

CORRIGENDUM NO. 2

to BIDDING DOCUMENT For ICB: No. OSRP-CW-Y1-P01

Construction for Widening & Strengthening of existing carriageway to 2-lane for Bhawanipatna to Khariar (Km. 2/0 to Km. 70/0 of SH – 16)

Sl. No.	Clause No. ITB/GCC/ SCC/Forms	As existing	As amended
1	Section I. Instruction to Bidder Cl. 20.3 (b) Page – 19	Include the Representative's authorization referred to ITB 14.1(b), consisting of a power or attorney signed by those legally authorized to sign on behalf of the JVCA.	Include the Representative's authorization referred to ITB 4.1(b), consisting of a power or attorney signed by those legally authorized to sign on behalf of the JVCA.
2	Section II. Bid Data Sheet ITB 1.1 [Page 29]	The number of the Invitation for Bids is : PIU-WB-CW-01	The number of the Invitation for Bids is : CW-ICB-Y1-P01-E-44509 Dt.23.10.2007
3	Section II. Bid Data Sheet ITB 17.3 [Page 30-31]	<p>Insert a new sub-clause 17.3 as under</p> <p>17.3 Bidders who meet the minimum qualification criteria will be qualified for award of contract only if their available bid capacity on the date of Bid opening is more than the total bid value of the works to be awarded to him. The bid capacity will be calculated at this stage as under :</p> <p style="text-align: center;">Assessed available bid capacity = $A*N*1.5 - B$, where</p> <p>A = Maximum value of works executed if any one year during the last 5 years which will take into account the completed as well as works in progress.</p> <p>B = Value of the existing commitments and on-going works to be completed during the next two years</p> <p>N = Number of years prescribed for completion of works for which the bids are invited i.e, two years.</p>	<p>Insert a new sub-clause 17.3 as under</p> <p>17.3 Bidders who meet the minimum qualification criteria will be qualified for award of contract only if their available bid capacity on the date of Bid opening is more than the total bid value of the works to be awarded to him. The bid capacity will be calculated at this stage as under :</p> <p style="text-align: center;">Assessed available bid capacity = $A*N*1.5 - B$, where</p> <p>A = Maximum value of works executed if any one year during the last 5 years which will take into account the completed as well as works in progress.</p> <p>B = Value of the existing commitments and on-going works to be completed during the next two and half years</p> <p>N = Number of years prescribed for completion of works for which the bids are invited i.e, two and half years.</p>
4	Section II. Bid Data Sheet ITB 22.1 [Page 31]	<p>For bid submission purposes only, the Employer's address is :</p> <p>Attention: Chief Engineer, World Bank Project Street Address: Nirman Soudha Floor/Room number: Ground Floor City: Bhubaneswar, ZIP Code: 751001, Country: 751001</p> <p>The deadline for bid submission is: Date: 17.12.2007 Time: 4.00 PM Bidders shall not have the option of submitting their bids electronically.</p>	<p>For bid submission purposes only, the Employer's address is :</p> <p>Attention: Chief Engineer, World Bank Project Street Address: Nirman Soudha Floor/Room number: Ground Floor City: Bhubaneswar, ZIP Code: 751001, Country: INDIA</p> <p>The deadline for bid submission is: Date: 16.01.2008 , Time: 4.00 PM Bidders shall not have the option of submitting their bids electronically.</p>

(Sd/- J M Nayak)
Chief Engineer
World Bank Projects, Orissa

Sl. No.	Clause No. ITB/GCC/ SCC/Forms	As existing				As amended													
5	Section II. Bid Data Sheet ITB 25.1 [Page 31]	The bid opening shall take place at: Street Address: Nirman Soudha Floor/Room number: Ground Floor City : Bhubaneswar Country: India Date: : 17.12.2007 Time: 4.30PM				The bid opening shall take place at: Street Address: Nirman Soudha Floor/Room number: Ground Floor City : Bhubaneswar Country: India Date: : 16.01.2008 Time: 4.30PM													
6	Section III. Evaluation and Qualifying Criteria: Cl. 2.2.1 [Page -37]	Documentation Required : Form CON-2				Documentation Required : Form-LIT													
7	Section III. Evaluation and Qualifying Criteria: Cl. 2.2.2 [Page – 38]	Documentation Required : Form CON-2				Documentation Required : Form-LIT													
8	Section III. Evaluation and Qualifying Criteria: Cl. 2.4.2 (b) (iv) [Page -44]	iv.) Bituminous work with DBM & BC work -24,000 Cum				iv.) Bituminous work with DBM, BM, BC and SDBC work - 24,000 Cum													
9.	Section. IV Bidding Forms Form – LIT – Pending Litigation	Pending litigation in accordance with Criteria 2.2.1 of Section III (Evaluation and Qualification Criteria)				Pending litigation in accordance with Criteria 2.2.2 of Section III (Evaluation and Qualification Criteria)													
10	Bill No. 9.05 [Page 46 of 77 of Vol. III]	<table border="1"> <thead> <tr> <th>Item No</th> <th>Description</th> <th>UNIT</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>9.05</td> <td>Providing and laying Cement concrete wearing coat M-30 grade complete as per technical specification section 2700 and as per direction of the Engineer-in-charge.</td> <td>Cum</td> <td>290.00</td> </tr> </tbody> </table>	Item No	Description	UNIT	Quantity	9.05	Providing and laying Cement concrete wearing coat M-30 grade complete as per technical specification section 2700 and as per direction of the Engineer-in-charge.	Cum	290.00	<table border="1"> <thead> <tr> <th>Item No</th> <th>Description</th> <th>UNIT</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>9.05</td> <td>Providing and laying 75mm thick Cement concrete wearing coat M-30 grade complete as per technical specification section 2700 and as per direction of the Engineer-in-charge.</td> <td>Sqm</td> <td>290.00</td> </tr> </tbody> </table>	Item No	Description	UNIT	Quantity	9.05	Providing and laying 75mm thick Cement concrete wearing coat M-30 grade complete as per technical specification section 2700 and as per direction of the Engineer-in-charge.	Sqm	290.00
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11	Section VI: Works Requirement- Supplementary Information	4- Environmental Management Plan				Revised Environment Management Plan enclosed.													

(Sd/- J M Nayak)
Chief Engineer
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ENVIRONMENTAL MANAGEMENT PLAN

Pre-Construction Stage

S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
Pre-construction activities by Project Implementation Unit, Orissa Works Department					
P.1	Land Acquisition	<p>The acquisition of land and properties (govt./private) will be carried out in accordance with the Rehabilitation Action Plan and the entitlement framework for the project.</p> <p>The PIU has to ascertain that any environmental impacts resulting from additional acquisition of land shall be addressed and integrated into the EMP and other relevant contract documents.</p>	Land Acquisition Act 1984 and its Amendments; R&R Policy and RAP of OSRP.	PIU, Revenue Dept., NGOs, Collaborating Agencies	PIU /OWD /District Collectors
P.2	EMP Preparation of Resettlement Sites	<p>All R & R activities will be undertaken in accordance with the RAP document. It will be ensured that all R&R activities including preparation and implementation of environmental management plan for such site/s are completed before the construction activity starts on any section of ROW of existing/proposed road including bypasses.</p> <p>EMPs for such a Resettlement Site will be prepared in consultation with the concerned community. Plans will include specific actions in relation to basic services, health, hygiene and plantation.</p>	R&R Policy and RAP of OSRP.	PIU, Revenue Dept., NGOs, Collaborating Agencies	PIU /OWD /District Collectors

