctions improvement at major intersections Plantation of pollutant absorbing trees.			Included in construction costs	Design Consultant and Contractor	CSC / ADB PIU PWD	Major junctions are being improved to facilitate free movement of traffic. Plantation being undertaken along road side to improve air quality.

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
Dust Generation due to construction activities and transport, storage and handling of construction materials	Transport of loose and fine materials through covered vehicles and paved roads to the extent feasible. Loading and unloading of construction materials shall be made at designated locations in project area with provisions of water fogging around these locations Storage areas to be located downwind of the habitation area. Water spraying on earthworks, unpaved haulage roads and other dust prone areas. Provision of PPEs to workers.					CSC / ADB PIU PWD	Raw material being transported through covered tarpaulin to minimize dust generation. Loading and unloading of construction material being undertaken at designated areas. Water sprinkling is regularly being undertaken at required locations to reduce fugitive dust. PPEs have been provided to workers working at site. Overall compliance Satisfactory
Emission from vehicle, equipment and machinery	Regular maintenance of machinery and equipment. Hot Mix Plant shall be located at least 1 KM downwind of the human settlement. Batching, plants and crushers at downwind (0.5km) direction from the nearest settlement. Hot mix plant to be fitted with adequate stack height. Obtain consent to establish (NOC) from PCB before setting up these plants. Only crushers licensed by the PCB shall be used DG sets with stacks of adequate height and use of low sulphur diesel		Asphalt mixing plants, crushers, DG sets locations	Included in construction costs Included in monitoring cost	Contractor	CSC/ CSC / ADB PIU PWD	Contractors have been advised to regularly maintain machinery and equipment's. No Objection certificates from C.G. Environment Conservation Board, Raipur has been obtained for Hot Mix Plant, Batching Plant and Crusher Plants where ever required. Periodic Ambient Air Quality is being monitored by MoEF&CC recognised laboratory (M/S Enviro Analysts & Engineers Pvt. Ltd.) as per EMOP.

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
	as fuel. Use LPG as fuel at construction camps Undertake periodic ambient air quality monitoring as per EMOP						Overall compliance Satisfactory
4 . Noise							
Noise from construction vehicle, equipment and machinery.	Provision is made for installing need base noise barrier near sensitive locations like hospitals, schools. All equipment shall be fitted with silencers and will be properly maintained to minimize its operational noise. Stationary noise making equipment shall be placed along uninhabited stretches. The timing for construction activities shall be regulated such that all noise generating construction activities happen after school hours. The provision of temporary noise barrier (Barricading) shall be made near identified sensitive locations or near the noise source during construction. Plantation along the boundary wall shall be made at start of construction itself. Protection devices (ear plugs or ear muffs) shall be provided to the workers operating near high noise	Legal requirement Noise Pollution (Regulation and Control) Rules, 2000 and amendments thereof + Clause No 501.8.6. MoRSTH Specifications for Road and Bridge works	The school, hospitals are away from the road, therefore, at the time of construction of road supervision consultant will evaluate the need to noise barriers.	Cost for Plantation already indicated above. Rest part of construction costs Monitoring Cost as indicated In EMoP.	Contractor	CSC / ADB PIU PWD	As of now noise levels are within permissible limits and hence requirement of noise barriers is not required. At any point of time if the noise levels are exceeding the permissible limits then installation of noise barriers can be planned after due consultation with concerned local residents/ stakeholders. . Plantation along the boundary of camp sites has been undertaken. PPEs have been provided to workers working at site. Contractor advised to provide PPEs till completion of project. Periodic Noise levels are being monitored by MoEF&CC

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
	generating machines Noise measurements as per EMoP should be carried out to ensure the effectiveness of mitigation measures and develop a mechanism to record and respond to complaints on noise Noise monitoring as per EMoP.						recognised laboratory (M/S Enviro Analysts & Engineers Pvt. Ltd.) as per EMOP. Overall compliance Satisfactory
5. Land and Soil							
Land use Change and Loss of productive/top soil	The top soil from the productive land shall be preserved and reused for plantation purposes as top cover of embankment slope for growing vegetation to protect soil erosion. The land taken on lease for access road and construction camp shall be is restored back to its original land use before handing it over back to land owner	Project requirement	Throughout the project section and borrow areas	Included in construction cost	Contractor	CSC / ADB PIU PWD	The top soil is being preserved and shall be reused in the project for embankment slopes and for plantation purposes along road side. The land taken on lease for access road and construction camp shall be is restored back to its original land after the completion of the works. Overall compliance Satisfactory

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
Slope protection and Soil erosion due to construction activities, earthwork, and cut and fill	Bank protection measures shall be taken at erosion prone areas. The protection measures may include use of geo-textiles matting, bio (vegetative) - turfing Side slopes of the embankment shall not be steeper than 2H:1V. Provision of side drain to guide the water to natural outfalls. In rural stretches, longitudinal side drains shall be intercepted by drains serving as outlet channels to reduce the erosion. Soil spread on slopes for permanent disposal shall be buttressed at the toe by retaining walls. Turfing of embankment slopes shall be done along the stretch. Stone pitching wherever necessary. Shrubs shall be planted in loose soil area. Soil erosion shall be visually checked on slopes and high embankment areas. In case soil erosion is found, suitable measures shall be taken to control the soil erosion further including bio-turfing While planning or executing excavations the Contractor will take all adequate precautions against soil erosion as per MoRSTH 306.	IRC: 56 -1974 recommended practice for treatment of embankment slopes for erosion control Clause No. 306 and 305.2.2 MoRSTH Specifications for Road and Bridge works Guidelines IX for Soil erosion	At high embankment area	Construction cost	Design consultant and Contractor,	CSC / ADB PIU PWD	Shall be complied as per the provisions.
Soil erosion at	The earth stockpiles to be provided		At earth	Construction	Contractor	CSC / ADB	This practice is being followed.

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
earth stockpiles	with gentle slopes to prevent soil erosion and stock piles to be located downwind.		stockpiles	cost		PIU PWD	
Borrow areas	Non-productive, barren lands, wasteland shall be used for borrowing earth with the necessary permissions/ consents. Borrow areas should not be located on cultivable lands except in the situations where land owners desires to level the land. The top soil shall be preserved and depth shall be restricted to the desired level and the slop shall not be steeper than 25%. Borrow areas shall be sited away from inhabited areas. To the extent possible, To the extent borrow areas shall be sited away from inhabited areas. Borrow areas shall be leveled with salvaged material or other filling materials which do not pose contamination of soil. Else, it shall be converted into fishpond in consultation with fishery department and land owner/community. Rehabilitation of the borrow areas as per Guidelines for redevelopment of Borrow Areas.	IRC Guidelines (No. IRC:10-1961) on borrow areas selection and amount to be extracted For quarries (Environmental Protection Act and Rules, 1986; Water Act, Air Act) + Clause No. 305.2.2 MoRSTH Specifications for Road and Bridge works Guidelines V for Borrow Areas Management	Borrow sites location.	Construction cost	Contractor	CSC / ADB PIU PWD	Mostly the ponds falling under village panchayats have been identified as borrow areas. These ponds are being widened and deepened by gram panchayats with help of contractors. Contractors have been advised to obtain requisite permissions wherever necessary and submit a copy of the same to CSC and PIU Office.
Quarry Operations	Aggregates will be sourced from existing licensed quarries. Copies of consent/ approval / rehabilitation plan for a new quarry or use of existing source will be submitted to EO, PIU.	Clause No. 111.3 MoRSTH Specifications for Road and Bridge works Guidelines VI					Contractors have been advised to source the aggregate material from approved quarries.

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
	The contractor will develop a Quarry Redevelopment plan, as per the Mining Rules of the state and submit a copy of the approval to EA if new quarries are to be opened. .	for Quarry Areas Management					
Compaction of soil and impact on quarry haul roads due to movement of vehicles and equipment	Construction vehicles, machinery, and equipment to be stationed in the designated ROW to avoid compaction. Approach roads/haulage roads shall be designed along the barren and hard soil area to reduce the compaction. Transportation of quarry material to the dumping site through heavy vehicles shall be done through existing major roads to the extent possible to restrict wear and tear to the village/minor roads. Land taken for construction camp and other temporary facility shall be restored to its original conditions.	Design requirement	Parking areas, Haulage roads and construction yards.	Included in construction cost	Contractor	CSC / ADB PIU PWD	Construction vehicles, machinery, and equipment are stationed in the designated places. Transportation of quarry material is being done through existing major roads. Land taken on lease for construction camps shall be restored to original condition after completion of works.
Contamination of soil and construction waste management	Fuel and lubricants shall be stored at the predefined storage location away from drainage channels. The storage area shall be paved with gentle slope to a corner and connected with a chamber to collect any spills of the oils Construction vehicles and equipment will be maintained and refueled in such a fashion that oil/diesel spillage does not contaminate the soil. All efforts shall be made to	Design requirement	Fuelling station, construction sites, and construction camps and disposal location.	Monitoring Cost Included in EMoP	Contractor	CSC / ADB PIU PWD	Fuel and lubricants are being stored on paved areas. Oil collection pits have been proposed and are being used to collect spilled oils. Construction vehicles and equipment's are being maintained and refuelled at designated areas to avoid oil spillages.

