

**MONITORING FORMAT (Ending March 2023)**

-If environmental reviews indicate the need of monitoring by JICA, JICA undertakes monitoring for necessary items that are decided by environmental reviews, JICA undertakes monitoring based on regular reports including measured data submitted by the project proponent, when necessary, the project proponent should refer to the following monitoring form for submitting reports.

-When monitoring plans including monitoring items, frequencies and methods are decided, project phase or project life cycle (such as construction phase and operation phase) should be considered.

**1. Responses/Actions to Comments and Guidance from Government Authorities and the Public**

Monitoring Item	Monitoring Result of Reporting Period
<p>To be filled with Conditions of Forest Clearance Stage I, Stage II and Environmental Clearance</p> <p><b>Stage-I conditions Dt.21.11.1996</b></p> <ol style="list-style-type: none"> <li>1. Immediate action should be taken for transfer and mutation of equivalent non-forest land in favor of the state forest Department.</li> <li>2. The user Agency will transfer the cost of Compensatory A forestation revised as on date to incorporate existing wage structure in favor of the forest Department.</li> <li>3. Funds for compensatory a forestation will be provided for a forestation /rehabilitation of an area equivalent to forest area proposed to be the land offered for compensatory aforestation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Already done.</li> <li>2. Already deposited.</li> <li>3. Already provided</li> </ol>

Monitoring Item	Monitoring Result of Reporting Period
<p>this area will be utilized for the purposed irrigated plantation for which free water will such a programme at present. Certain areas will be identified for eco-tourism and will be developed as such.</p> <p>4. The Advisory committee recommended the proposal for diversion of (2159.43-52.03 ha) forest land.</p> <p>5. The project will provide crossing points for wild elephants where necessary after consultation with officers at local level.</p> <p><b>Stage-II conditions Dt.13/14.05.2003</b></p> <ol style="list-style-type: none"> <li>1. Legal status of the forest shall remain unchanged</li> <li>2. Compensatory A forestation shall be raised over equivalent non forest land and shall be maintained in the project cost.</li> <li>3. Demarcation of the area will be done on ground at project cost using 4 feet high RCC Pillars with Serial No. , forwarded back bearing and distance from pillar to pillar</li> <li>4. The non-forest land transferred to the forest department for compensatory A forestation shall be declared as: Reserve Forest” under Indian Forest Act, 1927.</li> <li>5. Trees shall be felled only when it becomes necessary and under direct supervision of State Forest Department.</li> <li>6. Reservoir so created shall be declared as “Reserve Forest” under Indian Forest Act, 1927 with regulated fishing guide.</li> <li>7. Irrigated plantation shall be raised and maintained at the Project cost.</li> <li>8. Areas identified for Eco- tourism will be developed at the Project Cost.</li> <li>9. Crossing points for wild elephants will be provided in consultation with the State Forest Department at the Project Cost.</li> <li>10. Canal bank plantation shall be raised in consultation with the State Forest Department at the Project Cost</li> <li>11. No tree felling in the area between FRL and 4 mtr bellow FRL shall be carried out.</li> <li>12. Water will be provided free of cost to the Forest Department for raising nursery/ plantation in</li> </ol>	<ol style="list-style-type: none"> <li>4. Diversion of forest land has been done.</li> <li>5. Elephants corridor and crossing points have been provided. <ol style="list-style-type: none"> <li>1. Complied.</li> <li>2. Funds have been provided by the Project to Department of Forest, GoO.</li> <li>3. Done</li> <li>4. Declared.</li> <li>5. Being done.</li> <li>6. Under process.</li> <li>7. Being done.</li> <li>8. Being done</li> <li>9. Being done.</li> <li>10. Being done.</li> <li>11. Being followed.</li> <li>12. Being done.</li> </ol> </li> </ol>

Monitoring Item	Monitoring Result of Reporting Period
<p>nearby areas.</p> <p>13. Catchment area treatment plan shall be implemented under the supervision of State Forest Department</p> <p>14. Re-settlement and Rehabilitation plan for the displaced people shall be implemented immediately by the State Government</p> <p>15. No labour camp shall be established on the forest land</p> <p>16. Sufficient fire wood depot should be opened after procuring fire wood from Orissa Forest Development Corporation (OFDC)</p> <p>17. The User Agency shall ensure that there should be no damage to the available wildlife</p> <p>18. The approval under the Forest (Conservation) Act,1980 is subject to the clearance under the Environment (Protection) Act,1986 if required</p> <p>19. The forest land shall not be used for any purpose other than that specific in the proposal</p> <p>20. The action initiated against erring officials and the prosecution of those officials must be completed by October,2003. All other Officers and Agencies those who are yet to be identified, shall be identified as erring Officials and Agencies by RCCF, Bhubaneswar who shall advise State Government to initiate action against them by 31<sup>ST</sup> October 2003 and complete the task by 31.03.2004RCCF, Bhubaneswar will quarterly review compliance/ progress of this condition.</p> <p>21. Any other conditions that the State Government as well as CCF (Central Regional Office, Bhubaneswar) may impose from time to time for the protection and improvement of flora and fauna in forest area.</p>	<p>13. Being done.</p> <p>14. Not applicable.</p> <p>15. Being done.</p> <p>16. Being done.</p> <p>17. Being done.</p> <p>18. Being done.</p> <p>19. Being done</p> <p>20. Being done.</p> <p>21. Being followed.</p>