(Sd/- J M Nayak)
Chief Engineer
World Bank Projects, Orissa

S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
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P.3	Tree Cutting	<p>Tree cutting is to proceed only after all the legal requirements including attaining of in-principle and formal clearances from the Forest Dept. /MoEF are obtained by OWD. In case of plantation outside forest areas, a joint enumeration of the trees to be cut shall be conducted by the PIU/OWD in association with Orissa Forest Development Corporation (OFDC) and the Forest Department, GoO.</p> <p>Subsequent approval orders shall be obtained from the concerned Divisional Forest Officers to fell the trees in compliance with the Orissa Timber and Other Forest Produce Transit Rules, 1980 and Orissa Forest Act, 1972. The tree felling operations will to be carried out by OFDC. No construction activity and tree felling can be taken up in any location of the contract package, which has not been cleared by the Regional C.C.F., Eastern Region, Bhubaneswar or the MoEF, Govt. of India.</p> <p>In all around, 4000 trees have been identified for cutting after design finalization. Details can be referred in Annexure 1. This doesn't include trees on forest land or those on private properties, which are proposed to be acquired for the project. The records shall be updated by the PIU as these figures are available upon completion of joint enumeration exercises for such sites.</p> <p>Activities pertaining to tree felling, logging, stacking of fire wood and passing of timber and removal are to be synchronized and removal of the converted materials shall be taken up by the responsible agencies as per tree cutting and removal rules as prescribed separately together with the prevailing of Orissa Timber and Other Forest produce</p>	<p>Orissa Forest Act, 1972; Orissa Timber and Other Forest Produce Transit Rules, 1980; MoRTH 201.2; Framework on Arrangements with the Forest Department for OSRP</p>	<p>EMU of PIU /OWD, Forest Dept., OFDC /Tree Felling Contractor</p>	<p>EMU of PIU /OWD, Site Engineer /Supervision Consultant</p>

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Chief Engineer
World Bank Projects, Orissa

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		<p>Transit Rule 1980. or as specified by the Competent Authority.</p> <p>Trees will be removed from the Corridor of Impact before the actual commencement of the construction work to prevent traffic problems and accidents.</p> <p>Tree cutting should not be carried out simultaneously all along the corridor as this will adversely impact the traffic movement and road safety. It should be carried out on priority basis at locations of diversions, bridge and culvert construction, and such other places where the construction work is scheduled to be started early i.e. is under priority one stretch as identified in the Contract Package.</p> <p>All workers involved in the cutting and removal of trees and demolition of structures shall wear safety helmets, gloves, and protective shoes and shall provided with a batch of first aid facility for attending to basic unforeseen and freak accidents. Emergency numbers and details of nearest hospitals shall be identified during work in each stretch of the road corridor and this information shall be with the Site Supervisor.</p> <p>On the spot records shall be maintained for all trees felled and logs, fire wood, stacks, obtained from such trees in the conversion register, which shall be available for verification by any competent supervising authority of the Forest Department, OWD/PIU and SC.</p> <p>No sooner the trees are felled, the same has to be kept under watch and ward by the felling agency and steps taken for its authentication by 'passing' carried out at stump site.</p> <p>The 'passing' by any Forest Officer not below the rank of an ACF of the Forest Department irrespective of the location of the tree (either with in RoW or the acquired private land and govt. forest</p>			

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Chief Engineer
World Bank Projects, Orissa

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		<p>land) should be considered for quick removal of such trees. Uprooting of the stumps should start immediately after the logs and firewood are removed from the stump site to speed-up road construction.</p> <p>To the extent possible, felling of trees which are located beyond the hard shoulder - that is on the slopes of the embankment can be retained for reducing the loss of vegetative cover by careful selection of young and sound trees within 30cm girth and up to 1mtr girth.</p>			
P.4	Relocation of Community Utilities and Common Property Resources	<p>All community utilities and common property resources such as stand posts, bore wells, wells, ponds, water supply lines, toilets, sewage lines, drainage systems, optical fiber cables, electric power supply lines, transformers, irrigation pump houses, telephone and television cables shall have to be relocated and restored before the commencement of the road improvement activity. Details can be referred in Annexure 2. The fittings/pipes that can be re-utilized shall be salvaged and reused.</p> <p>While relocating these utilities and facilities, all concerned agencies including PIU shall take necessary pre-cautions and provide for barricading/delineation of such sites to prevent accidents including accidental fall into bore holes, pits, drains both during demolition and construction/relocation of such facilities. Standard safety practices shall be adopted for all such works.</p> <p>Early completion of works for schools, colleges and health centres including shifting of gates and construction of boundary walls will be planned during holidays so that the risk of accidents and disturbance to day-to-day activity of</p>	EMP Annexure 2 and RAP document of OSRP.	OWD/PIU; Concerned Agencies/Departments; Contractor	PIU/OWD, Site Engineer/Supervision Consultant

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Chief Engineer
World Bank Projects, Orissa

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		<p>such institutions is minimized.</p> <p>The schools and health centers will be constructed as per the relevant state norms. In case of govt. buildings, staff quarters, weekly and kisan markets, proper planning and extra care has to be taken to prevent unusual hardship to public on account of demolition/discontinuance of functioning of such facilities along with provision of appropriate safety measures during the construction /relocation process.</p> <p>Relocation sites for all CPRs shall be selected in consultation with concerned communities, local administrative authorities/departments and the gram sava. Environmental considerations with suitable/required actions including health and hygiene aspects will be kept in mind while relocating all community utilities and resources.</p> <p>The PIU/OWD will relocate these properties in consultation and written agreement with the agency/ owner/community prior to initiation of any type of construction work/activity in such stretches. This includes construction of noise barrier walls, boundary walls, shifting of entrance gates and other protection works, specifically at school, college and health centre sites.</p> <p>Proper placement (as per codes) of passenger shelters/bus stops will be ensured to prevent distress to the commuters and passengers.</p> <p>The dismantled bore holes, wells and tap points shall be properly packed and sealed so that no external water or</p>			

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		pollutants can enter such openings.			
P.5	Relocation of affected Cultural and Religious Properties	<p>All religious structures, statues (idols), mandaps and boundaries coming within the corridor of impact will be relocated after alternative sites are selected for relocation of these structures in consultation with the concerned communities, management committee/trust/endowment authority and after disbursement of the due payments are made or construction is taken up and completed by the PIU /Contractor as per the design and specification approved by the community /endowment.</p> <p>No cultural properties or religious structures shall be removed or relocated without the knowledge and written consent of the concerned parties or communities and local administration as the case may be.</p> <p>Sites for the relocation of these religious structures will be identified in accordance with the choice of the community. The NGO and PIU in consultation with local people will finalize design of these temples.</p> <p>As far as possible, the architectural elements of the structure should be conserved/reflected/translated into the design of new structures in accordance with wishes of the community.</p> <p>The relocation of such properties must be completed before commencement of any physical road improvement activity .</p> <p>Proper drainage and garbage disposal at such sites will be ensured to prevent unhygienic conditions, blocking of drains etc. at/near relocated structures. Garbage collection bins, soaks pits or other appropriate measures will be provided apart from simple enhancement of such sites.</p>	EMP Annexure 2; RAP document of OSRP	EMU of PIU /OWD; NGOs; Contractor; Concerned Community	EMU of PIU /OWD, Site Engineer /Supervision Consultant

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P.6	Orientation of Implementing Agencies	<p>The OWD/PIU shall organize orientation sessions during all stages of the project. This shall include on-site training (general as well as specific to the context of this sub-project) as well.</p> <p>These sessions shall involve concerned division-level staff of the OWD involved in this sub-project, Staff of the Site Engineer/ Supervision Consultant and the implementing agencies. Refer details in Chapter 4.</p>	Training Plan (EMP) – Chapter 4	EMU OF PIU/OWD, Site Engineer/Supervision Consultant	EMU OF PIU/OWD
Pre-construction activities by the Contractor/Environmental Officer of the Site Engineer/Supervision Consultant (SC)					
P.7	Field Verification and Modification of the Contract Documents				
P.7.1	Joint Field Verification	<p>The Environmental Officer of Supervision Consultant and the Contractor will carry out joint field verification to ascertain the possibility to saving trees, environmental and community resources wherever such representations or suggestions in writing have been received and forwarded by the project authority or by the site engineer in accordance with the local situations.</p> <p>In all such cases the interested organization/representatives, authority, expert (as required for a specific situation), executing and supervising agencies together with the local administrative set-up has to under take a joint field verification for assessing the pros and cons of such demands/suggestions to assess the need for any changes in the design and implementation plan for the activities earlier approved by the project authority.</p>		Contractor; Environmental Officer of SC	PIU/OWD