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
	minimize the waste generation. Unavoidable waste shall be stored at the designated place prior to disposal. To avoid soil contamination at the wash-down and re-fuelling areas, "oil interceptors" shall be provided. Oil and grease spill and oil soaked materials are to be collected and stored in labeled containers (Labelled: WASTE OIL; and hazardous sign be displayed) and sold off to SPCB/ MoEF authorized Waste Oil Recycler Septic tank or mobile toilets fitted with anaerobic treatment facility shall be provided at construction camp. Domestic solid waste at construction camp shall be segregated into biodegradable and non-biodegradable waste. The non-biodegradable and recyclable waste shall be sold off. Efforts shall be made that biodegradable waste shall be composted in the mechanized and movable composter by the contractor. Non bio-degradable and non saleable waste shall be disposed off to authorized land fill site. All excavated materials from roadway, shoulders, drains, cross drainage should be used for backfilling embankments, filling pits,						Unavoidable waste is being collected in drums labelled as Waste Oil and hazardous signs have been displayed. Contractors have been advised to dispose off waste oil to SPCB / MoEF&CC authorized waste oil recycler. Septic tanks have been provided at construction camps. Domestic solid waste at construction camp is being segregated into biodegradable and non-biodegradable waste. Non bio-degradable and non-saleable waste is being disposed off. Excavated material and debris

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
	and landscaping. Unusable debris material should be suitably disposed off at pre designated disposal locations, with approval of the concerned authority. Unproductive/wastelands shall be selected for dumping sites. Away from residential areas and located at least 1KM downwind side of these locations, Dumping sites shall not be close to water body and contaminate any water sources, rivers. Dumping sites should have adequate capacity equal to the amount of debris generated. Public perception and consent from the village Panchayats about the location of debris disposal site shall be obtained before finalizing the location. The bituminous wastes shall be disposed in secure landfill sites only in environmentally accepted manner. For removal of debris, wastes and its disposal MoRSTH guidelines should be followed. Soil quality monitoring shall be carried out as per EMoP.						material from road is being reused for filling low-lying areas. The unused debris material is presently being stored in designated areas and eventually disposed off after obtaining approval of concerned authority. The bituminous waste is presently being stored in designated areas and eventually disposed off after obtaining approval of concerned authority. Soil quality monitoring is being undertaken by by MoEF&CC recognised laboratory (M/S Enviro Analysts & Engineers Pvt. Ltd.) as per EMOP.
6. Water Resources							
Construction water	Requisite permission as applicable shall be obtained for abstraction of groundwater.	Clause No. 1010 EP Act 1986 MoRSTH	Throughout the Project section	Included in construction cost	Contractor	CSC / ADB PIU PWD	Requisite permission to extract ground water from competent authority has been obtained by contractors of package 1,2,3,4

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
	The contractor shall make arrangements for water required for construction without affecting the water availability and supply to nearby communities. Water intensive activities shall not be undertaken during summer season. Provisions shall be made to connect road side drains with exiting nearby ponds.	Specifications for Road and Bridge works					and 6. Permission awaited from package 5. Also permission to use surface water for construction purpose has been obtained by contractors of package 1,2,3,4 and 6 from competent authority

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
Alteration in surface water hydrology due to embankment	Existing drainage system to be maintained and further enhanced. Adequate cross drainage structures shall be provided. Additional balancing culverts shall be provided in flood prone areas. The embankment height shall be designed consistent with the existing topography of the region and shall be higher than the HFL. Elaborate drainage system shall be provided to drain the storm water from the roadway and embankment and to ensure minimum disturbance to natural drainage of surface and subsurface water of the area. Surface runoff from the main road and embankment slopes shall be discharged through longitudinal drains, designed for adequate cross section, and the outfalls. No construction material will be stored or disposed near any water body except for reusing it for enhancement measures such as embankment raising.	Design requirement, Clause No 501.8.6. MoRSTH Specifications for Road and Bridge. IRC SP 42 and 50 for design of surface and subsurface	Near all drainage channels, river crossings etc.	Included in construction cost	Contractor	CSC / ADB PIU PWD	Existing drainage system is being maintained. Adequate cross drainage structures have been provided. Additional culverts where required are being provided. Embankment height has been designed higher than HFL. Proper drainage system has been proposed in the project. Lined drains have been proposed in urban/settlement areas, where as unlined drains have been proposed in rural areas. The same shall be complied with. No construction material is being stored or disposed near water bodies.
Siltation in water bodies due to construction activities/ earthwork	Embankment slopes to be modified suitably to restrict the soil debris entering water bodies. Provision of Silt fencing shall be made at water bodies. Silt/sediment should be collected and stockpiled for possible reuse as surfacing of slopes where they have	Design requirement , Clause No 501.8.6. MoRSTH Specifications for Road and Bridge works (CP and CP)	Near Mahanadi and Joke River bodies, embankment slopes.	Included in construction cost	Contractor	CSC / ADB PIU PWD	Shall be complied with.

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
	to be re-vegetated. Earthworks and stone works to be prevented from impeding natural flow of rivers, streams and existing drainage system. Provision of retaining wall is made along the road for the ponds located next to the road to prevent soil erosion and siltation of pond	and worldwide best practices					
Deterioration in Surface water quality due to leakage from vehicles and equipment.	No vehicles or equipment should be parked or refueled near water-bodies, so as to avoid contamination from fuel and lubricants. Oil and grease traps and fuelling platforms to be provided at re-fuelling locations. All chemicals and oil shall be stored away from water and on concreted platform with catchment pit for spills collection. All equipment operators, drivers, and warehouse personnel will be trained in immediate response for spill containment and eventual cleanup. Readily available, simple to understand and preferably written in the local language emergency response procedure, including reporting, will be provided by the contractors Construction camp to be sited away from water bodies. Wastes must be collected, stored	The Water (Prevention and Control of Pollution) Act, 1974 and amendments thereof.	Water bodies, refueling stations, construction camps.	Construction cost Monitoring cost as indicated in EMoP	Contractor	CSC / ADB PIU PWD	The measures shall be adopted as per the provision.

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
	and taken to approve disposal site only. Water quality shall be monitored periodically.						Water quality monitoring are being monitored periodically by MoEF&CC recognised laboratory (M/S Enviro Analysts & Engineers Pvt. Ltd.) as per EMOP.
7. Flora and Fauna							
Vegetation loss due to site preparation and construction activities and Plantation Strategy	Suitable modifications in design to minimize tree cutting. Roadside trees to be removed with prior approval of competent authority. Compensatory plantation at 1:10 basis with local forest department. Provision of LPG in construction camp as fuel source to avoid tree cutting, if possible. Additional plantation near river banks to check erosion (not possible during construction stage). In the event of design changes during the construction stages additional assessments including the possibility to save trees shall be made by the EA . Road side Plantation Strategy as per IRC specifications including manuring. Control use of pesticides/manure	Forest Conservation Act 1980 + IRC SP: 21 and IRC SP:66	Throughout project corridor	Indicated above	Forest Department for tree cutting and compensatory tree plantation. Rest contractor	CSC / ADB PIU PWD	Minimum tree cutting being done after obtaining permission from competent authority. 1:10 compensatory plantation shall be undertaken by forest department along the road side. Additionally plantation under Corporate Social Responsibility Scheme has been undertaken by contractors.. At present there is no change in alignment. Road side plantation to be undertaken as per IRC specifications.
8. Construction Camps							
Impact associated with location	All camps should maintain minimum distance from following: # 1000 m from habitation # 500 m from water bodies	Design Requirement	Both construction camps	Included in construction cost	Contractor	CSC / ADB PIU PWD	Adequate distance being maintained.

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
worker's Health in construction camp	The location, layout and basic facility provision of each labor camp will be submitted to CSC prior to their construction. The construction shall commence only after approval of CSC concurrence The contractor will maintain necessary living accommodation and ancillary facilities in functional and hygienic manner as approved by the EA. Preventive medical care to be provided to workers. Disposal of solid waste on regular basis at identified locations. The Contractor will take all precautions to protect the workers from insect and pest to reduce the risk to health. This includes the use of insecticides which should comply with local regulations. No alcoholic liquor or prohibited drugs will be imported to, sell, give, barter to the workers of host community. Provision of day crèche for children Limited recreation and sporting facilities for the staff and workers. Immunization to immigrant workers/local community against communicable and sexually transmitted diseases.	The Building and Other Construction workers (Regulation of Employment and Conditions of Service) Act 1996 and The Water (Prevention and Control of Pollution) Act, 1974 and amendments thereof	All construction camps	Part of the Contract	Contractor	CSC / ADB PIU PWD	The following measures are being provided: • First Aid facility at camp site and construction site • Provision of safe drinking water • Proper disposal of solid waste on regular basis • Provision of safe living and hygienic conditions

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
9. Management of Construction Waste/Dismantled Debris							
Selection of Dumping Sites	Unproductive/wastelands shall be selected for dumping sites. Away from residential areas and water bodies Dumping sites have adequate capacity equal to the amount of debris generated. Public perception and consent from the village Panchayats has to be obtained before finalizing the location.	Design Requirement and MoRSTH guidelines	At all Dumping Sites	Part of the contract	Contractor.	CSC / ADB PIU PWD	Construction waste material is being used to raise the low lying areas.

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
Reuse and disposal of construction and dismantled waste	The existing bitumen surface shall be utilized for paving of cross roads, access roads, and paving works in construction sites and camps, temporary traffic diversions, and haulage routes. All excavated materials from roadway, shoulders, verges, drains, cross drainage will be used for backfilling embankments, filling pits, and landscaping. Unusable debris material should be suitably disposed off at pre-designated disposal locations, with approval of the concerned authority. The bituminous wastes shall be disposed in secure landfill sites only in environmentally accepted manner. For removal of debris, wastes and its disposal MORSTH guidelines should be followed. Unusable and surplus materials, as determined by the Project Engineer, will be removed and disposed off-site.						The excavated material is being reused in the project for backfilling of embankment and filling of low lying areas.
10. Accessibility, Traffic Management, Accident and Safety Risks							
Design requirement and Traffic Planning During Construction Stage	Temporary traffic diversion shall be planned by the contractor and approved by the .CSC The traffic control plans shall contain details of diversions; traffic safety arrangements during construction; safety measures for nighttime traffic and precautions for transportation of hazardous	Design requirement and IRC SP:55	Throughout the project corridor especially at intersections.	Project preparation and construction cost	Contractor	CSC / ADB PIU PWD	Traffic Diversions being prepared as per requirement of IRC SP 55 by contractors and approved by CSC. Contractors have been advised that diversions should always be maintained in running condition particularly during monsoon.