## 1. Result of Monitoring

### 2.1 Construction Phase

#### 2.1.1 Pollution

Air Environment (Arrangement for air pollution testing is being arranged by the Chief Engineer, JICA Project. Orbital Infrastructure Consultancy & Research Pvt. Ltd., approved laboratory Govt. of Odisha has been engaged for studying Air Environment, Sampling & Analysis of air quality and suitability of drinking water near the construction packages already started for A1, A2, A3(A) & B1 for the previous period in PSR 4 & PSR 7. During this reporting period from 1st January 2023 to 31st March 2023 Civil Work Packages A3(B), B2, C1, C2, C3&C4 are near completion, new packages D1,E1,G1, G2, and J1 has started during this reporting period G3 is at tender stage.

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (NAAQS 2009)	Referred International Standard (WHO)	Remarks (Measurement Point, Frequency, Method, etc.)		
						Measurement Point	Frequency	Method
PM 10	$\mu\text{g}/\text{m}^3$			100	150	Chandipal	As per CPCB / SPCB norms.	IS - 5182 Part - 23
PM 2.5				60	75		ditto	NAQS Monitoring & Analysis guidelines Vol.-I
SO <sub>2</sub>				80	20 (24 Hours) 500 (Minute)		ditto	IS - 5182 Part - 2

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (NAAQS 2009)	Referred International Standard (WHO)	Remarks (Measurement Point, Frequency, Method, etc.)			
						Measurement Point	Frequency	Method	
NOx			80	40			ditto	IS – 5182 Part – 6	
PM 10	µg/ m <sup>3</sup>		100	150	Kansargoda		As per CPCB / SPCB norms.	IS - 5182 Part - 23	
PM 2.5			60	75			ditto	NAQS Monitoring & Analysis guidelines Vol. - I	
SO <sub>2</sub>			80	20 (24 Hours) 500 (Minute)			ditto	IS – 5182 Part - 2	
NOx			80	40			ditto	IS – 5182 Part – 6	
PM 10	µg/ m <sup>3</sup>		100	150	Damodarpur		As per CPCB / SPCB norms.	IS - 5182 Part - 23	
PM			60	75			ditto	NAQS Monitoring & Analysis	

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (NAAQS 2009)	Referred International Standard (WHO)	Remarks (Measurement Point, Frequency, Method, etc.)		
						Measurement Point	Frequency	Method
2.5								guidelines Vol.-I
SO <sub>2</sub>				80	20 (24 Hours) 500 (Minute)		ditto	IS – 5182 Part - 2
NO <sub>x</sub>				80	40		ditto	IS – 5182 Part – 6

**Water Environment (Arrangements for testing of water is being done by Orbital Infrastructure Consultancy & Research Pvt. Ltd.)in the reporting period from March 2023.**

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
<b>Surface Water</b>								
Colour	Hazen			5	5	Chandipal	As per CPCB / SPCB norms.	IS – 3025 Part - 4
Odour	mg/L			UO	UO (Un Objectionable)			IS – 3025 Part-5
Taste				Agbl	0			IS – 3025 Part-8
Conductivity	µmho/cm			0	-			IS – 3025 Part-14
Turbidity	NTU			5	5			IS – 3025 Part-10
pH				6.5-8.5	7-8.5			IS – 3025 Part-11
COD	Mg/L			0	-			IS – 3025 Part-58
BOD	Mg/L			3	0-8			IS – 3025 Part-44
Total Hardness	Mg/L			300	-			IS – 3025 Part-21

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
Iron	Mg/L			0.3	.3			IS – 3025 Part-53
Chloride	Mg/L			250	-			IS – 3025 Part-32
Residual Chlorine	Mg/L			0.2	0.1			IS – 3025 Part-26
Total SS	Mg/L			0	-			IS – 3025 Part-17
Total DS	Mg/L			500	500			IS – 3025 Part-16
DO	Mg/L			4	-			IS – 3025 Part-38
Calcium	Mg/L			75	75			IS – 3025 Part-40
Magnesium	Mg/L			30	50			IS – 3025 Part-46
Sulphate	Mg/L			200	200			IS – 3025 Part-24
Nitrate	Mg/L			45	50 - 100			IS – 3025 Part-34
Fluoride	Mg/L			0.6-1.2	0.5 - 1.5			IS – 3025 Part-23
Phosphate	Mg/L			0	5			APHA 4500 (D)
Sodium	Mg/L			6	-			IS – 3025 Part-45
Potassium	Mg/L			0	To be filled			IS – 3025 Part-45



Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
Cyanide	Mg/L			0.05	0.01			IS – 3025 Part-27
Chromium	Mg/L			0.05	0.05			IS – 3025 Part-52
Boron	Mg/L			1	0.024			IS – 3025 Part-29
SAR	Mg/L			26	-			By Calculation
Lead	Mg/L			0.05	0.01			IS – 3025 Part-47
Cadmium	Mg/L			0.01	-			IS – 3025 Part-41
Mercury	Mg/L			0.001	-			IS – 3025 Part-48
Copper	Mg/L			0.05	1			IS – 3025 Part-36
Color	Hazen			5	5			IS – 3025 Part – 4
Odour	mg/L			UO	UO (Un Objectionable			As per CPCB / SPCB norms.
Taste				Agbl	0			IS – 3025 Part-8
Conductivity	µmho/cm			0	-			IS – 3025 Part-14
Turbidity	NTU			5	5			IS – 3025 Part-10
pH				6.5-8.5	7-8.5			IS – 3025 Part-11
COD	Mg/L			0	-			IS – 3025 Part-58

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
BOD	Mg/L			0	0-8			IS – 3025 Part-44
Total Hardness	Mg/L			300	-			IS – 3025 Part-21
Iron	Mg/L			0.3	.3			IS – 3025 Part-53
Chloride	Mg/L			250	-			IS – 3025 Part-32
Residual Chloride	Mg/L			0.2	0.1			IS – 3025 Part-26
Total SS	Mg/L			0	-			IS – 3025 Part-17
Total DS	Mg/L			0	500			IS – 3025 Part-16
DO	Mg/L			0	-			IS – 3025 Part-38
Calcium	Mg/L			75	75			IS – 3025 Part-40
Magnesium	Mg/L			30	50			IS – 3025 Part-46
Sulphate	Mg/L			200	200			IS – 3025 Part-24
Nitrate	Mg/L			45	50 - 100			IS – 3025 Part-34
Fluoride	Mg/L			0.6-1.2	0.5 - 1.5			IS – 3025 Part-23
Phosphate	Mg/L			0	5			APHA 4500 (D)
Sodium	Mg/L			0	-			IS – 3025 Part-45
Potassium	Mg/L			0	To be filled			IS – 3025 Part-45

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
Cyanide	Mg/L			0.05	0.01			IS – 3025 Part-27
Chromium	Mg/L			0.05	0.05			IS – 3025 Part-52
Boron	Mg/L			0	0.024			IS – 3025 Part-29
SAR	Mg/L			0	-			By Calculation
Lead	Mg/L			0.05	0.01			IS – 3025 Part-47
Cadmium	Mg/L			0.01	-			IS – 3025 Part-41
Mercury	Mg/L			0.001	-			IS – 3025 Part-48
Copper	Mg/L			0.05	1			IS – 3025 Part-36

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	
<b>Surface Water</b>								
Colour	Hazen			5	5	Kansargoda	IS – 3025 Part - 4	
Odour	mg/L			UO	UO (Un Objectionable)		As per CPCB / SPCB norms.	IS – 3025 Part-5
Taste				Agbl	0		IS – 3025 Part-8	
Conductivity	µmho/cm			0	-		IS – 3025 Part-14	
Turbidity	NTU			5	5		IS – 3025 Part-10	
pH				6.5-8.5	7-8.5		IS – 3025 Part-11	
COD	Mg/L			0	-		IS – 3025 Part-58	
BOD	Mg/L			3	0-8		IS – 3025 Part-44	
Total Hardness	Mg/L			300	-		IS – 3025 Part-21	
Iron	Mg/L			0.3	.3		IS – 3025 Part-53	

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks	
						Measurement Point	Frequency Method
Chloride	Mg/L			250	-		IS – 3025 Part-32
Residual Chlorine	Mg/L			0.2	0.1		IS – 3025 Part-26
Total SS	Mg/L			0	-		IS – 3025 Part-17
Total DS	Mg/L			500	500		IS – 3025 Part-16
DO	Mg/L			4	-		IS – 3025 Part-38
Calcium	Mg/L			75	75		IS – 3025 Part-40
Magnesium	Mg/L			30	50		IS – 3025 Part-46
Sulphate	Mg/L			200	200		IS – 3025 Part-24
Nitrate	Mg/L			45	50 - 100		IS – 3025 Part-34
Fluoride	Mg/L			0.6-1.2	0.5 - 1.5		IS – 3025 Part-23
Phosphate	Mg/L			0	5		APHA 4500 (D)
Sodium	Mg/L			6	-		IS – 3025 Part-45
Potassium	Mg/L			0	To be filled		IS – 3025 Part-45
Cyanide	Mg/L			0.05	0.01		IS – 3025 Part-27
Chromium	Mg/L			0.05	0.05		IS – 3025 Part-52