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		<p>The complaints/suggestions together with the observations and expert opinion of the joint verification team containing the need for additional protection measures or changes in design/scale/nature of protection measures including the efficacy of enhancement measures suggested in the EMP shall be summarized in a written document containing all the details with date, time, place and signature of the individuals involved and this shall be sent to the EMU OF PIU/OWD for approval.</p> <p>The PIU shall maintain proper documentation and justifications/reasons in all such cases where deviation from the original EMP is proposed.</p>			
P.7.2	Assessment of Impacts due to Changes/ Revisions in the Project Work	The Environmental Officer of SC will assess impacts and revise/modify the EMP in consultation with the PIU/OWD in accordance to the recommendation made by the field survey party in the event of changes /revisions (including addition or deletion) in the project's scope of work.	EA; Biodiversity Management Plan; EMP Document of OSRP	Contractor; Environmental Officer of SC	PIU/OWD
P.8	Crushers, Hot-mix Plants and Batching Plants Location	<p>Hot-mix and batching plants will be located 1000 mts. away from settlements, forests, wildlife movement areas and commercial establishments, preferably in the downwind direction. No plants can be set-up within 1000mts. from the following locations :</p> <ul style="list-style-type: none"> • 6.00km Narayanpur • 7.2 to 8.3km Kamthana • 9.00 to 9.40km Sankharimala • 15.0 to 15.3km Pastipada • 20.5 to 21.5km Karlapada 	MoRTH 111.1; Air Pollution Control Act; Noise Rules; EMP document of OSRP	Contractor	Environmental Officer of SC ; PIU/OWD

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World Bank Projects, Orissa

S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
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		<ul style="list-style-type: none"> • 26.100km Borthopada • 27.100km Turkel • 30.200km Saipui • 33.100km Borbhata • 35.100km Salipada • 39.900km Borda • 43.600km Kursud • 50.000 to 51.400km Gandharla • 53.000km Tureikela • 57.500km Dohelpada • 61.500km Tukla • 62.500km Rishigaon • 65.000km Lachhipur • 69.000km Khariar • 4.100, 18.850, 22.150, 54.35, 65.100, 67.850 to facilitate movement of wildlife across the road by providing traffic calming measures. <p>The Contractor shall submit a detailed layout plan for all such sites and seek prior approval of Environmental Officer of SC before entering into formal agreement with a land owner for setting-up such sites. Actions by SC and PIU/OWD against any non-compliance shall be borne by the Contractor at his own cost.</p> <p>Arrangements to minimize dust pollution through provision of windscreens, mist spray units, and dust encapsulation will have to be provided at all such sites. Specifications of crushers, hot mix plants and batching plants should have to comply with the requirements of the relevant current emission control legislations and Consent / NOC for all</p>			

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		<p>such plants shall be submitted to the SC and PIU/OWD.</p> <p>No such installation by the Contractor shall be allowed till all the required legal clearances are obtained from the competent authority and the same is submitted to the PIU/OWD and the SC.</p>			
P.9	Other Construction Vehicles, Equipment and Machinery	<p>All vehicles, equipment and machinery to be procured for construction will confirm to the relevant Bureau of India Standard (BIS) norms. The discharge standards promulgated under Environment Protection Act, 1986 will be strictly adhered to.</p> <p>Efficient and environment friendly equipment confirming to the latest noise and effluent emission control measures available in the market should be used in the project.</p> <p>The Contractor shall maintain a record of PUC for all vehicles and machinery used during the contract period, which shall be produced to the PIU/OWD and the Supervision Consultant for verification whenever required.</p>	<p>Air Pollution Control Act, 1981; Noise Rules; Motor Vehicle Act, 1988; EMP document of OSRP</p>	Contractor	<p>Environmental Officer of SC ; EMU of PIU /OWD</p>
P.10	Identification and Selection of Material Sources				
P.10.1	Borrow Areas	<p>Finalizing borrows areas for borrowing earth and all logistic arrangements as well as compliance to environmental requirements, as applicable, will be the sole responsibility of the Contractor. Locations finalized by the Contractor shall be reported to the Environmental Officer of SC and who will in turn report to PIU/OWD.</p> <p>4.100, 18.850, 22.150, 54.35, 65.100, 67.850 to facilitate</p>	<p>IRC Guidelines; Borrow Area Management Framework given in the EMP of OSRP</p>	Contractor	<p>Supervision Consultant; EMU of PIU /OWD</p>

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		<p>movement of wildlife across the road by providing traffic calming measures.</p> <p>Format for reporting will be as per the Reporting Format for Borrow Area and will include a reference map and proposed rehabilitation plan. The Environmental Officer of the SC will be required to inspect every borrow area location and evaluate such proposals in accordance to environmental requirements prior to issuing approval for use of such sites.</p> <p>No borrow areas shall be opened within 500 mts. from wildlife movement zones and forest areas. The borrow areas shall be atleast 300 mts. from schools and village access roads.</p> <p>The Contractor will not start borrowing earth from the selected borrow area until a formal agreement is signed between land owner and Contractor and a copy of this agreement is submitted to the Environmental Officer of the SC. The Supervision Consultant shall report these facts to the PIU/OWD along with remarks in the prescribed format along with documentary proofs.</p> <p>Planning of haul roads for accessing borrow materials will be undertaken by the Contractor and these details will be provided in the format given in the EMP. The haul roads shall be routed to avoid agricultural areas as far as possible and will use the existing village roads wherever available. In case such agricultural land is disturbed, the Contractor will rehabilitate it as per Borrow Area Rehabilitation Framework given in this EMP or as approved by the Environmental Officer of SC.</p> <p>Haul roads shall be maintained throughout the operation period of the borrow areas by undertaking the required</p>			

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		<p>maintenance and repair works, which may include strengthening, pot hole repairing and diversions. Improvements shall be done to reduce inconvenience to users of these roads, residents living along the haul roads and minimize air and water pollution.</p> <p>Such measures will include, but not limited to, frequent sprinkling of water, repairing of the road, road safety provisions (warning and informatory signage, flagmen etc.), and ensuring covering of loaded vehicles by waterproof tarpaulin and consultation with public and special precautions required near schools, health centers and settlement areas.</p> <p>All borrow areas whether in private, community or govt. land shall be restored either to the original condition or as per the approved rehabilitation plan immediately upon completion of the use of such a source. The Contractor shall plan and ensure rehabilitation work in such a manner that it is completed prior to the rainy season.</p> <p>Action against non-compliance in this regard shall be the sole responsibility of the Contractor and shall be made good at his own cost. Substantial completion or completion certificates for the civil work shall not be issued unless restoration and rehabilitation works are completed and the same has been approved by the SC and the PIU/OWD in writing.</p>			
P.10.2	Quarry	Contractor will finalize the quarry for procurement of construction materials after assessment of the availability of sufficient materials and other logistical arrangements.	MoRTH 111.3; Quarry Area Management	Contractor	Supervision Consultant;

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		<p>The Contractor will procure necessary legal permission for quarry opening and operation from Directorate of Mines, GoO; District Administration; SPCB and will obtain written approval from the local Tahasildar. A copy of such approval along with the rehabilitation plan shall be submitted to the PIU/OWD and Environmental Officer of Supervision Consultant.</p> <p>Format on quarry/ crushers along with the required maps showing site details and haul road network shall be submitted to PIU/OWD through the Environmental Officer of SC prior to initiating and operation of quarry sites for the project.</p> <p>No quarry and/or crusher units shall be selected or used, which is within 1000 mts. from a forest boundary, wildlife movement path, breeding and nesting habitats and national parks/sanctuaries. No quarries or crusher units for this contract package shall be established within 1000 mts. from the following locations:</p> <ul style="list-style-type: none"> • 6.00km Narayanpur • 7.2 to 8.3km Kamthana • 9.00 to 9.40km Sankharimala • 15.0 to 15.3km Pastipada • 20.5 to 21.5km Karlapada • 26.100km Borthopada • 27.100km Turkel • 30.200km Saipui • 33.100km Borbhata • 35.100km Salipada • 39.900km Borda 	Framework given in the EMP of OSRP		PIU/OWD