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
	materials. Traffic control plans shall be prepared in line with requirements of IRC's SP 55 document'. The Contractor will ensure that the diversion/detour is always maintained in running condition, particularly during the monsoon to avoid disruption to traffic flow. On stretches where it is not possible to pass the traffic on the part width of existing carriageway, temporary paved diversions will be constructed. The contractor shall inform local community of changes to traffic routes, and pedestrian access arrangements with assistance from CSC and Nodal officer concerned Use of adequate signage to ensure traffic management and safety. Conduct of regular safety audit on safety measures.						Overall compliance Satisfactory Adequate signages for free and safe movement of traffic and pedestrians are being followed. Compliance is satisfactory.
Pedestrians, animal and Vehicular movement,	All measures for the safety of traffic during construction viz. signs, markings, flags, lights and flagmen as proposed in the Traffic Control Plan/Drawings shall be taken. Temporary access and diversion, with proper drainage facilities. Access facility to the schools located adjacent to the highway.	Design requirement and IRC: SP: 27 - 1984 Report Containing Recommend--ations of IRC Regional Workshops on Highway Safety	Near habitation on both sides of schools, temples, hospitals, construction sites, haulage roads, diversion sites.	Included in construction cost.	Contractor in consultation with Forest department and PIU	CSC / ADB PIU PWD	Adequate signages for free and safe movement of traffic and pedestrians are being followed such as road signs, markings, flags, lights and flagmen etc. It can further be improved. Compliance is satisfactory.
Accident risk from	Contractors to adopt and maintain safe working practices.		Construction sites	Included in construction	Obligation of Contractor	CSC / ADB PIU PWD	Presently fluorescent tapes are being used. Contractors have

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
Construction activities	Usage of fluorescent and retro-reflective signage, in local language at the construction sites Training to workers on safety procedures and precautions. Provision of PPEs to workers. Provision of a readily available first aid unit including an adequate supply of dressing materials. Ensure ready access to ambulance, nursing staff, and doctor when needed. The contractor will not employ any person below the age of 14 years for any work and no woman will be employed on the work of painting with products containing lead in any form. Clear demarcation of areas for restricted accesses to avoid accidents.	IRC:SP: 32 - 1988 Road Safety for Children (5-12 Years Old) IRC:SP: 44 1994 Highway Safety Code IRC: SP: 55 2001 Guidelines for Safety in Construction Zones The Building and other Construction workers Act 1996 and Cess Act of 1996 Factories Act 1948		cost			been advised to use fluorescent and retro reflective signages. PPEs such as helmets, jackets, gum boots, gloves and noise mask have been provided to workers. Primary first aid facility is being maintained at construction camps. Contractors have been advised not to use any person below the age of 14 years for any work and also not to engage any women for painting works.
11. Common Property Resources and other Utilities							
Damage to Common Property Resources and Utilities	Ensure that no construction material dumped close to the such facilities and all precautions are taken such that no damage happen to any of common property resources and utilities.	Environment Protection Requirement	Throughout the corridor	Construction cost	Contractor	CSC / ADB PIU PWD	Measures are adopted as per the provisions
Access to common property resources	The area shall be barricaded for safety prospective. It shall be ensured that access to these area ensure for people to visit such places.	Environment Protection Requirement	Throughout the corridor	Construction cost	Contractor	CSC / ADB PIU PWD	Measures are adopted as per the provisions
12. Enhancement Measures							

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
Environmental enhancement along the corridor	Enhancement of tree plantations near likely to be relocated community structures/ landscaping etc. Enhancement/rehabilitation of borrow areas etc.	Environmental Enhancement as part of project requirement	Throughout the corridor	Construction cost	Contractor	CSC / ADB PIU PWD	Plantation along the road side has been undertaken by contractors.
13. Contractor Demobilization							
Clean-up Operations, Restoration and Rehabilitation	Contractor will prepare site restoration plans, which will be approved by the CSC. The cleanup and restoration operations are to be implemented by the contractor prior to demobilization. All construction zones including river-beds, culverts, road-side areas, camps, hot mix plant sites, crushers, batching plant sites and any other area used/affected by the project will be left clean and tidy, at the contractor's expense, to the satisfaction of the Environmental officer. All the opened borrow areas will be rehabilitated .and CSC will certify in this regard.	Project requirement	Throughout the Corridor and borrow areas	----	Contractor	CSC / ADB PIU PWD	This activity shall be undertaken after completion of all civil works
B. Operation Stage							
1. Climate and Air quality							
Air pollution due to due to vehicular movement	Roadside tree plantations shall be maintained. Regular maintenance of the road will be done to ensure good surface condition Ambient air quality monitoring shall be carried out as per EMoP. If monitored parameters are above the prescribed limit, suitable control measures must be taken. Road signs shall be provided	Environmental Protection Act, 1986; The Air (Prevention and Control of Pollution) Act, 1981	Throughout the Corridor	Indicated In EMoP	CSC / ADB PIU PWD		This activity shall be undertaken during operation phase

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
	reminding the motorist to properly maintain their vehicles to economize on fuel consumption and protect the environment.						
2 Noise Environment							
Noise due to movement of traffic	Effective traffic management and good riding conditions shall be maintained to reduce the noise level throughout the stretch and speed limitation and honking restrictions may be enforced near sensitive locations. The effectiveness of the multilayered plantation should be monitored.	Noise Pollution (Regulation and Control) Rules, 2000 and amendments thereof	In all settlement areas	Included in additional plantation cost.	CSC / ADB PIU PWD		This activity shall be undertaken during operation phase
3. Land and Soil							
Soil erosion at embankment during heavy rain fall.	Periodic checking to be carried to assess the effectiveness of the stabilization measures viz. turfing, stone pitching, river training structures etc.	Project requirement	At bridge locations and embankment slopes and other probable soil erosion areas.	Included in Operation/ Maintenance cost	CSC / ADB PIU PWD		This activity shall be undertaken during operation phase
Soil erosion at borrow areas	Visual monitoring and inspection of soil erosion at borrow areas, quarries (if closed and rehabilitated), embankments and other places expected to be affected, will be carried out once in every six months as suggested in monitoring plan.	Project requirement	At bridge locations and embankment slopes and other probable soil erosion areas.	Included in Operation/ Maintenance cost	CSC / ADB PIU PWD		This activity shall be undertaken during operation phase
4. Water Resources							
Contamination of surface water quality due to leakage of oil	Monitoring of surface water bodies		Near Mahanadi and Joke River	Indicated in EMoP	CSC / ADB PIU PWD		This activity shall be undertaken during operation phase

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
Siltation	Regular visual checks shall be made to observe any incidence of blockade of drains/culverts. Regular checks shall be made for soil erosion and turfing conditions of river training structures for its effective maintenance. . .						This activity shall be undertaken during operation phase
5. Flora and Fauna							
Vegetation	Planted trees, shrubs, and grasses to be properly maintained. The tree survivalist audit to be conducted at least once in a year to assess the effectiveness	Forest Conservation Act 1980	Throughout the corridor	Indicated in Monitoring cost in EMoP	CSC / ADB PIU PWD		This activity shall be undertaken during operation phase
6. Flooding/ inundation							
Road inundation due to choking of drainage channels	Field Unit will ensure that all drains (side drains and all cross drainages) are periodically cleared especially before monsoon season to facilitate the quick passage of rainwater and avoid flooding.	Project operation requirement	In settlement area	Overall Operation cost	CSC/PIU CSC / ADB PIU PWD		This activity shall be undertaken during operation phase
7. Right-of-Way Maintenance							
Accident Risk due to uncontrolled growth of vegetation	The construction site shall be kept completely clear of vegetation. Regular maintenance of plantation Invasive plant not to be planted near the road. Controlled use of herbicide/pesticide The designated ROW shall be maintained free of any encroachment.	Project requirement	Throughout the Project route	Included in operation/ Maintenance cost	CSC / ADB PIU PWD		This activity shall be undertaken during operation phase

Environmental Issue/ Component	Remedial Measure	Reference to Laws / Guidelines	Approximate Location	Mitigation Cost	Institutional Responsibility		Status of Compliance (Excellent/Good/Satisfactory/ Poor/Very Poor)
					Implementation	Supervision	
8. Accidents and Safety							
Accident risks associated with traffic movement.	Traffic control measures, including speed limits, will be enforced strictly. Further encroachment and squatting within the ROW will be prevented. Monitor/ensure that all safety provisions included in design and construction phase are properly maintained	IRC:SP:55	Throughout the Project route	Included in operation/ Maintenance cost	CSC / ADB PIU PWD		This activity shall be undertaken during operation phase
Transport of Dangerous Goods	Preparation of spill prevention and control and emergency preparedness and responsive plans based on an analysis of hazards, implementation of presentation and control measures.		Throughout the project stretch	Included in operation/ Maintenance cost.	CSC / ADB PIU PWD		This activity shall be undertaken during operation phase
9. Monitoring Operation Performance							
Monitoring Operation Performance	Monitor the operational performance of the mitigation/ enhancement measures carried out as a part of the project The indicators selected for monitoring include the survival rate of trees; utility of enhancement provision, status of rehabilitation of borrow areas, Air quality, water quality, noise levels, soil quality, drainage pattern. The monitoring and reporting to be carried out as per EMoP		Throughout the corridor	Included in EMoP	CSC / ADB PIU PWD		This activity shall be undertaken during operation phase

5.0 SAFEGUARDS MONITORING RESULTS AND UNANTICIPATED IMPACTS

A. Environmental Monitoring Schedule

In order to comply to requirements of Environmental Monitoring Plan (EMoP) as provided in Contract Agreement an external environmental monitoring agency M/s Enviro Analysts & Engineers Pvt. Ltd. (NABET Accredited & MoEF&CC approved Laboratory) has been hired by Contractors for their respective packages to carry out the environmental monitoring with regards to ambient air quality, water quality, soil quality and noise levels during construction period. The primary responsibility of the environmental monitoring agency is for testing, analyzing and reporting of test results as conducted by them.

The environmental monitoring for ambient air quality, water quality, soil quality and noise levels have been conducted during the month of November/December 2015 followed by May/June 2016 and November 2016 for following packages. The status of environmental monitoring for each package is provided below in **Table 14.0**.