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
Boron	Mg/L			1	0.024			IS – 3025 Part-29
SAR	Mg/L			26	-			By Calculation
Lead	Mg/L			0.05	0.01			IS – 3025 Part-47
Cadmium	Mg/L			0.01	-			IS – 3025 Part-41
Mercury	Mg/L			0.001	-			IS – 3025 Part-48
Copper	Mg/L			0.05	1			IS – 3025 Part-36
<b>Ground Water</b>								
Colour	Hazen			5	5			IS – 3025 Part – 4
Odour	mg/L			UO	UO (Un Objectionable)			IS – 3025 Part-5
Taste				Agbl	0			IS – 3025 Part-8
Conductivity	µmho/cm			0	-			IS – 3025 Part-14
Turbidity	NTU			5	5			IS – 3025 Part-10
pH				6.5-8.5	7-8.5			IS – 3025 Part-11
COD	Mg/L			0	-			IS – 3025 Part-58
BOD	Mg/L			0	0-8			IS – 3025 Part-44
Total Hardness	Mg/L			300	-			IS – 3025 Part-21
						Kansargoda (Under Pkg.B-1)		
						As per CPCB / SPCB norms.		

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
Iron	Mg/L			0.3	.3			IS – 3025 Part-53
Chloride	Mg/L			250	-			IS – 3025 Part-32
Residual Chloride	Mg/L			0.2	0.1			IS – 3025 Part-26
Total SS	Mg/L			0	-			IS – 3025 Part-17
Total DS	Mg/L			0	500			IS – 3025 Part-16
DO	Mg/L			0	-			IS – 3025 Part-38
Calcium	Mg/L			75	75			IS – 3025 Part-40
Magnesium	Mg/L			30	50			IS – 3025 Part-46
Sulphate	Mg/L			200	200			IS – 3025 Part-24
Nitrate	Mg/L			45	50 - 100			IS – 3025 Part-34
Fluoride	Mg/L			0.6-1.2	0.5 - 1.5			IS – 3025 Part-23
Phosphate	Mg/L			0	5			APHA 4500 (D)
Sodium	Mg/L			0	-			IS – 3025 Part-45
Potassium	Mg/L			0	To be filled			IS – 3025 Part-45

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
Cyanide	Mg/L			0.05	0.01			IS – 3025 Part-27
Chromium	Mg/L			0.05	0.05			IS – 3025 Part-52
Boron	Mg/L			0	0.024			IS – 3025 Part-29
SAR	Mg/L			0	-			By Calculation
Lead	Mg/L			0.05	0.01			IS – 3025 Part-47
Cadmium	Mg/L			0.01	-			IS – 3025 Part-41
Mercury	Mg/L			0.001	-			IS – 3025 Part-48
Copper	Mg/L			0.05	1			IS – 3025 Part-36



Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	
<b>Surface Water</b>								
Colour	Hazen			5	5	Damdarpur (Under Pkg.A3B)	IS – 3025 Part - 4	
Odour	mg/L			UO	UO (Un Objectionable)		As per CPCB / SPCB norms.	IS – 3025 Part-5
Taste				Agbl	0		IS – 3025 Part-8	
Conductivity	µmho/cm			0	-		IS – 3025 Part-14	
Turbidity	NTU			5	5		IS – 3025 Part-10	
pH				6.5-8.5	7-8.5		IS – 3025 Part-11	
COD	Mg/L			0	-		IS – 3025 Part-58	
BOD	Mg/L			3	0-8		IS – 3025 Part-44	
Total Hardness	Mg/L			300	-		IS – 3025 Part-21	

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks	
						Measurement Point	Frequency Method
Iron	Mg/L			0.3	.3		IS – 3025 Part-53
Chloride	Mg/L			250	-		IS – 3025 Part-32
Residual Chlorine	Mg/L			0.2	0.1		IS – 3025 Part-26
Total SS	Mg/L			0	-		IS – 3025 Part-17
Total DS	Mg/L			500	500		IS – 3025 Part-16
DO	Mg/L			4	-		IS – 3025 Part-38
Calcium	Mg/L			75	75		IS – 3025 Part-40
Magnesium	Mg/L			30	50		IS – 3025 Part-46
Sulphate	Mg/L			200	200		IS – 3025 Part-24
Nitrate	Mg/L			45	50 - 100		IS – 3025 Part-34
Fluoride	Mg/L			0.6-1.2	0.5 - 1.5		IS – 3025 Part-23