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S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
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		<ul style="list-style-type: none"> • 43.600km Kursud • 50.000 to 51.400km Gandharla • 53.000km Tureikela • 57.500km Dohelpada • 61.500km Tukla • 62.500km Rishigaon • 65.000km Lachhipur • 69.000km Khariar • 4.100, 18.850, 22.150, 54.35, 65.100, 67.850 to facilitate movement of wildlife across the road by providing traffic calming measures. <p>Contractor will also work out haul road network and report to Environmental Officer of Supervision Consultant who shall inspect and in turn report to PIU/OWD on the suitability of such haul roads from safety of residents, biodiversity and other environment point of views. All precautions for preventing accidents, spillage of materials and pollution, as mentioned in P.11.1 shall be adhered to by the Contractor.</p>			
P.10.3	Sand (all river and stream beds used directly or indirectly for the project)	Quality sand can be procured from riverbeds adjacent to the corridors i.e. from River Tel and Sunder free from silt and other impurities. This procurement shall be made only after declaration of sand quarry sites by the local Tahasildar Borda, Titlagarh and Khariar with the concurrence of the District Collector with due regard to Orissa Miner Mineral Concession Rules, 2004 and regulation regarding protection of river basins by Irrigation department.	MoRTH 111.3; Miner Mineral Concession Rules, 2004	Contractor	Supervision Consultant; EMU of PIU /OWD

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		<p>In case of selection of new sites for sand quarrying, the Contractor shall obtain prior approval and concurrence from Competent District Authority and the Environment Officer of the SC keeping in view the objections and convenience of the local population, who may restrain such activities for their own security and safety.</p> <p>Where the supplier of sand is another party, the authentic copy of lease agreement that has been executed between the local Tahasildar and the supplier has to be submitted to SC and PIU/OWD Executive Engineer of the project before any procurement is made from such a site.</p> <p>To avoid accidents and caving in of sand banks at quarry sites, sand shall be removed layer by layer. Digging deeper than the permissible limit has to be completely avoided by the Contractor. Such quarry should be barricaded 10 mtr away from the periphery on all sides except the entry point, so as to prevent accidental fall of domestic cattle, wildlife and human beings.</p> <p>The flood embankment on either side of the river shall not be used for movement of tippers and loaders, which are likely to be damage and destroy such structures. Instead alternative haul roads will be constructed, avoiding the embankment for safety and security of the vehicles, road users and the habitations along the banks of the river.</p>			
P.10.4	Arrangement for Construction	To avoid disruption/disturbance to other water users, the Contractor will extract water from fixed locations and consult the Environmental Officer of SC before finalizing the locations. The Contractor will provide a list of locations	State Norms and Water Policy	Contractor	Environmental Officer of SC ; PIU/OWD

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S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
	Water	<p>and type of sources from where water for construction will be used to the SC and the PIU/OWD.</p> <p>All efforts shall be made to ensure avoidance of competitive use of a single water source, which may be depleted on account of the stress caused by drawing of water for road construction activity by the Contractor.</p> <p>The Contractor should use surface water depending on the availability and quality by developing its own water storage units in a river bed during sand quarrying or by developing ponds during borrowing earth from where water can be lifted using diesel or electric pump sets.</p> <p>In case of nalas and water scarcity areas, the possibility/permission for sinking of bore wells adjacent to nalas and streams may be examined, such that while the water requirement for the road construction activity is met, these structures when abandoned will serve as a ground water recharge after suitable modification.</p> <p>Use of ground water facility shall be subject to the local legislation; ground water availability in the area and the granting of necessary permission by the Competent Authority as declared by the State Govt. The Contractor shall pay the royalty for use of such water as decided by the State Govt. under relevant norms. A copy of the permission obtained from the Competent Authority shall be submitted to Supervision Consultant and OWD prior to initiation of construction activity.</p> <p>Use of any other water source such as irrigation canals, ponds,</p>			

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S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		water harvesting structures and river/stream, which is likely to strain and deplete availability for surrounding and downstream inhabitants will not be allowed. Contractor can use ponds, which are not in use by the community/wildlife or have been identified for filling-in for the proposed works, but in such a case, he will obtain a written consent from the owner and submit this to the SC.			
P.11	Labor Requirements	The Contractor preferably will use unskilled labor drawn from local areas to provide maximum benefit to the local community especially to the SC and ST population along the corridor.	General Conditions of the Contract Document	Contractor	Supervision Consultant; PIU/OWD
P.12	Construction Camp Locations – Selection, Design and Lay-out	<p>Construction camps will not be proposed within 500 mts. from the nearest settlement and 1000 mts. from the nearest reserved or protected forest to avoid conflicts and stress on the local infrastructure facilities resources.</p> <p>Stock piling of construction materials and godowns shall be at least 500 mts. from the nearest water source. These are to be located on higher ground to avoid impact during floods due to pollution or due to any accidental spillage of stored /stockpiled materials.</p> <p>All location and lay-out plans of such sites will be submitted by the Contractor prior to their establishment and will be approved by the Environmental Officer of SC and OWD/PIU. Other conditions laid out in the Framework for Construction Camps (part of this EMP) shall apply.</p> <p>The waste disposal and sewage treatment shall be such that the environment is not polluted with the waste material and foul order including the effluents and wastewater generated at the campsite. The designing and setting up of these structures should be as per the approved site plan. This</p>	Framework for Construction Camps; General Conditions of Contract Document	Contractor	Supervision Consultant; PIU/OWD

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S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>should include soak pits, septic tanks and arrangements for carriage of extra sewage by sealed mechanized containers for disposal at designated sites, as available in the locality, with due written permission from the Competent Local Authority.</p> <p>In case of non-receipt of any such permission from the competent authority as stated above, the provision of wider safety tanks and storage facility for garbage has to be made at the camp site as additional measures.</p>			
P.13	Arrangements for Temporary Land Requirement	<p>The Contractor will carry out negotiations with the landowners for obtaining their consent for temporary use of their lands for haulage roads, approach roads, temporary diversions; stockpiling of bulk construction materials; establishment of camps, hot-mix plants, batching plants and crusher units with proper agreement, detailing the terms and conditions agreed between both the parties. This needs to include conditions governing activities to be ensured during the construction stage and at the time of decommissioning of the project.</p> <p>The agreement must contain the details of the land involved with relevant records of ownership. A copy of such agreement/s (use and clean-up operations) shall have to be submitted to the Supervision Consultant and PIU/OWD.</p>	Contract Document	Contractor	Supervision Consultant; PIU/OWD
P.14	Orientation of Implementing Agencies	<p>The OWD/PIU shall organize orientation sessions during all stages of the Project. This shall include on-site training (general as well as specific to the context of this sub-project) as well.</p> <p>These sessions shall involve staff of the Site Engineer/</p>	Training Plan (EMP) – Chapter 4	PIU/OWD, Site Engineer/Supervision Consultant	PIU/OWD

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S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		Supervision Consultant and the contractor/s. Refer details in Chapter 4.			