Table No. 14.0: Status of Environmental Monitoring

S. No.	Package	Name of the Road	Month/Year of Monitoring		
1.	Package 1	Raipur – Bhaisa (SH-9)	January 2016	May 2016	-
2.	Package 2	Bhaisa – Baloda Bazar (SH-9)	November 2015	May 2016	November 2016
3.	Package 3	Nandghat – Baloda Bazar (SH-10)	December 2015	May 2016	-
4.	Package 4	Baloda Bazar - Gidhori (SH- 9)	January 2016	June 2016	-
5.	Package 5	Simga – Arang(Gullu) (SH- 20)	December 2015	May 2016	November 2016
6.	Package 6	Arang (Gullu) – Kurud (SH-20 / MDR)	November 2015	May 2016	November 2016

B. Environmental Monitoring Parameters

The details of parameters for Ambient Air, Water, Soil and Noise being monitored by Environmental Monitoring Agency are given below in **Table 15.0**. The detailed environmental monitoring results including site photographs under each package are given in **Annexure – 2**.

Table No. 15.0: Environmental Monitoring Parameters

Sl. No.	Environmental Parameters	Analytical Parameters
1	Air Quality Monitoring	PM_{10}, $PM_{2.5}$,SO_2, NO_x, CO
2	Water Quality Monitoring (Ground/Surface)	pH, Colour, Odour, Taste, Turbidity (NTU), Total Suspended Solids, Total Dissolved Solids (TDS), Total Alkalinity (as $CaCO_3$), Total Hardness (as

Sl. No.	Environmental Parameters	Analytical Parameters
		$CaCO_3$), Total Alkalinity (as $CaCO_3$), Aluminium (as Al), Calcium (as Ca), Magnesium (as Mg), Chlorides (as Cl), Sulphates (as SO_4), Fluoride (as F), Iron (as Fe), Total Phosphate, Cadmium (as Cd), Lead (as Pb), Copper (as Cu), Mercury (as Hg), Arsenic (as As), Chromium (as Cr), Zinc (as Zn), Phenolic Compounds, Boron (as B), Nickel (as Ni), Sulphide as S, Barium (as Ba), Ammonia (as NH_3), COD, BOD, DO, E-Coli and Total Coliform bacteria
3	Soil Monitoring	pH, Electrical Conductivity (µs/cm), Organic Carbon (%), Moisture Retention Capacity (%), Moisture (%), Infiltration Rate (mm/Hr), Sand (%), Silt (%),Clay (%), Texture, NPK, Sulphates, Sodium Sulphate, Calcium Sulphate, Oil & Grease
4	Noise Level Monitoring	Day and Night time

C. Ambient Air Quality

Ambient air quality monitoring has been conducted on 24 hourly bases with respect to the following parameters

1. Particulate matter (Size less than 10 µm) or PM_{10}
2. Particulate matter (Size less than 2.5 µm) or $PM_{2.5}$
3. Sulphur dioxide (SO_2)
4. Nitrogen dioxide (NO_x)
5. Carbon monoxide (CO)

Ambient air quality monitoring has been carried out near to Hot Mix Plants, Stone Crushers, WMM Plants, and Batching Plants and at major settlements along the road side. Ambient air quality monitoring conducted under different packages are as - : Package 2 (3 Locations) ; Package 5 (7 Locations) and at Package 6 (4 Locations) . The results were compared with National Ambient Air Quality Standards, 2009 as specified by CPCB. The brief findings of the monitoring carried out in November 2016 are presented below:

PM_{10}: In these three construction packages the value of PM_{10} was found below the National Ambient Air Quality Standards 2009 limit of 100 µg/m^3. The maximum measured value of PM_{10} was found in package 6 near Stone Crusher at Ch. 110+650 where the recorded values were 86 µg/m^3. The minimum measured value of PM_{10} was found in package 5 near village Phulsari where the recorded values were as low as 58 µg/m^3.

$PM_{2.5}$: In these three construction packages the value of $PM_{2.5}$ was found below the National Ambient Air Quality Standards 2009 limit of 60 µg/m^3. The maximum measured value of $PM_{2.5}$ was found in package 6 near Stone Crusher at Ch. 110+650 where the recorded values were 48.0 µg/m^3. The minimum measured value of PM_{10} was found in package 5 near village Phulsari where the recorded values were as low as 28.4 µg/m^3.

SO_2: In these three construction packages the value of SO_2 was found well below the National Ambient Air Quality Standards 2009 limit of 80 µg/m^3. The maximum measured value of SO_2 was found in package 6 near Hot Mix Plant at Ch. 106+700 where the recorded

concentrations were 16.2 µg/m^3. The minimum measured value of SO_2 was found in package 5 near village Kosangi at Ch. 48+200 where the recorded concentrations were as low as 5.2 µg/m^3.

NO_X: In these three construction packages the value of NO_X was found well below the National Ambient Air Quality Standards 2009 limit of 80 µg/m^3. The maximum measured value of NO_X was found in package 6 near Hot Mix Plant at Ch. 106+700 where the recorded concentrations were 40.5 µg/m^3. The minimum measured value of NO_X was found in package 5 near village Kosangi at Ch. 48+200 where the recorded concentrations were as low as 17.5 µg/m^3.

CO: In these three construction packages the value of CO was found well below the National Ambient Air Quality Standards 2009 limit of 2 mg/m^3. The maximum measured value of CO was found in package 2 near Hot Mix Plant at Ch. 57+000 and in package 6 near Hot Mix Plant at Ch. 106+700 where the recorded concentrations were 0.950 mg/m^3. The minimum measured value of CO was found in package 5 near village Phulsari where the recorded concentrations were as low as 0.102 mg/m^3.

D. Ambient Noise Levels

Noise level monitoring has been carried out near to Hot Mix Plants, Stone Crushers, WMM Plants, and Batching Plants and near major sensitive receptor/settlements along the road side. Noise level monitoring conducted under different packages are as Package 2 (5 Locations); Package 5 (9 Locations) and at Package 6 (8 Locations) . The results were compared with National Ambient Noise Standards, 2000 (for different category of area/zone) as specified by CPCB. The brief findings of the monitoring carried out in November 2016 are presented below:

Day Time Noise Levels - In these three construction packages the day time Leq was found well below the National Ambient Noise Standards 2000 limits. The maximum day time Leq recorded in Industrial zone was in package 5 near Batching Plant at Ch. 30+500 where the recorded level was 73.8 dB(A) against the standard limits of 75.0 dB(A). The maximum day time Leq recorded in Residential area was in package 5 near village Kharora at Ch. 36+500 where the recorded level was 47.2 dB(A) against the standard limits of 55.0 dB(A). The maximum day time Leq recorded in Silence zone was in package 2 near Public Health Centre Palari Village at Ch. 67+700 where the recorded levels were 44.2 dB(A) against the standard limits of 50.0 dB(A).

Night Time Noise Levels - In these three construction packages the night time Leq was found well below the National Ambient Noise Standards 2000 limits. The maximum night time Leq recorded in Industrial zone was in Industrial zone was in package 5 near Batching Plant at Ch. 30+500 where the recorded level was 69.0 dB(A) against the standard limits of 70.0 dB(A). The maximum night time Leq recorded in Residential area was in package 5 near village Kharora at Ch. 36+500 where the recorded levels were 42.0 dB(A) against the standard limits of 45.0 dB(A). The maximum night time Leq recorded in Silence zone was in package 6 near school at village Nari at Ch. 110+200 where the recorded level was 38.4. dB(A) against the standard limits of 40.0 dB(A).

E. Water Quality

Water quality both Ground Water and Surface Water were monitored to examine for physico-chemical and heavy metals along the project roads. These water samples were taken as grab samples. Ground water samples were collected from bore wells, hand pumps, while Surface water samples were collected from ponds/nalas falling along project roads and analysed for various parameters.

Water quality monitoring conducted under different packages are as - Package 2 (1 Drinking Water, 3 Ground Water and 1 Surface Water); Package 5 (1 Drinking Water and 3 Ground Water) and at Package 6 (4 Ground Water 1 Surface Water and 1 Waste Water from Batching Plant). The results were compared as per Drinking Water Indian Standard IS: 10500:2012. The major findings of the monitoring carried out in November, 2016 are presented below:

The water quality of all ground water samples in package 2, 5 and 6 is found to be suitable for drinking purpose. The water quality of Canal water near village Palari and in package 6 the water quality of Nala water near Katholi village at Ch. 104+000 are not suitable for drinking purpose.

The results of waste water sample from Batching Plant at package 6 have insignificant impacts.

F. Soil Quality

The physical and chemical testing of few soil samples were collected from package 2 and 6. The samples were collected from nearby agricultural fields. Since no standards are specified hence the results are presented in **Annexure -2**.

6.0 IMPLEMENTATION OF GRIEVANCE REDRESS MECHANISM AND COMPLAINTS RECEIVED FROM STAKEHOLDERS

There is a provision of Grievances Redress Mechanism (GRM) related to the implementation of the project, particularly regarding the environmental management plan. The GRM include formation of District level Grievance Redress Committee (GRC) comprising of District Commissioner, revenue official, forest official, public representative and respective nodal officer from PWD. Similarly village level GRC are to be formed in the project.