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
Phosphate	Mg/L			0	5			APHA 4500 (D)
Sodium	Mg/L			6	-			IS – 3025 Part-45
Potassium	Mg/L			0	To be filled			IS – 3025 Part-45
Cyanide	Mg/L			0.05	0.01			IS – 3025 Part-27
Chromium	Mg/L			0.05	0.05			IS – 3025 Part-52
Boron	Mg/L			1	0.024			IS – 3025 Part-29
SAR	Mg/L			26	-			By Calculation
Lead	Mg/L			0.05	0.01			IS – 3025 Part-47
Cadmium	Mg/L			0.01	-			IS – 3025 Part-41
Mercury	Mg/L			0.001	-			IS – 3025 Part-48
Copper	Mg/L			0.05	1			IS – 3025 Part-36
Color	Hazen			5	5	Damdarpur	As per	IS – 3025 Part – 4

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
Odour	mg/L			UO	UO (Un Objectionable)	(Under Pkg.A3B)	CPCB / SPCB norms.	IS – 3025 Part-5
Taste				Agbl	0			IS – 3025 Part-8
Conductivity	µmho/cm			0	-			IS – 3025 Part-14
Turbidity	NTU			5	5			IS – 3025 Part-10
pH				6.5-8.5	7-8.5			IS – 3025 Part-11
COD	Mg/L			0	-			IS – 3025 Part-58
BOD	Mg/L			0	0-8			IS – 3025 Part-44
Total Hardness	Mg/L			300	-			IS – 3025 Part-21
Iron	Mg/L			0.3	.3			IS – 3025 Part-53
Chloride	Mg/L			250	-			IS – 3025 Part-32
Residual Chloride	Mg/L			0.2	0.1			IS – 3025 Part-26

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks	
						Measurement Point	Frequency Method
Total SS	Mg/L			0	-		IS – 3025 Part-17
Total DS	Mg/L			0	500		IS – 3025 Part-16
DO	Mg/L			0	-		IS – 3025 Part-38
Calcium	Mg/L			75	75		IS – 3025 Part-40
Magnesium	Mg/L			30	50		IS – 3025 Part-46
Sulphate	Mg/L			200	200		IS – 3025 Part-24
Nitrate	Mg/L			45	50 - 100		IS – 3025 Part-34
Fluoride	Mg/L			0.6-1.2	0.5 - 1.5		IS – 3025 Part-23
Phosphate	Mg/L			0	5		APHA 4500 (D)
Sodium	Mg/L			0	-		IS – 3025 Part-45
Potassium	Mg/L			0	To be filled		IS – 3025 Part-45
Cyanide	Mg/L			0.05	0.01		IS – 3025 Part-27
Chromium	Mg/L			0.05	0.05		IS – 3025 Part-52

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
Boron	Mg/L			0	0.024			IS – 3025 Part-29
SAR	Mg/L			0	-			By Calculation
Lead	Mg/L			0.05	0.01			IS – 3025 Part-47
Cadmium	Mg/L			0.01	-			IS – 3025 Part-41
Mercury	Mg/L			0.001	-			IS – 3025 Part-48
Copper	Mg/L			0.05	1			IS – 3025 Part-36

**Noise and Vibration (Arrangements for testing of noise & vibration is being done by the Agencies.)**

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (NAAQS, 2009)				Referred International Standard	Remarks Measurement	Frequency	Method
				day	night	day	night				
Noise Level	dB(A)			Industrial	75	70	Chandipal	To be filled	Periodically as per CPCB / SPCB norms.	IS9876	
				Commercial	65	55					
				Residential	55	45					
				Silence Zone	50	40					
Vibration Level	mm/second			To be filled				To be filled	At sensitive receptors & settlements in the adjoining area of tunnel site		
				Industrial	75	70	Kansargoda				Periodically as per CPCB / SPCB norms.
Noise Level	dB(A)			Commercial	65	55					
				Residential	55	45					

Item	Unit	Measured Value (Min)	Measured Value (Max)	Indian Standard (NAAQS, 2009)	Referred International Standard	Remarks Measurement	Frequency	Method
Noise Level	dB(A)			Silence Zone		Damadarpur	Periodically as per CPCB / SPCB norms.	IS9876
				50	40			
				day	night			
				75	70			
				65	55			
				55	45			
		50	40					

### 2.1.2 Land Environment

Item	Monitoring Result of Reporting Period	Remarks Measurement Point	Frequency	Method
Degradation of land cover	(1st January 2023 to 31st March 2023.)			
	Not affected	1.Construction areas 2.Borrow areas	Quarterly	Visual observation



		3.Labour camps		
Soil Erosion	Not affected	At high banking zone of Canal sections	Quarterly	Site observation, review of records and public discussions

### 2.1.3 Soil Environment

<b>Item</b>	<b>Monitoring Result of Reporting Period (1st January 2023 to 31st March 2023.)</b>	<b>Remarks Measurement Point</b>	<b>Frequency</b>	<b>Method</b>
Degradation of land cover	Not affected	To be filled based on Annex XII	Quarterly	Observation
Soil Erosion	Not affected	To be filled based on Annex XII	Quarterly	Visual observation