Table 3.2
ENVIRONMENTAL MANAGEMENT PLAN

Construction Stage

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
Activities to be Carried Out by the Contractor					
C.1	Site Clearance				
C.1.1	Clearing and Grubbing	Site clearance including clearance of marked trees for felling and removal has to be carried out much before the actual road construction takes place. Structures and utilities (cabins, commercial properties, hoardings, overhead power transmission lines, cable connections, telephone lines, bore wells, stand posts, wells, statues, temples etc.) should have been compensated/relocated as per RAP and EMP provisions before tree felling work and clearing or grubbing activities are undertaken since such activities may damage structures (private and govt.) and essential facilities/utilities of public	MoRTH 201.2	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>use.</p> <p>All works shall be carried out in a manner such that the damage or disruption to flora is minimum. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval from Environmental Officer of SC.</p> <p>Any tree up to 30cm girth at breast height shall be uprooted mechanically with ball of earth intact for relocation and transplantation at various degraded sites, embankment of water body, ponds, temples, market places, schools and along road corridors for preventing complete loss of such vegetative cover.</p> <p>The Contractor, under any circumstances will not cut or damage trees. Vegetation above 30 cm girth will be considered as trees and can be compensated, in the event of OWD/PIU's written instruction to undertake tree cutting.</p>			
C.1.2	Generation of Debris from dismantling structures and road surface	<p>Debris generated due to the dismantling of the existing road will be suitably reused in the proposed construction as follows:</p> <ul style="list-style-type: none"> ➤ Eighty percent (80%) of the sub-grade excavated from the existing road surface, excluding the scarified layer of bitumen, shall be reused in the civil works after improving the soil below the sub-grade through addition of sand and suitable cementing material for qualitative up-gradation. ➤ The dismantled scraps of bitumen will be utilized for the paving of cross roads, access roads and paving works in construction sites and campus, temporary traffic diversions, haulage routes, parking areas along the 	<p>Framework for Waste Management (EMP);</p> <p>Guidelines of Orissa State Pollution Control Board.</p>	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>corridor or in any other manner approved by the Environmental Officer of SC.</p> <ul style="list-style-type: none"> ➤ At locations identified for disposal of residual bituminous wastes, the disposal will be carried out over a 60 mm thick layer of rammed clay so as to eliminate the possibility of leaching of wastes into the ground water. ➤ The Contractor will suitably dispose off unutilized non-toxic debris either through filling up of borrows areas located in wasteland or at pre-designated disposal sites, subject to the approval of the Environmental Officer of SC. ➤ Debris generated from pile driving or other construction activities along the rivers and streams drainage channels shall be carefully disposed in such a manner that it does not flow into the surface water bodies or form puddles in the area. <p>The pre-designated disposal locations will be a part of Comprehensive Solid Waste Management Plan to be prepared by Contractor in consultation and with approval of Environmental Officer of SC and approval local competent authority.</p> <p>All arrangements for transportation during construction including provision, maintenance, dismantling and clearing debris, considered incidental to the work, will be planned and implemented by the Contractor as approved and directed by the Environmental Officer of SC and OWD/PIU.</p> <p>All disposal sites shall be identified by the Contractor and a rehabilitation plan (including details about pollution prevention and safety measures) for each such site shall be submitted in the approved format. These shall be verified and</p>			

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>approved by the Environment Officer of SC in consultation with the Local Competent Authority after joint site visits, prior to disposal of any debris or waste materials.</p> <p>The Contractor shall then enter into an agreement with the concerned land owner/s and a copy of this document shall be submitted to OWD/PIU through Environment Officer of SC.</p>			
C.1.3	Other Construction Wastes Disposal including Fly Ash	<p>The pre-identified disposal locations will be a part of Comprehensive Waste Disposal & Solid Waste Management Plan to be prepared by the Contractor, which needs to be approved by the Environmental Officer of SC (as per the process described in C.1.2). Disposal sites will be finalized prior to initiation of any work on a particular section of the road.</p> <p>Contractor will ensure that any spoils/materials unsuitable for embankment fill shall not be disposed off near any water course; water body; agricultural land; natural habitats like grass lands, wet lands, flood plains, forests etc.; pastures; eroded slopes; and in ditches, which may pollute the surrounding including water sources.</p> <p>Such spoils from excavation can be used to reclaim borrow pits and filling-up of depressions which are not connected to any water source in the locality nor under use by the local people.</p> <p>Surplus fly ash, bottom ash and lime, if any transported for use on this corridor shall not be left open and dumped at any disposal site. Contractor shall take care of such residual materials for use at any other location/s of new embankment construction work with proper protection measures.</p> <p>The re-use and disposal of debris from diversions shall be the</p>	<p>Framework for Waste Management (EMP);</p> <p>Guidelines of Orissa State Pollution Control Board.</p>	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>responsibility of the Contractor, which includes rehabilitation and restoration of such sites. These quantities also need to be reflected in the Solid Waste Disposal Plan.</p> <p>Non-bituminous wastes other than fly ash may be dumped in borrow pits (preferably located in barren lands) where such borrow pits are not suitable to develop as a economic source like pisci-culture or a source of irrigation. Such borrow pits can be filled up with non-bitumen wastes and then covered with a minimum 30cm layer of the soil, where plantation of trees and shrubs will be taken-up by the Contractor as a part of site rehabilitation. The species suitable for such re-habitation work shall be at least one-year-old saplings of Alstonea, Zizyphus, Bel, Papal, Banyan, Babool, Chirounji, Arjuna, Karanja, Samania etc.</p> <p>No disposal site shall be created as part of the project, without prior approval of the Environmental Officer of SC, OWD/PIU and Local Competent Authority. SC will keep strict vigil on this aspect and ensure that work is not permitted without appropriate Solid Waste Disposal Plan in place.</p> <p>The Contractor at his own cost shall resolve any claim, arising out of waste disposal or any non-compliance that may arise on account of lack of action on his part.</p>			
C.1.4	Stripping, stacking and preservation of top soil	<p>The top soil from all sites including road side widening and working area, cutting areas, quarry sites, borrows areas, construction camps, haul roads in agricultural fields (if any) and areas to be permanently covered shall be stripped to a specified depth of 150mm and stored in stockpiles for reuse.</p> <p>A portion of the temporarily acquired area and/or RoW edges will be earmarked for storing top soil. The locations</p>	<p>MoRTH: 301.3.2; MoRTH: 301.7; MoRTH: 301.3.3; MoRTH: 305.3; Framework for</p>	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>for stacking will be pre-identified in consultation and with approval of Environmental Officer of SC. The following precautionary measures will be taken by the Contractor to preserve the stockpiles till they are re-used:</p> <p>(a) Stockpile will be such that the slope does not exceed 1:2 (vertical to horizontal), and height is restricted to 2 m.</p> <p>(b) To retain soil and to allow percolation of water, the edges of the pile will be protected by silt fencing.</p> <p>(c) Multiple handling kept to a minimum to ensure that no compaction occurs.</p> <p>(d) Such stockpiles shall be covered with empty gunny bags or will be planted with grasses to prevent loss during rains.</p> <p>Such stockpiled topsoil will be utilized for -</p> <ul style="list-style-type: none"> ➤ Covering reclamation sites or other disturbed areas including borrow areas (not those in barren areas) ➤ Top dressing of road embankment and fill slopes ➤ Filling up of tree pits and ➤ In the agricultural fields of farmers, acquired temporarily that need to be restored. <p>Residual topsoil, if there is any, will be utilized for the plantation works along the road corridor.</p> <p>The utilization as far as possible shall be in the same area/close to the same area from where the top soil was removed.</p> <p>The stripping, preservation and reuse shall be carefully inspected, closely supervised and properly recorded by the</p>	Borrow Areas		