The GRM framework is shown below in **Figure 2.0**:

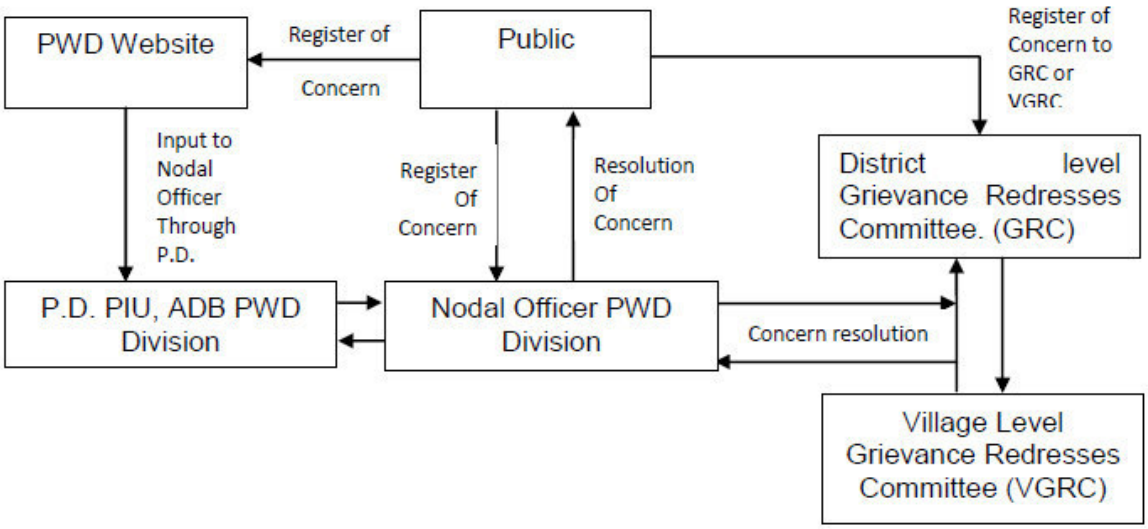

Figure 2.0: Grievances Redress Mechanism Framework

Road package 1 and 5 falls under Raipur District while package 2, 3 and 4 falls under Baloda Bazar District. Major portion of package 6 falls under Raipur while a small portion of road length falls under Dhamtari District. Grievance Redressal Committee (GRC) has been formed in all 3 project districts. The details are provided in **Annexure 3.0**.

Grievance Redress Committee (GRC) set up at district level monitors grievances arising during implementation for each package under area of its jurisdictions. The GRC determines the merit of each grievance, and resolve grievances within an outer time limit of three months of receiving the complaint. The Affected Persons has the right to refer the grievances to appropriate courts of law if not satisfied with the redress at any stage of the process. The set up GRC has the system of records keeping, contact details of complainant, date of the complaint received, nature of grievance etc. if any for the ongoing project and taking the necessary action against the complaint. During this reporting period no formal complaint or grievances have been registered.

7.0 CONCLUSION AND RECOMMENDATIONS

In order to have a sustainable development in the project the emphasis on the implementation of EMP has been given top most priority. The EMP prepared for the project was made part of the bid document and the contractor was made responsible for the implementation of EMP. The bid conditions require the contractor to adopt best construction practices which include most of the mitigation measures suggested in the EMP. PIU, PWD - ADB Cell and Construction Supervision Consultant are closely monitoring the implementation of EMP being carried out by the contractors. A Grievance Redressal Committee has been constituted at district levels to monitor grievances arising during implementation for each package. No complaint has been recorded during this period. Proper training on environmental issues during project implementation and EMP implementation are being organized for the PIU staff and contractors. Executing Agency will give more attention towards the implementation of EMP and project will be implemented in compliance with environmental regulations of the country and environment covenant of Loan Agreement.

Annexure – 1

Site Photographs of each Construction Package

Package – 1

Public Consultation along project road

Access provided during drain construction

Package – 2

First Aid Kit at Construction Camp

Water Sprinkling on Project road

Package – 3

Emergency Numbers

Water Sprinkling on Project Road

Package – 4

Diversion Sign Boards

Health Camp at Construction Camp

Package – 5

Barricading at Diversion

Fly ash mixed Material

Package – 6

Water Sprinkling at Camp Site

Drinking Water facility at Camp site

Annexure – 2

ENVIRONMENTAL MONITORING RESULTS

I. AMBIENT AIR QUALITY MONITORING RESULTS

Package 2: Bhaisa – Baloda Bazar SH-9

(Date of Sampling: 22.11.2016 to 23.11.2016)

Sr. No.	LOCATION	PM_{10}	$PM_{2.5}$	SO_2	NOx	CO
		$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3
1.	Near Hot Mix Plant (Ch. 57+000)	80.7	41.5	15.7	36.2	0.950
2.	Near WMM Plant (Ch.29+00)	72.8	36.6	6.2	19.3	0.370
3.	Near Batching Plant (Ch. 82+00)	76.4	38.8	7.2	21.4	0.532
National Ambient Air Quality Standards		**100**	**60**	**80**	**80**	**2.0**

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

Package 5: Simga – Arang Gullu SH- 20

(Date of Sampling: 21.11.2016 to 22.11.2016)

Sr. No.	LOCATION	PM_{10}	$PM_{2.5}$	SO_2	NOx	CO
		$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3
1.	Near WMM Plant (Ch. 27+500)	66.7	32.0	9.2	21.8	0.230
2.	Near Hot Mix Plant (Ch. 30+500)	73.8	36.4	11.3	37.8	0.652
3.	Near Batching Plant (Ch. 30+500)	70.4	35.2	9.0	28.4	0.310
4.	Near Ramdoot Stone Crusher (27+500)	78.0	40.0	7.1	22.7	0.184
5.	Near Village Tilda (Ch. 14+500)	62.4	31.0	5.6	18.6	0.114
6.	Village Kosangi (Ch. 48+200)	58.8	29.0	5.2	17.5	0.106
7.	Village Phulsari (Ch 4+050)	58.0	28.4	5.3	18.2	0.102
National Ambient Air Quality Standards		**100**	**60**	**80**	**80**	**2.0**

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

Package 6: Arang Gullu – Kurud SH-20 / MDR

(Date of Sampling: 23.11.2016 to 24.11.2016)

Sr. No.	LOCATION	PM_{10}	$PM_{2.5}$	SO_2	NOx	CO
		$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3
1.	Near Hot Mix Plant at (Ch.106+700)	84	42.6	16.2	40.5	0.950
2.	Near WMM Plant (Ch. 106+700)	72	36.8	10.2	26.4	0.277
3.	Near Batching Plant(Ch. 106+700)	74.4	38.0	9.1	23.8	0.290
4.	Near Stone Crusher (Ch. 110+650)	86.0	44.0	6.8	19.6	0.154
National Ambient Air Quality Standards		**100**	**60**	**80**	**80**	**2.0**

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

AMBIENT AIR QUALITY MONITORING PHOTOGRAPHS

Air Quality Monitoring at HMP
(Package 2)

Air Quality Monitoring near Batching Plant
(Package 2)

Air Quality Monitoring at HMP
(Package 5)

Air Quality Monitoring near Batching Plant
(Package 5)

Air Quality Monitoring at HMP
(Package 6)

Air Quality Monitoring at Construction Camp
(Package 6)

II. NOISE LEVEL MONITORING RESULTS

Package 2: Bhaisa – Baloda Bazar SH-9

(Date of Sampling: 21.11.2016)

SL. NO.	LOCATION	RESULT (dBA)	
		DAY	NIGHT
1	10m away from Hot Mix Plant (Ch.57+000) - IA	66.2	61.5
2	10m away from WMM Plant (Ch.29+000) - IA	62.0	56.7
3	10m away from Batching Plant (Ch. 82+000) - IA	60.2	55.3
4	20m from Public Health Centre Palari Village (Ch.67+700) - SZ	44.2	40.0
5	20m away from Dispensary (Ch. 55+000) - SZ	43.8	40.3
CPCB Standards	**Industrial Area (IA)**	**75**	**70**
	Silence Zone (SZ)	**50**	**40**

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

Package 5: Simga – ArangGullu SH- 20

(Date of Sampling: 21.11.2016 to 22.11.2016)

Sr. No.	LOCATION	RESULT (dBA)	
		DAY	NIGHT
1.	10m away from WMM Plant (Ch 27+500) - IA	72.4	66.8
2.	10m away from Hot Mix Plant (30+500) -IA	73.8	69.0
3.	10m away from Batching Plant (30+500) - IA	66.3	61.8
4.	10M away from Ramdoot Stone Crusher (27+500) - IA	72.8	68.0
5.	Village Tilda (Ch. 14+500) - RA	46.8	41.7
6.	Village Kharora (Ch. 36+500) - RA	47.2	42.0
7.	Village Moherenga (Ch 29+800) - RA	46.2	41.0
8.	Village Kosangi (Ch. 48+200) - RA	44.8	40.3
9.	Village Phulsari (Ch 4+050) - RA	45.3	40.5
CPCB Standards	**Industrial Area (IA)**	**75**	**70**
	Residential Area (RA)	**55**	**45**

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

Package 6: Arang Gullu – Kurud SH-20 / MDR

(Date of Sampling: 23.11.2016 & 24.11.2016)

Sr. No.	LOCATION	RESULT (dBA)	
		DAY	NIGHT
1	10m away from Hot Mix Plant (Ch.106+700) - IA	71.8	66.3
2	10m away from Crusher (Ch.110+650) - IA	73.4	67.5
3	10m away from WMM Plant (Ch.106+700) - IA	63.8	61.0

4	10m away from Batching Plant (Ch.106+700) - IA	61.7	59.2
5	Near School at Navapara (Ch. 99+390) -SZ	44.0	38.0
6	Near School at Katholi (Ch.106+000) -SZ	43.0	38.0
7	Near Hospital at Nari (Ch.110+200) -SZ	42.8	37.5
8	Near School at Nari (Ch.110+400) -SZ	44.1	38.4
CPCB Standards	**Industrial Area (IA)**	**75**	**70**
	Silence Zone (SZ)	**50**	**40**

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

NOISE LEVEL MONITORING PHOTOGRAPHS

Noise Level Monitoring near Hot Mix Plant (Package 2)

Noise Level Monitoring near Batching Plant (Package 2)

Noise Level Monitoring near Hot Mix Plant (Package 5)

Noise Level Monitoring near Stone Crusher (Package 5)

Noise Level Monitoring near Hot Mix Plant (Package 6)

Noise Level Monitoring at Village Nari (110+400) (Package 6)