#### 2.1.4 Occupational Health of Workers

Item	Monitoring Result of Reporting Period (1st January 2023 to 31st March 2023.)	Remarks Measurement Point	Frequency	Method
Health of workers may be affected due to unhealthy working conditions.	The contractor has made all arrangements for the workers for Health Environment working condition 1. Arrangement has been made for conducting health camp. 2. Regularly public interruption made during construction.	Construction Site / labour camps	Quarterly	1. Health camp by Health Dept. 2. Public discussion

#### 2.1.5 Biodiversity

Item	Monitoring Result of Reporting Period (1st January 2023 to 31st March 2023.)	Remarks Measurement Point	Frequency	Method
Related environmental issues including elephant passages	1. No environmental issues encountered during canal construction work. 2. There are no elephant passages as information collected from forest activities. 3. No flora & fauna has been affected.	Command Area elephant passages	Bi-annually Regular observation	

### 2.1.6 Hydrology

Item	Monitoring Result of Reporting Period (1st January 2023 to 31st March 2023.)	Remarks Measurement Point	Frequency	Method
Adequacy of irrigation water supply	started	Command area	During cropping season	Observe of the concerned area
Depletion of water level due to use of surface water	Not affected as system is not completed.	Barrage pond	Post Khariff supply and Post Rabi supply	Observe of the concerned area
Ground water fluctuation	Observation will be made prior to & after monsoon.	Villages in the Project area	Twice a year	Depth of water level
Change in course of natural drains	Not observed. Programme to supply irrigation water in command area after completion of the distribution system during Khariff season.	In the Project area	Once Post monsoon	Course of natural drain.

### 2.1.7 Solid Waste

Item	Monitoring Result of Reporting Period (1st January 2023 to 31st March 2023.)	Remarks Measurement Point	Frequency	Method
Construction waste	Contractor managing the construction works such as excavated earth using in filling section of canal & laterite rock is being disposed off for utilization of building materials	At construction site and at Spoil banks	Periodical	Routine site visit

### 2.1.8 Risk and Hazard

Item	Monitoring Result of Reporting Period (1st January 2023 to 31st March 2023.)	Remarks Measurement Point	Frequency	Method
Accidents in construction sites	No accident occurred during a period of construction works in working sites.	At the work side of Package A1, A2 & B1	Periodical	Measures as suggested are taken
Hazards due to storage spillage of oil & lubricants	Diesel & Lubricants are stocked away from the Fire place and also above the ground level on Pan / Tray such that it is not contaminated with the soil.	At the work side of Package A1, A2 & B1	Periodical	As per SPCB. Measures as suggested are taken.

## 2.2 Operation and Decommission Stages (Not Applicable Now)

### 2.2.1 Pollution (Arrangement for the testing is being carried out by the contractor)

#### Water Environment

Item	Unit	Measured Value(Min)	Measured Value(Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
<b>Surface Water</b>								
Colour	Hazen	The system is not completed		5	To be filled	Panaspal Chadipal	At regular interval	APHA 2120 (B)
Odour				UO	To be filled	Gohira		APHA 2150 (B)
Taste				Agbl	To be filled	Belabahali		2160 Taste-B,C
Conductivity	µmho/cm			0	To be filled	Korda		APHA 2510 (B)
Turbidity	NTU			5	To be filled	Laxminagar		APHA 2130 B
pH				6.5-8.5	To be filled			APHA 4500 (B)
COD	Mg/L			0	To be filled			APHA 5220(B)
BOD	Mg/L			0	To be filled			APHA 5210(B)

Item	Unit	Measured Value(Min)	Measured Value(Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
Total Hardness	Mg/L			300	To be filled			APHA 2340 (C)
Iron	Mg/L			0.3	To be filled			APHA 3500 (B)
Chloride	Mg/L			250	To be filled			APHA 4500 Cl (B)
Residual Chloride	Mg/L			0.2	To be filled			APHA 4500 Cl-B,C
Total SS	Mg/L			0	To be filled			APHA 2540 (D)
Total DS	Mg/L			0	To be filled			APHA 2540 (C)
DO	Mg/L			0	To be filled			APHA 4500(B)
Calcium	Mg/L			75	To be filled			APHA 3500 Ca (B)
Magnesium	Mg/L			30	To be filled			APHA 3500 Mg (B)
Sulphate	Mg/L			200	To be filled			APHA 4500 So4

Item	Unit	Measured Value(Min)	Measured Value(Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
								(E)
Nitrate	Mg/L			45	To be filled			APHA 4500 NO3(B)
Fluoride	Mg/L			0.6-1.2	To be filled			APHA 4500 F-(D)
Phosphate	Mg/L			0	To be filled			APHA 4500 (D)
Sodium	Mg/L			0	To be filled			APHA 3500 Na (B)
Potassium	Mg/L			0	To be filled			APHA 3500 K (B)
Cyanide	Mg/L			0.05	To be filled			APHA 4500Cn-(D)
Chromium	Mg/L			0.05	To be filled			APHA 3500 Cr (B)
Boron	Mg/L			0	To be filled			APHA 3500 (B)