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		SC.			
C.1.5	Accessibility	<p>The Contractor will provide safe and convenient passage for vehicles, pedestrians and livestock to and from roadsides and property accesses connecting the project road by providing temporary connecting road, as necessary.</p> <p>Construction activities that shall affect the use of side roads and existing accesses to individual properties, whether public or private, shall not be undertaken without providing adequate provision approved by the SC.</p> <p>The Contractor will take care that the cross roads are constructed in such a sequence that construction work over the adjacent cross roads are taken up in a manner that traffic movement in any given area does not get affected.</p>	MoRTH specifications and IRC guidelines	Contractor	Supervision Consultant; PIU/OWD
C.1.6	Planning for Traffic Diversions and Detours	<p>Detailed traffic control plans will be prepared and submitted to the Resident Engineer of SC for approval, minimum seven days prior to commencement of works on any section of road.</p> <p>The traffic control plans shall contain details of temporary diversions, traffic safety arrangements including night time safety measures, details of traffic arrangement after cessation of work each day, safety measures undertaken for transport of hazardous materials and arrangement of flagmen etc. to regulate traffic congestion.</p> <p>The Contractor will provide specific measures for safety of pedestrians and workers as a part of traffic control plans.</p> <p>Temporary diversions will be constructed with the approval of the Resident Engineer and Environmental Officer of Supervision Consultant. The temporary traffic detours will</p>	MoRTH: 112; IRC SP:55	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>be kept free of dust by sprinkling of water three times a day or as required under specific conditions and directed by the SC (depending on weather conditions, construction in the settlement areas and volume of traffic). The Contractor will ensure that the diversion/detour is always maintained in running condition, particularly during the monsoon to avoid disruption to traffic flow.</p> <p>The Contractor will also inform local community of changes in traffic routes and pedestrian access arrangements with assistance from SC and OWD.</p>			
C.2	Construction Material				
C.2.1	Earth from Borrow Areas for Construction	<p>No borrow area will be opened without permission of the Environmental Expert of Supervision Consultant. The location, shape and size of the designated borrow areas will be as approved by the Environmental Expert of Supervision Consultant and in accordance to the IRC recommended practice for borrow pits for road embankments (IRC 10: 1961).</p> <p>The borrowing operations will be carried out as specified in the guidelines for setting and operation of borrow areas.</p> <p>The unpaved surfaces used for the haulage of borrow materials, if passing through the settlement areas or habitations; will be maintained dust free by the Contractor. Sprinkling of water will be carried out thrice a day to control dust along such roads during their period of use.</p> <p>During dry seasons (winter and summer) frequency of water sprinkling will have to be increased according to the site and climatic conditions in the settlement areas and Environmental Officer of SC will decide the numbers of</p>	MoRTH: 305.2; Framework for Borrow Area Management	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>sprinkling depending on the local requirements.</p> <p>Contractor will rehabilitate the borrow areas as soon as borrowing is over from a particular borrow area in accordance with the Framework for Borrow Area Management (refer Framework – 4) or as suggested by Environmental Expert of Supervision Consultant.</p>			
C.2.2	Quarry Operations	<p>The Contractor shall obtain materials for quarries only after the approval of Department of Mines, Govt. of Orissa and the District Administration. A copy of this consent must be submitted to OWD/PIU through Environment Expert of SC.</p> <p>The Contractor will develop a Comprehensive Quarry Redevelopment Plan, as per the Mining Rules of the State and submit a copy to OWD and SC prior to opening of the quarry site.</p> <p>The quarry operations will be undertaken within the rules and regulations in vogue.</p>	MoRTH:111.3	Contractor	Supervision Consultant; PIU/OWD
C.2.3	Transporting Construction Materials and Haul Road Management	<p>Contractor shall maintain properly (as directed by SC) all roads (existing or constructed for the project), which are used for transporting construction materials, equipment and machineries.</p> <p>All vehicles delivering goods to the site shall be covered to avoid spillage of materials and air pollution.</p> <p>It shall be the responsibility of the Contractor to ensure that highways and other roads used for transportation of construction materials are clear from any dust, sand, soil, aggregates etc., fallen from the transporting vehicles used for the project. Contractor will arrange for regular water sprinkling for dust suppression of all such roads and</p>	MoRTH specifications	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>surfaces, as directed by Environmental Officer of SC.</p> <p>The unloading of all materials at construction sites will be limited to day time only to avoid accidents. Screens of hessian cloth, agro-net and such other barricading material are to be erected along all dumping and stockpiling sites, so that generation of the dust in the vicinity of such locations can be minimized to a great extent.</p>			
C.2.4	Construction Water	<p>Contractor will arrange adequate supply and storage of water for the whole construction period at his own cost.</p> <p>The Contractor will take all precaution to minimize the wastage of water in the construction process and related operations.</p>	<p>State Water Policy;</p> <p>Water Act and Rules</p>	Contractor	<p>Supervision Consultant;</p> <p>PIU/OWD</p>
C.3	Construction Work				
C.3.1	Disruption to Other Users of Water	<p>While working across or close to any perennial water bodies, Contractor will not obstruct/ prevent the flow of water.</p> <p>Construction over and close to the non-perennial streams shall be undertaken in dry season and if such activity is likely to disrupt, constrain or impact the community use of the water body, adequate prior information (at least two weeks in advance) will be provided to such community. Such water body may be ponds, water harvesting structures (WHS), feeder channels to pond, irrigation sources etc.</p> <p>If the supply of water or access to a source is being completely cut off, then the Contractor shall make necessary arrangements to provide water in the interim period. Water quality test shall be done prior to providing / supplying the water.</p> <p>In all such cases specific provision of lessening the impact of</p>	<p>MoRTH:304.3.2;</p> <p>Water Rules and Policy of the State</p>	Contractor	<p>Supervision Consultant;</p> <p>PIU/OWD</p>

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>construction has been elaborated in the design plan of retaining walls, spillways and ghats in Drawing No. OSRP/CEG/SH /ENV/03</p> <p>Wherever excavation for diverting water flow will be required as per the engineering designs, the Contractor will ensure that such diversion channels have no stepper slopes than 1:2 (V to H). Proper slope protection measures have to be taken as approved by the Environmental Officer of SC and OWD/PIU.</p> <p>The Contractor will take prior approval of the River Authority or Irrigation Department and SC for any such activity. The OWD/PIU will ensure that Contractor has served the notice to the downstream users of water well in advance where such diversion of the flow is likely to affect the down stream population subject to the condition that under no circumstances the down stream flow shall be stopped putting the wildlife, the aquatic fauna and the shore line settlement under distress.</p> <p>Minimum eco-flow shall be maintained even during the construction stage by ensuring downstream connection to the main channel.</p>			
C.3.2	Drainage and Flood Control	<p>Contractor will ensure that no construction materials like earth, stone, ash or appendage disposed off so as not to block the flow of water of any water course and cross drainage channels.</p> <p>Where necessary adequate mechanical devices to bail out accumulated water from construction sites, camp sites, storage yard, excavation areas are to be pre-settled and arranged well in advance of the rainy season besides providing temporary cross drainage systems.</p>	<p>MoRTH:305.3.7; MoRTH:306</p>	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>The contractor will take all adequate precautions to ensure that construction materials and excavated materials are enclosed in such a manner that erosion or run-off of sediments is controlled. Silt fencing shall be installed prior to the onset of the monsoon at all the required locations, as directed by Environmental Officer of SC and OWD/PIU.</p> <p>The contractor will also ensure that no material blocks the natural flow of water in any water course or cross drainage channel.</p> <p>Prior to monsoon, the contractor will provide either permanent or temporary drains to prevent water accumulation in surrounding residential, commercial and agricultural areas. Additionally, all structure construction sites shall be cleared/cleaned-up.</p> <p>A pre-monsoon joint inspection (in May first week) by SC and/or PIU/OWD will be conducted to identify all such areas which need to be cleared and restored before the onset of rains.</p>			
C.3.3	Siltation of Water Bodies and Degradation of Water Quality	<p>Contractor will construct silt fencing at the base of the embankment construction near all water bodies (including wells) and around the stockpiles at the construction sites.</p> <p>Silt fencing will be provided prior to the commencement of earthwork and continue till the stabilization of the embankment slopes is complete on the particular sub-section of the road.</p> <p>The contractor will also put up sedimentation cum grease traps at the outer mouth of the drains located in truck lay bays and bus bays which are ultimately entering into any</p>	MoRTH: 306; Silt Fencing Details in Annexure 4	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>surface water bodies / water channels with a fall exceeding 1.5 m.</p> <p>Contractor will ensure that construction materials containing fine particles are stored in an enclosure such that sediment-laden water does not drain into nearby water bodies.</p>			
C.3.4	Slope Protection and Control of Soil Erosion	<ul style="list-style-type: none"> ➤ The contractor will construct slope protection works as per design, or as directed by the Environmental Officer of SC to control soil erosion and sedimentation through use of dykes, sedimentation chambers, basins, fiber mats, mulches, grasses, slope drains and other devices as required under specific local conditions. ➤ All temporary sedimentation, pollution control works and maintenance thereof will be deemed as incidental to the earth work or other items of work and as such no separate payment will be made for them. <p>Contractor will ensure the following:</p> <ul style="list-style-type: none"> ➤ After construction of road embankment, the side slopes of all cut and fill areas will be graded and covered with stone pitching, grass and shrub as per design specifications. ➤ Terfing works will be taken up as soon as possible provided the season is favorable for the establishment of grass sods. ➤ Other measures of slope stabilization will include mulching netting and seeding of batters and drains immediately on completion of earthworks with sowing of seeds of grass, shrub and bushes 30cm interval from line to line across the slope and sprinkling of water on such slopes after completion of the earth work. 	<p>MoRTH: 305.2.2.2; MoRTH: 306.2; Framework for Soil Erosion and Sedimentation Control</p>	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<ul style="list-style-type: none"> ➤ Regular watering shall be provided at such locations as required. In all these cases, seeds of Banachakunda (Cassia tora), Banakolthi (Tephrosia), Bala (Sida species), Vetiver grass, Pamarosa grass, Croton bonplandianus (Gandha tulasi), Jatropha gossypifolia etc. will be used. ➤ In borrow pits, the depth shall be regulated so that the sides of the excavation should not be steeper than 1 vertical to 2 horizontal, from the edge of the final section of the bank. ➤ Along sections abutting water bodies, stone pitching as per design specification will be provided to protect slopes. All such stone pitching should have a filter layer to prevent scouring and settlement of the pitched surface when the water level recedes. ➤ Stabilization of the embankment with appropriate technique/s shall commence soon after the embankment formation. ➤ Any existing drainage channel or body shall not be obstructed during filling operations. ➤ The embankment slope shall be maintained as per IRC specifications. 			
C.4	Pollution				
C.4.1	Water Pollution				
C.4.1.1	Water Pollution from Construction Wastes	The Contractor will take all precautionary measures to prevent the wastewater generated during construction from entering into streams, water bodies or the irrigation system	MoRTH: 111.4; MoRTH: 111.1;	Contractor	Supervision Consultant; PIU/OWD,