III. WATER QUALITY MONITORING RESULTS

Package 2: Bhaisa – Baloda Bazar SH-9

Source of Water Samples: Ground Water
Date of Sampling: 23.11.2016

Sr. No.	Parameter	Unit	As per Drinking Water IS 10500 : 2012 Acceptable (Permissible) Limit	Results			
				Drinking Water Camp Site Ch. 57+00	Hand Pump Sakri Village	Hand Pump Palari Village	Hand pump Bhainsa Village
1.	pH value	-	6.5-8.5	7.55	7.50	7.60	7.70
2.	Colour	Hazen units	5 (15)	0.1	0.1	0.1	0.2
3.	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4.	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Turbidity	NTU	1 (5)	0.1	0.1	0.1	0.1
6.	Total dissolved solids	mg/l	500 (2000)	540	594	570	582
7.	Total hardness (as $CaCO_3$)	mg/l	200 (600)	274	288	268	308
8.	Total alkalinity as ($CaCO_3$)	mg/l	200 (600)	160	158	162	184
9.	Aluminium (as Al)	mg/l	0.03 (0.2)	< 0.001	< 0.001	< 0.001	< 0.001
10.	Calcium (as Ca)	mg/l	75 (200)	62.0	66.8	62.2	68.2
11.	Magnesium (asMg)	mg/l	30 (100)	28.9	29.4	27.3	33.4
12.	Chloride (as Cl)	mg/l	250 (1000)	18.8	20.7	17.8	20.2
13.	Sulphate (as SO_4)	mg/l	200 (400)	16.4	18.0	15.4	18.6
14.	Fluoride (as F)	mg/l	1.0 (1.5)	0.65	0.60	0.65	0.65
15.	Free residual chlorine	mg/l	0.2 (1)	0.2	N.D.	N.D.	N.D.
16.	Iron (as Fe)	mg/l	0.3	0.10	0.15	0.10	0.12
17.	Nitrate (as NO_3)	mg/l	45	2.15	3.25	2.45	2.75
18.	Copper (as Cu)	mg/l	0.05 (1.5)	< 0.001	< 0.001	< 0.001	< 0.001
19.	Cadmium (as Cd)	mg/l	0.003	< 0.001	< 0.001	< 0.001	< 0.001
20.	Lead (as Pb)	mg/l	0.01	< 0.001	< 0.001	< 0.001	< 0.001
21.	Mercury (as Hg)	mg/l	0.001	< 0.001	< 0.001	< 0.001	< 0.001
22.	Total arsenic (as As)	mg/l	0.01(0.05)	< 0.001	< 0.001	< 0.001	< 0.001
23.	Total chromium (as Cr)	mg/l	0.05	< 0.001	< 0.001	< 0.001	< 0.001
24.	Zinc as (Zn)	mg/l	15	0.18	0.27	0.20	0.20
25.	Cyanide as (CN)	mg/l	0.05	< 0.005	< 0.005	< 0.005	< 0.005
26.	Phenolic Compounds	mg/l	0.001 (0.002)	< 0.001	< 0.001	< 0.001	< 0.001
27.	Boron as B	mg/l	1.0	< 0.03	< 0.03	< 0.03	< 0.03
28.	Nickel as Ni	mg/l	0.02	< 0.001	< 0.001	< 0.001	< 0.001
29.	Sulphide as S	mg/l	0.05	< 0.01	< 0.01	< 0.01	< 0.01
30.	Barium as Ba	mg/l	0.7	< 0.01	< 0.01	< 0.01	< 0.01
31.	Ammonia as NH_3	mg/l	0.5	< 0.1	< 0.1	< 0.1	< 0.1
32.	Silver as Ag	mg/l	0.4	< 0.05	< 0.05	< 0.05	< 0.05
33.	Molybdenum as Mo	mg/l	0.07	< 0.05	< 0.05	< 0.05	< 0.05
34.	E. Coli	Per 100ml	Absent	Absent	Absent	Absent	Absent
35.	Total coliform bacteria	CFU/100ml	Absent	Absent	Absent	Absent	Absent

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

Package 2: Bhaisa – Baloda Bazar SH-9
Source of Water Samples: Surface Water
Date of Sampling: 23.11.2016

Sr. No.	Parameter	Unit	As per Drinking Water IS 10500 : 2012 Acceptable (Permissible) Limit	Canal Water near Palari village
1.	pH value	-	6.5-8.5	7.20
2.	Colour	Hazen units	5 (15)	1.5
3.	Odour	-	Agreeable	Agreeable
4.	Taste	-	Agreeable	Agreeable
5.	Turbidity	NTU	1 (5)	0.5
6.	Total dissolved solids	mg/l	500 (2000)	382
7.	Total hardness (as $CaCO_3$)	mg/l	200 (600)	180
8.	Total alkalinity as ($CaCO_3$)	mg/l	200 (600)	110
9.	Aluminium (as Al)	mg/l	0.03 (0.2)	< 0.001
10.	Calcium (as Ca)	mg/l	75 (200)	52.0
11.	Magnesium (asMg)	mg/l	30 (100)	12.1
12.	Chloride (as Cl)	mg/l	250 (1000)	12.3
13.	Sulphate (as SO_4)	mg/l	200 (400)	10.7
14.	Fluoride (as F)	mg/l	1.0 (1.5)	0.55
15.	Free residual chlorine	mg/l	0.2 (1)	N.D.
16.	Iron (as Fe)	mg/l	0.3	0.08
17.	Nitrate (as NO_3)	mg/l	45	5.6
18.	Copper (as Cu)	mg/l	0.05 (1.5)	< 0.001
19.	Cadmium (as Cd)	mg/l	0.003	< 0.001
20.	Lead (as Pb)	mg/l	0.01	< 0.001
21.	Mercury (as Hg)	mg/l	0.001	< 0.001
22.	Total arsenic (as As)	mg/l	0.01(0.05)	< 0.001
23.	Total chromium (as Cr)	mg/l	0.05	< 0.001
24.	Zinc as (Zn)	mg/l	15	0.12
25.	Cyanide as (CN)	mg/l	0.05	< 0.005
26.	Phenolic Compounds	mg/l	0.001 (0.002)	< 0.001
27.	Boron as B	mg/l	1.0	< 0.03
28.	Nickel as Ni	mg/l	0.02	< 0.001
29.	Sulphide as S	mg/l	0.05	< 0.01
30.	Barium as Ba	mg/l	0.7	< 0.01
31.	Ammonia as NH_3	mg/l	0.5	< 0.1
32.	Silver as Ag	mg/l	0.4	< 0.05
33.	Molybdenum as Mo	mg/l	0.07	< 0.05
34.	E. Coli	Per 100ml	Absent	8
35.	Total coliform bacteria	CFU/100ml	Absent	> 16

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

Package 5: Simga – Arang Gullu SH- 20
Source of Water Samples: Ground Water
Date of Sampling 22.11.2016

Sr. No.	Parameter	Unit	As per Drinking Water IS 10500: 2012 Acceptable (Permissible) Limit	Results			
				Drinking Water at Camp Site Ch 30+500	Borewell Water at Camp Site Ch 30+500	Hand Pump at Kharora Village	Handpump at Kasangi Village
1.	pH value	-	6.5-8.5	7.20	7.45	7.50	7.30
2.	Colour	Hazen units	5(15)	0.1	0.2	0.2	0.2
3.	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4.	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Turbidity	NTU	1(5)	0.1	0.1	0.1	0.1
6.	Total dissolved Solids	mg/l	500(2000)	518	524	580	568
8.	Total hardness (as $CaCO_3$)	mg/l	200(600)	242	262	302	290
9.	Total alkalinity as ($CaCO_3$)	mg/l	200(600)	152	166	160	142
10.	Aluminium (as Al)	mg/l	0.03(0.2)	< 0.001	< 0.001	< 0.001	< 0.001
11.	Calcium (as Ca)	mg/l	75 (200)	60.8	62.2	68.0	64.8
12.	Magnesium (as Mg)	mg/l	30(100)	21.9	25.9	32.0	31.1
13.	Chloride (as Cl)	mg/l	250(1000)	18.0	19.7	18.6	17.4
14.	Sulphate (as SO_4)	mg/l	200(400)	14.2	16.8	17.0	16.6
15.	Fluoride (as F)	mg/l	1.0 (1.5)	0.55	0.60	0.65	0.60
16.	Free residual chlorine	mg/l	0.2(1)	0.2	ND	N.D.	N.D.
17.	Iron (as Fe)	mg/l	0.3	0.08	0.10	0.15	0.12
18.	Nitrate (as NO_3)	mg/l	45	2.10	2.75	3.55	3.10
19.	Copper (as Cu)	mg/l	0.05(1.5)	< 0.001	< 0.001	< 0.001	< 0.001
20	Cadmium (as Cd)	mg/l	0.003	< 0.001	< 0.001	< 0.001	< 0.001
21.	Lead (as Pb)	mg/l	0.01	< 0.001	< 0.001	< 0.001	< 0.001
22.	Mercury (as Hg)	mg/l	0.001	< 0.001	< 0.001	< 0.001	< 0.001
23.	Total arsenic (as As)	mg/l	0.01(0.05)	< 0.001	< 0.001	< 0.001	< 0.001
24.	Total chromium (as Cr)	mg/l	0.05	< 0.001	< 0.001	< 0.001	< 0.001
25.	Cyanide as (CN)	mg/l	0.05	< 0.005	< 0.005	0.22	0.20
26.	Phenolic Compounds	mg/l	0.001 (0.002)	< 0.001	< 0.001	< 0.005	< 0.005
27.	Boron as B	mg/l	1.0	< 0.03	< 0.03	< 0.03	< 0.03
28.	Nickel as Ni	mg/l	0.02	< 0.001	< 0.001	< 0.001	< 0.001
29.	Sulphide as S	mg/l	0.05	< 0.01	< 0.01	< 0.01	< 0.01
30.	Barium as Ba	mg/l	0.7	< 0.01	< 0.01	< 0.01	< 0.01
31.	Ammonia as NH_3	mg/l	0.5	< 0.1	< 0.1	< 0.1	< 0.1
32.	Silver as Ag	mg/l	0.4	< 0.05	< 0.05	< 0.05	< 0.05
33.	Molybdenum as Mo	mg/l	0.07	< 0.05	< 0.05	< 0.05	< 0.05
34.	E. Coli	Per 100ml	Absent	Absent	Absent	Absent	Absent
35.	Total coliform bacteria	CFU/100ml	Absent	Absent	Absent	Absent	Absent