Item	Unit	Measured Value(Min)	Measured Value(Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
SAR	Mg/L			0	To be filled			By Calculation
Lead	Mg/L			0.05	To be filled			APHA 3500 Pb
Cadmium	Mg/L			0.01	To be filled			APHA 3500 Cd
Mercury	Mg/L			0.001	To be filled			APHA 3500-Hg
Copper	Mg/L			0.05	To be filled			APHA 3500-Cu
<b>Ground Water</b>								
Colour	Hazen			5	To be filled	Marthapur	At regular interval	APHA 2120 (B)
Odour				UO	To be filled	Gohira		APHA 2150 (B)
Taste				Agbl	To be filled	Belabahali		2160 Taste-B,C
Conductivity	µmho/cm			0	To be filled	Korda		APHA 2510 (B)
Turbidity	NTU			5	To be filled			APHA 2130 B
pH				6.5-8.5	To be filled			APHA 4500 (B)
COD	Mg/L			0	To be filled			APHA 5220(B)



Item	Unit	Measured Value(Min)	Measured Value(Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
BOD	Mg/L			0	To be filled			APHA 5210(B)
Total Hardness	Mg/L			300	To be filled			APHA 2340 (C)
Iron	Mg/L			0.3	To be filled			APHA 3500 (B)
Chloride	Mg/L			250	To be filled			APHA 4500 Cl (B)
Residual Chloride	Mg/L			0.2	To be filled			APHA 4500 Cl-B,C
Total SS	Mg/L			0	To be filled			APHA 2540 (D)
Total DS	Mg/L			0	To be filled			APHA 2540 (C)
DO	Mg/L			0	To be filled			APHA 4500(B)
Calcium	Mg/L			75	To be filled			APHA 3500 Ca (B)
Magnesium	Mg/L			30	To be filled			APHA 3500 Mg (B)

Item	Unit	Measured Value(Min)	Measured Value(Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
Sulphate	Mg/L			200	To be filled			APHA 4500 So4 (E)
Nitrate	Mg/L			45	To be filled			APHA 4500 NO3(B)
Fluoride	Mg/L			0.6-1.2	To be filled			APHA 4500 F-(D)
Phosphate	Mg/L			0	To be filled			APHA 4500 (D)
Sodium	Mg/L			0	To be filled			APHA 3500 Na (B)
Potassium	Mg/L			0	To be filled			APHA 3500 K (B)
Cyanide	Mg/L			0.05	To be filled			APHA 4500Cr-(D)
Chromium	Mg/L			0.05	To be filled			APHA 3500 Cr (B)

Item	Unit	Measured Value(Min)	Measured Value(Max)	Indian Standard (IS:10500 Drinking Water)	Referred International Standard	Remarks		
						Measurement Point	Frequency	Method
Boron	Mg/L			0	To be filled			APHA 3500 (B)
SAR	Mg/L			0	To be filled			By Calculation
Lead	Mg/L			0.05	To be filled			APHA 3500 Pb
Cadmium	Mg/L			0.01	To be filled			APHA 3500 Cd
Mercury	Mg/L			0.001	To be filled			APHA 3500-Hg
Copper	Mg/L			0.05	To be filled			APHA 3500-Cu

<b>Ground Water Level</b>										
Change in ground water level	mbgl	To be carried out as suggested.		To be filled	To be filled				Once in Post Monsoon & Once in Pre Monsoon	
									Chandipal Damadarpur Panasapal (Hudisahi Village) Laxminagar Belbahali Ragadi Barunde Ranapur Chandali Bamphidi Suano Barakhai Dhuligarh Ramachandrapur (Manoharpur) Ankurapal Sukinda Haripur Nua- Nilakanthapur Gadagaunpur Kansargada Bambilo	
<b>Water logging &amp; drainage</b>										
Water logging & drainage water level	Sq. km	Not observed		To be filled	To be filled				In the peak monsoon season & at the time of full flow in the canal	
									Low lying areas of command area	

<b>Weed infestation in the water body</b>						
Water logging & drainage water level	To be filled	Not Observed		To be filled	To be filled	Stagnant areas of surface water body.
<b>Wastage of water</b>						
Wastage of water	To be filled	Not Observed		To be filled	To be filled	Command area
						Post-monsoon period
						During Rabi & Khariff