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>by providing safe wastewater soak pits away from any aquifers or water body.</p> <p>The Contractor will avoid continuation of construction activity close to the streams or water bodies during monsoon. Stream courses and drains will be kept free from dumping of solid wastes, excavated earth, sludge and discharge of waste water from construction camps and sites. Liquid wastes arising from construction sites are to be impounded into collection pits.</p> <p>Construction materials containing fine particles like lime stone, lime, cement, fine aggregates etc. shall be stored in enclosures away from water bodies on high land to ensure that any run off from such locations does not drain into nearby water courses.</p> <p>No garbage, sludge, lubricants, fuel, sewerage or contaminated waste water is to be released in the settlement areas, water bodies, forests and wildlife habitats or grazing areas. All waste arising from the project is to be disposed off in the manner that is acceptable to the State Pollution Control Board or as directed by Environmental Expert of Supervision Consultant.</p> <p>The Environmental Expert of SC will specify in the progress reports on whether the all liquid wastes disposed off from the various sites meets the discharge standards as specified by the CPCB Govt. of India. If case of non-compliance actions taken by SC shall also be specified.</p> <p>This shall be done on the basis of pollution monitoring</p>	Water Act, 1974		SPCB

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				Execution / Civil Work	Supervision/ Monitoring
		results received from the Contractor and that from the Independent Agency hired by OWD/PIU.			
C.4.1.2	Water Pollution from Fuel, Lubricants and Chemicals	<p>The Contractor will ensure that location of parking lots; garage; fuel/lubricants storage sites; POL waste collection sites; vehicle, machinery and equipment maintenance and refueling sites (other than those located inside construction camps, for which the relevant clause is applicable); are located on high ground at least 500 m from rivers, streams, canals, ponds, wildlife movement areas, forests and ground water sources.</p> <p>If such areas are located on agricultural land, top soil will be stripped, stockpiled and returned after cessation of such use.</p> <p>Garage, service stations, refueling stations and equipment maintenance yards shall be so located at least 100 mts. away from kitchen, mess and drinking water facilities within the camp site.</p> <p>The Contractor will ensure that all vehicle/machinery and equipments operation, maintenance and refueling will be carried out in such a fashion that any spillage (while working or accidental) of fuel and lubricants does not contaminate the land and water resources.</p> <p>There shall be lined drains and service ramps with oil and grease traps/oil interceptors (as per the design provided) in such areas to prevent liquid wastes from entering into any aquifer, local water source, abandoned well, bore well, pond and other water bodies.</p>	<p>MoRTH: 111.4; MoRTH: 111.1; Petroleum Act and Rules; MoEF/CPCB Notifications; Framework for Construction Camps</p>	Contractor	Supervision Consultant; PIU/OWD, SPCB

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		<p>Storage of drums (both filled and empty) and refueling shall be done on concrete platforms (impervious surface). Additionally, roofing (of any type) shall be provided to prevent contamination of land and water due to run-off from such sites during rains. Oil interceptors are also to be provided at vehicle parking areas.</p> <p>The contractor will arrange for collection, storage, reuse/disposal of spent oil, lubricants, grease, sludge, slurry, bitumen, chemicals, paints etc. Covered bins/drums (marked specifically regarding the contents) shall be kept separately at maintenance and refueling areas.</p> <p>Disposal shall be at pre-identified sites (list to be submitted to SC and OWD/PIU) as approved by the Environmental Officer of SC. All spills and collected petroleum products will be disposed off in accordance with the prevailing MoEF and SPCB guidelines issued for such purpose. Environmental Officer of SC will certify that all arrangements comply with the guidelines of SPCB/ MoEF or any other relevant laws such as the Central Excise and Explosive Substances Act.</p>			
C.4.2	Air Pollution				
C.4.2.1	Dust Pollution	<p>The contractor will take every precaution to reduce the level of dust (SPM and RSPM) from crushers, material storage yards, haul roads and construction sites (including earthwork, dismantling, scarification and material mixing sites) by sprinkling of water, mist spray, encapsulation of dust source and erection of screen /barriers.</p> <p>Hot mix plant and batch mix plant will be fitted with dust extraction units and mist spray to keep down the dust</p>	<p>MoRTH:111.1; MoRTH:111.5; MoRTH:111.9; MoRTH:111.10; Air Act; SPCB Rules and</p>	Contractor	Supervision Consultant; PIU/OWD, SPCB

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				Execution / Civil Work	Supervision/ Monitoring
		<p>emission levels. The suspended particulate matter value at a distance of 40m from a unit located in such a cluster should be less than 500 µg/m³.</p> <p>Dust screening vegetation such as Dwarf bamboo, Justiacea, Vitex negundo, Lawsonia inermis will be planted around the crusher sites besides provision of dust screens.</p> <p>The contractor will provide necessary certificates to confirm that all crushers used in the project conform to relevant dust emission control legislation. Air pollution monitoring will be conducted as per the Pollution Monitoring Plan and results shall be used to strengthen/rectify problematic areas. If other existing crushers are used, such units need to have valid license from the SPCB.</p> <p>Copies of the required certificates and consents of the operator owner shall be procured by the Contractor and submitted to OWD/PIU through Environment Officer of SC prior to the procurement of material from such units. The Resident Engineer will ensure that the necessary documents have been submitted by the contractor before material procurement permission is issued by the Materials Engineer of SC.</p>	Guidelines		
C.4.2.2	Emission from Construction Vehicles, Equipment and Machineries	<p>Contractor will ensure that all vehicles, equipment and machinery used for construction are regularly maintained and confirm to the emission standards specified by the CPCB. Certification issued for such contrivances obtained from designated/approved authority shall be submitted along with the specified reporting format. The contractor will maintain a separate file and submit PUC certificates for all vehicles/equipment/machinery used for the project.</p> <p>Monitoring results will also be submitted to SC and OWD/PIU as per the Pollution Monitoring Plan in the</p>	Motor Vehicles Act	Contractor	Supervision Consultant; PIU/OWD, SPCB