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

Package 6: Arang Gullu – Kurud SH-20 / MDR

Source of Water Samples: Ground Water

Date of Sampling: 24.11.2016

Sr. No.	Parameter	Unit	As per Drinking water IS 10500 : 2012 Acceptable (Permissible) Limit	Results			
				Bore Well water at Camp area (Ch.106+700)	Hand Pump at Navapara Village (Ch.99+390)	Hand pump at Nari Village (Ch.110+650)	Hand pump at Katoli Village (Ch.106+000)
1.	pH value	-	6.5-8.5	7.65	7.50	7.45	7.65
2.	Colour	Hazen units	5(15)	0.1	0.1	0.1	0.3
3.	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4.	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Turbidity	NTU	1(5)	0.1	0.1	0.1	0.2
6.	Total dissolved solids	mg/l	500 (2000)	618	590	604	615
7.	Total hardness (as $CaCO_3$)	mg/l	200 (600)	318	284	293	310
8.	Total alkalinity as ($CaCO_3$)	mg/l	200 (600)	186	171	158	173
9.	Aluminium (as Al)	mg/l	0.03 (0.2)	< 0.001	< 0.001	< 0.001	< 0.001
10.	Calcium (as Ca)	mg/l	75 (200)	68.2	65.8	66.2	69.2
11.	Magnesium (asMg)	mg/l	30 (100)	35.8	29.0	31.0	33.3
12.	Chloride (as Cl)	mg/l	250 (1000)	19.4	17.2	18.8	19.7
13.	Sulphate (as SO_4)	mg/l	200 (400)	15.5	13.6	17.0	14.3
14.	Fluoride (as F)	mg/l	1.0 (1.5)	0.55	0.50	0.60	0.65
15.	Free residual chlorine	mg/l	0.2 (1)	N.D.	N.D.	N.D.	N.D.
16.	Iron (as Fe)	mg/l	0.3	0.15	0.10	0.12	0.17
17.	Nitrate (as NO_3)	mg/l	45	3.05	3.80	2.75	2.85
18.	Copper (as Cu)	mg/l	0.05 (1.5)	< 0.001	< 0.001	< 0.001	< 0.001
19.	Cadmium (as Cd)	mg/l	0.003	< 0.001	< 0.001	< 0.001	< 0.001
20.	Lead (as Pb)	mg/l	0.01	< 0.001	< 0.001	< 0.001	< 0.001
21.	Mercury (as Hg)	mg/l	0.001	< 0.001	< 0.001	< 0.001	< 0.001
22.	Total arsenic (as As)	mg/l	0.01(0.05)	< 0.001	< 0.001	< 0.001	< 0.001
23.	Total chromium (as Cr)	mg/l	0.05	< 0.001	< 0.001	< 0.001	< 0.001
24.	Zinc as (Zn)	mg/l	15	0.22	0.15	0.12	0.20
25.	Cyanide as (CN)	mg/l	0.05	< 0.005	< 0.005	< 0.005	< 0.005
26.	Phenolic Compounds	mg/l	0.001 (0.002)	< 0.001	< 0.001	< 0.001	< 0.001
27.	Boron as B	mg/l	1.0	< 0.03	< 0.03	< 0.03	< 0.03
28.	Nickel as Ni	mg/l	0.02	< 0.001	< 0.001	< 0.001	< 0.001
29.	Sulphide as S	mg/l	0.05	< 0.01	< 0.01	< 0.01	< 0.01
30.	Barium as Ba	mg/l	0.7	< 0.01	< 0.01	< 0.01	< 0.01
31.	Ammonia as NH_3	mg/l	0.5	< 0.1	< 0.1	< 0.1	< 0.1
32.	Silver as Ag	mg/l	0.4	< 0.05	< 0.05	< 0.05	< 0.05
33.	Molybdenum as Mo	mg/l	0.07	< 0.05	< 0.05	< 0.05	< 0.05
34.	E. Coli	Per 100ml	Absent	Absent	Absent	Absent	Absent
35.	Total coliform bacteria	CFU/100ml	Absent	Absent	Absent	Absent	Absent

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

Package 6: Arang Gullu – Kurud SH-20 / MDR

Source of Water Samples: Nala Near Katoli Village (Ch. 104+00)

Date of Sampling: 24.11.2016

Sr. No.	Parameter	Unit	As per Drinking water IS 10500 : 2012 Acceptable (Permissible) Limit	Results
1.	pH value	-	6.5-8.5	7.25
2.	Colour	Hazen units	5(15)	7.5
3.	Odour	-	Agreeable	Agreeable
4.	Taste	-	Agreeable	ND
5.	Turbidity	NTU	1(5)	5.5
6.	Total Suspended Solid	mg/l	-	16
7.	Total dissolved solids	mg/l	500 (2000)	440
8.	Total hardness (as $CaCO_3$)	mg/l	200 (600)	214
9.	Total alkalinity as ($CaCO_3$)	mg/l	200 (600)	150
10.	Aluminium (as Al)	mg/l	0.03 (0.2)	< 0.001
11.	Calcium (as Ca)	mg/l	75 (200)	54.8
12.	Magnesium (as Mg)	mg/l	30 (100)	18.7
13.	Chloride (as Cl)	mg/l	250 (1000)	12.3
14.	Sulphate (as SO_4)	mg/l	200 (400)	9.8
15.	Fluoride (as F)	mg/l	1.0 (1.5)	0.40
16.	Iron (as Fe)	mg/l	0.3	0.07
17.	Nitrate (as NO_3)	mg/l	45	5.8
18.	Total Phosphate	mg/l	-	5.2
19.	Cadmium (as Cd)	mg/l	0.003	< 0.001
20	Lead (as Pb)	mg/l	0.01	< 0.001
21.	Copper (as Cu)	mg/l	0.05 (1.5)	< 0.001
22.	Mercury (as Hg)	mg/l	0.001	< 0.001
23.	Total arsenic (as As)	mg/l	0.01 (0.05)	< 0.001
24.	Total chromium (as Cr)	mg/l	0.05	< 0.001
25.	Zinc as (Zn)	mg/l	15	0.18
26.	Phenolic Compounds	mg/l	0.001 (0.002)	< 0.001
27.	Boron as B	mg/l	1.0	< 0.03
28.	Nickel as Ni	mg/l	0.02	< 0.001
29.	Sulphide as S	mg/l	0.05	< 0.01
30.	Barium as Ba	mg/l	0.7	< 0.01
31.	Ammonia as NH_3	mg/l	0.5	< 0.1
32.	Chemical Oxygen Demand (COD)	mg/l	-	28.7
33.	Bio-Chemical Oxygen Demand (BOD)	mg/l	-	6.8
34.	Dissolve Oxygen (DO)	mg/l	-	5.6
35.	E. Coli	Per 100ml	Absent	< 16
36	Total coliform bacteria	CFU/100ml	Absent	< 16

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

Package 6: Arang Gullu – Kurud SH-20 / MDR
Source of Water Samples: Waste Water from Batching Plant
Date of Sampling: 24.11.2016

SL. NO.	PARAMETERS	Units	Concentration	SPCB Limit
			Settling Tank Out let	
1.	pH Value		7.85	5.5- 9.0
2.	Total Suspended Solid	mg/l	62	100
3.	Total Dissolved Solid	mg/l	766	2100
4.	Chlorides (as Cl)	mg/l	47	600
5.	Sulphate (as SO_4)	mg/l	35.4	1000
6.	Chemical Oxygen Demand (COD)	mg/l	91.6	250
7.	BOD at 27^{o}C for 3 days	mg/l	14.5	100

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

IV. SOIL QUALITY MONITORING RESULTS

Package 2: Bhaisa – Baloda Bazar SH-9

Sr. No.	Test Parameters	Unit	Results
			Agricultural Land Near Ch 67+700 at Palari Village
1	pH	-	7.75
2	Electrical Conductivity at 25^0C	µs/cm	240
3	Organic Carbon	%	0.462
4	Moisture Retention Capacity	%	5.6
5	Moisture	%	8.3
6	Infiltration Rate	mm/Hr	0.73
7	Sand	%	29.8
8	Silt	%	24.4
9	Clay	%	45.8
10	Texture		Clay Loamy
11	Available Nitrogen as N	kg/hect.	386
12	Available Phosphorous as P	kg/hect.	58.8
13	Available Potassium as K	kg/hect.	96.6
14	Sulphates	mg/ kg	58.2
15	Sodium Sulphate	mg/ kg	104.3
16	Calcium Sulphate	mg/ kg	211.4
17	Oil & Grease	mg/ kg	Nil

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

Note:
1. Results relate to tested sample only.
2. Test report should not be reproduced partially.
3. All results are reported on Air Dried basis.
4. Standards not specified

Package 6: Arang Gullu – Kurud SH-20 / MDR

Sr. No	Test Parameters	Unit	Results	
			Agricultural Land Near Nari Village (Ch. 108+700)	Agricultural Land Near Katholi Village (Ch.105+650)
1	pH	-	7.70	7.45
2	Electrical Conductivity at 25^0C	µs/cm	288	243
3	Organic Carbon	%	0.436	0.332
4	Moisture Retention Capacity	%	5.8	5.6
5	Moisture	%	6.3	6.7
6	Infiltration Rate	mm/Hr	0.73	0.70
7	Sand	%	37.0	37.8
8	Silt	%	26.2	27.4
9	Clay	%	36.8	34.8
10	Texture		Clay Loamy	Clay loamy
11	Available Nitrogen as N	kg/he	228	232
12	Available Phosphorous as P	kg/he	52.5	48.7
13	Available Potassium as K	kg/he	110	102.5
14	Sulphates	mg/ kg	46.2	38.8
15	Sodium Sulphate	mg/ kg	76.8	67.6
16	Calcium Sulphate	mg/ kg	212	179.3
17	Oil & Grease	mg/ kg	Nil	Nil

Source: Environmental Monitoring Report, November 2016, prepared by Enviro Analysts & Engineers Pvt. Ltd., Nagpur

Note:
1. Results relate to tested sample only.
2. Test report should not be reproduced partially.
3. All results are reported on Air Dried basis.
4. Standards not specified

Annexure - 3

Grievance Redress Committee – District Raipur

कार्यालय कार्यपालन अभियंता,

लोक निर्माण विभाग (भ/स), विधानसभा संभाग, रायपुर (छ.ग.)