### 2.2.2 Soil Environment (Testing report to be submitted after monsoon period) (Not Applicable Now)

Item	Unit	Measured Value(Mean)	Measured Value(Max)	Indian Standard	Referred International Standard	Remarks Measurement Point	Frequency	Method
<b>Soil fertility may be affected</b>								
EC	Micro mho/cm			To be filled	To be filled	Ghasipura Laxminagar	At regular intervals to be decided by PMU	EC metr (hesse, 1972)
OM	%			To be filled	To be filled	Garudabandi Damdarpur		Walkley& Black method
Total Nitrogen- by Mico-kjeldahl method	mg/100g			To be filled	To be filled	Korda Gohira Panaspal Kansargoda		Mico-kjeldahl method
Available	mg/100g			To be	To be filled	Belabahali		Olsen's method

Item	Unit	Measured Value(Mean)	Measured Value(Max)	Indian Standard	Referred International Standard	Remarks Measurement Point	Frequency	Method
Phosphorous – by Olsen's method				filled				
Calcium & Magnesium – by Versene method	Meq/100 g			To be filled	To be filled			Versene method
Sodium & Potassium – by Flame photometer	mg/100g			To be filled	To be filled			Flame photometer
<b>Use of agrochemicals</b>								
Dosage of fertilizers, pesticides, insecticides etc. specified by Dept. of Agriculture, Govt. of Odisha	To be filled			To be filled	To be filled	Command Area	At regular intervals to be decided by PMU	

### 2.2.3 Biodiversity (Not Applicable Now)

Item	Monitoring Result of Reporting Period	Remarks Measurement Point	Frequency	Method
Related environmental issues including elephant passages	<ol style="list-style-type: none"> <li>1. No environmental issues encountered during canal construction.</li> <li>2. There are no elephant passages as information collected from forest activities.</li> <li>3. No flora &amp; fauna has been affected</li> </ol>	Command Area	Bi-annually	Flora- Quadrant plot Analysis Fauna- Direct method <ul style="list-style-type: none"> <li>• Sighting</li> <li>• Transit line</li> </ul> Indirect Method <ul style="list-style-type: none"> <li>• Feeding Sign</li> <li>• Scat / dung / pellet identification</li> <li>• Hoof / pug marks</li> </ul> Information collection from villagers and forest officers to ensure that passage is followed or detoured.
		elephant passages	Regular observation	

### 2.2.4 Public Health (Not Applicable Now)

Item	Monitoring Result of Reporting Period	Remarks Measurement Point	Frequency	Method
Early diagnosis of malaria	Project area not malaria affected prone area	Stagnant water is not allowed near Camp / Work side of Pkg. A1, A2 & B1. Malaria control medicine are stocked at the camp.	Regular observation	Health camp
Implementation of malaria mitigation measures	Health Dept. has been requested to conduct health camp at different locations for health check-up & prevention of malaria & water born disease.		Regular observation	

### 2.2.5 Climate change (Not Applicable Now)

Item	Monitoring Result of Reporting Period	Remarks Measurement Point	Frequency	Method
Development of largescale green body.	After completion of project open land will be covered by agriculture & the agriculture land will be increased		Regular observation	



**Sample Form for External Periodical Monitoring (Annual) (Not yet finalised and is under process)**

Date	Sept. 2020				
Monitored Village/tahasil/district/Canal	Dhamanagadia, Tahasil-Danagadi, Dist. Jajpur, Rengali Left Bank Canal				
Reason for selecting the Village	This village is coming on the alignment of Rengali Left Bank Canal (Cut & Cover Portion) RD 100.49 KM to RD 103.46 KM				
Monitoring Period					
I. Status of Land Acquisition and Resettlement	Planned Number of Land Acquisition & Resettlement Activities	Completed Number of Land Acquisition & Resettlement Activities	Remaining Number of Land Acquisition & Resettlement Activities	Target to complete the Remaining Activities	Challenges/Remarks
Progress of the land acquisition process (Pre-award) (Hectare/HH,)	23.14 Hectore HH - 40+15=55	$\frac{22.81}{55}$	0	Completed	
Total No. of Affected Persons	85+9 = 94	94	0	Completed	
No of Affected Persons which land is acquired	21	-	0	Due to change of alignment.	
No of Affected Persons which Immovable Asset is affected					
(c) No of Other Affected Persons (e.g. Encroachers, Tenants, Sharecroppers; Specify the type and No.)	66	-	0	Due to change of alignment.	
Progress of the compensation disbursement for land (post award)(Hectare/HH)					
Progress of the R&R (no. of Households)					
No of displaced households for titleholders					
No of displaced households for encroachers					
No. of relocated/developed social infrastructures					
No of public awareness activities					
No. of provided employment (if applicable)					
No of the vulnerable received assistances					
No. of Grievances (received/settled)					
II. Feedbacks from PAPs through interviews/FGDs					
1.					

2.	
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10.	

Conclusions / Recommendations:

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Names of the Interviewees:

.....

Name & Signature of the Independent External Monitoring Expert:

.....(Date).....

Name & Signature of PIC of Environmental and Social Safeguard, the Executing Agency:

.....(Date).....

Attach photos