PIU ADB RAIPUR
Received on 5.3.13

आदेश क. /तक/2012–13 रायपुर, दिनांक / /2013 6/4/13

छत्तीसगढ़ शासन, लोक निर्माण विभाग, नया मंत्रालय महानदी भवन, नया रायपुर का पत्र क्र. 1656/2012, रायपुर, दिनांक 19.12.2012 के द्वारा ए.डी.बी. सहायित, छ.ग. राज्य सड़क परियोजना में सम्मिलित मार्गो के पर्यावरण संरक्षण एवं पुनर्वास व्यवस्थापन से संबंधित प्रकरणों के निराकरण हेतु निम्नानुसार **"जिला स्तरीय शिकायत निवारण कमेटी"** का गठन कलेक्टर, जिला–रायपुर के आदेशानुसार किया जाता है ।

1. अध्यक्ष – श्री संजय अग्रवाल (ए.डी.एम.), प्रतिनिधि
2. सदस्य – कार्यपालन अभियंता, लोनिवि, विधानसभा संभाग, रायपुर (छ.ग.)
   कार्यपालन अभियंता, लोनिवि, संभाग क्र.–2, रायपुर (छ.ग.)
3. सदस्य – संबंधित तहसील के एस.डी.एम.
4. सदस्य – उपवनमंडालाधिकारी, रायपुर (छ.ग.)
5. सदस्य – पर्यावरण प्रकरणों में समूह का प्रतिनिधि ।

विभाग द्वारा संबंधित मार्ग के संबंधित प्रकरणों के निवारण हेतु अनुबंधित एन.जी.ओ. द्वारा शिकायत प्रकरण समिति को प्रस्तुत किये जावेगें ।

कार्यपालन अभियंता,
लो.नि.वि. विधानसभा संभाग
रायपुर (छ.ग.)
रायपुर, दिनांक 28/3/2013

पृ. क. 1772/तक./2012–13

प्रतिलिपि :–

1) प्रमुख सचिव, छ.ग. शासन, लोक निर्माण विभाग, नया मंत्रालय महानदी भवन, नया रायपुर की ओर उनके पत्र क्र. 1656/2012/नया रायपुर, दिनांक 19.12.2012 के परिपेक्ष्य में सूचनार्थ प्रेषित ।
2) परियोजना संचालक, पी.आई.यूत्र/ए.डी.बी. कार्यालय प्रमुख अभियंता, लोक निर्माण विभाग, सिरपुर भवन, रायपुर की ओर सूचनार्थ प्रेषित ।
3) कलेक्टर, जिला–रायपुर की ओर उनके द्वारा दिनांक 21.3.2013 को दिये आदेश के तारतम्य में सादर सूचनार्थ संप्रेषित ।

क्रमशः

4) कार्यपालन अभियंता, लोक निर्माण विभाग, संभाग क्र.–2, रायपुर की ओर कलेक्टर महोदय, जिला–रायपुर द्वारा दिनांक 21.3.2013 को दिये आदेश के तारतम्य में आवश्यक कार्यवाही हेतु प्रेषित।

5) श्री संजय अग्रवाल, ए.डी.एम., कार्यालय कलेक्टर, जिला–रायपुर की ओर कलेक्टर महोदय, जिला–रायपुर द्वारा दिनांक 21.3.2013 को दिये आदेश के तारतम्य में आवश्यक कार्यवाही हेतु सूचनार्थ अग्रेषित।

6) अनुविभागीय अधिकारी (राजस्व), रायपुर की ओर प्राप्त पत्र की छायाप्रति सहित सूचनार्थ एवं कलेक्टर महोदय, जिला–रायपुर द्वारा दिनांक 21.3.2013 को दिये आदेश के तारतम्य में आवश्यक कार्यवाही हेतु अग्रेषित ।

7) उपमंडलाधिकारी, रायपुर की ओर प्राप्त पत्र की छायाप्रति सहित सूचनार्थ एवं कलेक्टर महोदय, जिला–रायपुर द्वारा दिनांक 21.3.2013 को दिये आदेश के तारतम्य में आवश्यक कार्यवाही हेतु अग्रेषित ।

[illegible] उपरोक्तानुसार स.क्र. 4 से 7 के लिए ।

सहपत्रः– उपरोक्तानुसार स.क्र. 4 से 7 के लिए ।

[illegible]
21/3/13
कार्यपालन अभियंता,
लो.नि.वि. विधानसभा संभाग
रायपुर (छ.ग.)

Grievance Redress Committee – District Balodabazar

कार्यालय कलेक्टर, जिला बलौदाबाजार–भाटापारा (छ.ग.)

" आदेश "

कमांक/ 83 /व0लि0/2012, बलौदाबाजार, दिनांक 20 /03/2013

छ0ग0शासन, लोक निर्माण विभाग, नया मंत्रालय, महानदी खंड, नया रायपुर के पत्र कमांक 1656/2012, रायपुर दिनांक 19.12.2012 के द्वारा ए.डी.पी. सहायतित छ0ग0राज्य सड़क परियोजना में सम्मिलित मार्गो के पर्यावरण संरक्षण एवं पुनर्वास व्यवस्थापन से सम्बन्धित प्रकरणों के निराकरण हेतु निम्नानुसार " जिला स्तरीय शिकायत निवारण कमेटी " का गठन किया जाता है :–

1. अध्यक्ष	–	अपर कलेक्टर, बलौदाबाजार
2. सदस्य	–	कार्यपालन अभियंता, लोक निर्माण विभाग भ/स, बलौदाबाजार
3. सदस्य	–	सम्बन्धित अनुविभागीय अधिकारी (राजस्व)
4. सदस्य	–	सम्बन्धित उप वन मण्डलाधिकारी
5. सदस्य	–	सम्बन्धित तहसीलदार
6. सदस्य	–	सम्बन्धित मुख्य नगरपालिका अधिकारी नगरपालिका/नगर पंचायत

विभाग द्वारा सम्बन्धित मार्ग के सम्बन्धित प्रकरणों के निवारण हेतु अनुबंधित NGO द्वारा शिकायत प्रकरण समिति को प्रस्तुत किये जावेंगे।

(राजेश सुकुमार टोप्पो),
कलेक्टर,
जिला बलौदाबाजार–भाटापारा

पृ0 कमांक/ 83 /व.लि./2012, बलौदाबाजार, दिनांक 20 /03/2013

प्रतिलिपिः–

1. प्रमुख सचिव, छ0ग0शासन, लोक निर्माण विभाग मंत्रालय, महानदी खंड, नया रायपुर की ओर उनके पत्र कमांक 1656/2012, रायपुर दिनांक 19.12.2012 के संदर्भ में सूचनार्थ।
2. परियोजना संचालक, पीआईयू/एडीबी कार्यालय प्रमुख अभियता, लोक निर्माण विभाग, रायपुर
3. कार्यपालन अभियंता, लोक निर्माण विभाग (भ/स) बलौदाबाजार
4. सर्व सम्बन्धित अधिकारियों की ओर पालनार्थ।

(राजेश सुकुमार टोप्पो),
कलेक्टर,
जिला बलौदाबाजार–भाटापारा

Grievance Redress Committee – District Dhamtari

कार्यालय कलेक्टर (पुर्नवास शाखा) जिला धमतरी

00 आदेश 00

क्रमांक / / पुर्नवास.लि. / 2013 धमतरी, दिनांक 02.04.2013

छ.ग.शासन, लोक निर्माण विभाग मंत्रालय नया रायपुर के आदेश दिनांक 19.12.2012 के परिपालन में जिला स्तरीय शिकायत निवारण कमेठी का गठन किया जाता है । समिति में निम्नलिखित पदनाम अधिकारीगण सदस्य होंगे ।

PIU ADB RAIPUR
Recei... 657
22/04/2013

जिला स्तरीय कमेठी

1. अध्यक्ष– जिला कलेक्टर अथवा प्रतिनिधि
2. अध्यक्ष– वनमंडलाधिकारी अथवा प्रतिनिधि
3. सदस्य– कार्यपालन अभियंता, लोनिवि, संभाग–धमतरी
4. सदस्य– कार्यपालन अभियंता, लोक स्वास्थ्य यांत्रिकीय धमतरी
5. सदस्य– कार्यपालन अभियंता, छ.ग.राज्य विद्युत मंडल धमतरी
6. सदस्य– प्रभारी अधिकारी, भू–अभिलेख जिला धमतरी
7. सदस्य– अनुविभागीय अधिकारी, दूरसंचार विभाग धमतरी

4.4.2013
कलेक्टर
धमतरी

पृ.क्रमांक / 2125 / पुर्नवास.लि. / 2013 धमतरी, दिनांक 02.04.2013

प्रतिलिपि :–

1. परियोजना संचालक पी.आई.यू. / ए.डी.बी. कार्यालय प्रमुख अभियंता, लोक निर्माण विभाग सिरपुर भवन रायपुर (छ.ग.) को सूचनार्थ प्रेषित ।
2. मुख्य अभियंता लोक निर्माण विभाग रायपुर परिक्षेत्र रायपुर को सूचनार्थ ।
3. अधीक्षण अभियंता लोक निर्माण विभाग मंडल क्रं.2 रायपुर को सूचनार्थ ।
4. सर्व संबंधित सदस्यगण.....को सूचनार्थ । वे प्रत्येक मंगलवार को होने वाली समय सीमा की बैठक में संलग्न एजेण्डा पर कार्यवाही कर जानकारी सहित उपस्थित होने का कष्ट करें ।

4.4.2013
कलेक्टर
धमतरी