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				Execution / Civil Work	Supervision/ Monitoring
		specified format.			
C.4.3	Noise Pollution				
C.4.3.1	Noise Pollution: Noise from Vehicles, Plants and Equipment	<p>The Contractor will ensure the following:</p> <ul style="list-style-type: none"> ➤ All plants and equipment used in construction (including those of sub-Contractors and/or suppliers such as aggregate crushing plants) shall strictly conform to the MoEF/CPCB noise standards and shall have latest noise suppression mountings. ➤ All vehicles and equipment used in construction will be fitted with exhaust silencers. ➤ Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective, these shall be replaced. ➤ Limits for construction equipment used in the project such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws shall not exceed 75 dB (A) (measured at one meter from the edge of equipment in the free field), as specified in the Environment (Protection) Rules, 1986. ➤ Maintenance of equipment, machinery and vehicles (including proper lubrication, tuning, checks for muffler effectiveness) shall be regular and upto the satisfaction of the Environmental Officer of SC to keep noise levels under control . ➤ Construction activity at sites within 100m habitations and hospitals shall not be carried out during night 	Noise Rules, 2002	Contractor	<p>Supervision Consultant; PIU/OWD; SPCB,</p> <p>Affected Communities; PRIs; NGOs; Staff at Schools and Health Centres</p>

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		<p>(10:00 pm to 06:00 am).</p> <ul style="list-style-type: none"> ➤ Construction activity at sites within 500m from wildlife movement zones, reserved and protected forest areas shall not be carried out between 06:00 pm to 06:00 am. ➤ The Contractor will not take any construction activity around educational institutes within a distance of 100 m between the working hours of these sensitive receptors. ➤ Contractor will provide noise barriers at all sensitive receptors mentioned in Tabular statement under Chapter -2 of EMP, which includes masonry walls and vegetative screens (creepers) as per the design drawing no. OSRP/CEG/SH/ENV/04B. <p>These locations include 5 temples (6.310,27.150,43.400,57.000,62.700) Bhawanipatana To Khariar, 18 schools and college (7.335,20.550,20.800,22.720,26.110,33.000,33.000,35.500,43.600,43.720,46.750,47.500,51.050,57.000,62.760, 65.910,67.680,69.540) on Bhawanipatana- Khariar, 8 govt. buildings (6.100,20.650,25.690,22.800,39.800,43.946,50.81)</p> <p>Blasting operations, if any shall be carried out with full safety precautions and in compliance with measures as specified in the legal provisions.</p> <ul style="list-style-type: none"> ➤ Monitoring shall be carried out at the construction sites as per the noise monitoring plan and results will be submitted to SC and OWD/PIU. <p>Environmental Officer of SC will be required to regularly inspect all above mentioned sites to ensure proper compliance of the said measures.</p>			
C.5	Safety				

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.5.1	Personal Safety Measures for Labour	<p>Contractor shall provide (including enforcement with zero tolerance):</p> <ul style="list-style-type: none"> ➤ Protective footwear and protective goggles to all workers employed on mixing asphalt materials, cement, mortars, concrete, welding sites, blasting, crusher and stockpiling locations etc. as per the Factory Act, 1948. ➤ Welder's protective eye-shields to workers engaged in welding works. ➤ Earplugs to workers exposed to high noise levels (above 65db) at quarries, crushers, compaction sites, concrete mixing, batch mixing, drilling, fabricating and heavy machinery operations. ➤ Hard hat or helmets to all workers, supervising staff and inspecting officials entering a construction site, plant area, quarry, loading and unloading site. ➤ Protective goggles and clothing to workers engaged in stone breaking activities. ➤ Earplugs to workers exposed to noise in crushing, compaction, blasting, dismantling or concrete mixing operations. ➤ Adequate safety measures for workers during handling of materials at site. ➤ Nettings and platforms below and on the sides of overhead construction and excavation work to prevent mishaps due to accidental fall of workmen and debris. <p>The Contractor will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway,</p>	<p>Factories Act, 1948; Building and Other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996</p>	Contractor	Supervision Consultant; PIU/OWD

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				Execution / Civil Work	Supervision/ Monitoring
		<p>stairwells, excavations, trenches and safe means of entry and egress.</p> <p>The Contractor will make sure that during the construction work all relevant provisions of the Factories Act, 1948 and the Building and Other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996 are adhered to.</p> <p>The Contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labor Organization (ILO) Convention No. 62 as far as those are applicable to this contract.</p> <p>The Contractor will not employ any person below the age of 18 years for any work and no woman of productive age will be engaged in the work of painting containing lead in any form. The Contractor will also ensure that no paint containing lead or lead products is used except in the form of paste or readymade paint.</p> <p>Contractor will provide facemasks to the workers engaged in spray painting or manual painting when lead based compound is one of the constituents of such surface to be scrubbed, cleaned and painted. These masks shall also be provided to workers to minimize risks from inhaling toxic fumes and dust.</p> <p>‘No smoking’ and other ‘high risk’ areas are to be provided with warning signage besides strict enforcement of PPE with zero tolerance limits.</p> <p>These arrangements need to be reflected in the Construction Safety Plan to be prepared by the Contractor during mobilization, which shall be approved by SC and OWD/PIU after proper scrutiny.</p>			

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.5.2	Traffic Safety	<p>The Contractor will take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signage, markings, flags, lights, reflectors and flagmen as proposed in the Traffic Control Plan/Drawings and as required by the Environmental Officer of SC for the information and protection of road users approaching or passing through the section of any construction site of activity or diversion.</p> <p>The Contractor will ensure that all signs, barricades, pavement markings are provided as per the MoRTH/ IRC specifications.</p> <p>Before taking up construction on any section of the existing lanes of the highway, a Traffic Control Plan will be devised and implemented to the satisfaction of the Environmental Officer of SC and local administrative authorities including traffic police.</p>	MoRTH specifications and IRC guidelines	Contractor	Resident Engineer; Bridge Engineers PIU/OWD
C.5.3	Risk from Electrical Equipment(s)	<p>All power transmission lines whether clawed or sufficiently covered are potential hazards at construction sites. The Contractor will take all required precautions to prevent danger from electrical cables, wires and equipment and ensure that –</p> <ul style="list-style-type: none"> ➤ No material will be stacked or placed below/near power transmission lines, wires and equipment, which can be a potential danger to any road user, workman or public. ➤ All such electrical installations and wirings shall be barricaded in manner that ensures safety of the road users, wildlife and operating vehicles/equipment such as cranes, excavators, loaders, fabricating units etc. 	-	Contractor	Supervision Consultant; PIU/OWD

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				Execution / Civil Work	Supervision/ Monitoring
		<ul style="list-style-type: none"> ➤ Necessary fencing, illumination and proper insulation of the electrical lines shall be ensured by the contractor for safety and security of the public, road users, workers and the wildlife. ➤ The contractor shall ensure proper maintenance of electrical supply lines/points. ➤ All such electrical operating units shall be switched off before operations are closed every day or night as the case may be. ➤ All electrical equipment/cables/wires to be used in the construction shall have to conform to the relevant BIS specifications/codes. ➤ The contractor will ensure that such equipment/cables/wires are free from patent defect, and under good working conditions and maintained in good working order (as per the owner manual supplied by the manufacturer) through regular supervision, monitoring, maintenance and repair/ replacement from time to time. 			
C.5.4	Risk Force Measure	<p>The contractor will take all reasonable precautions to prevent danger of destruction to life and property of the public as well as the workers on account of flood, fire, explosion, accidents involving vehicles carrying hazardous materials etc. in an around work sites, camps, maintenance units, borrow areas, quarries, haul roads and in any other place associated with the project activity.</p> <p>The contractor will make the required arrangements so that in case of any mishap all necessary steps can be taken for prompt on-the-spot first aid treatment. Arrangements shall be made for quick rescue operation including shifting of the injured to the nearest hospital</p>	-	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>Fire extinguishers/fire fighting equipment and salvaging equipment for the recovery of hazardous chemicals on account of accidents or spillage are to be kept ready at camping sites or major construction sites to attend to such eventualities.</p> <p>Construction Safety Plan to be prepared by the contractor shall identify all necessary actions in the event of an emergency. The actions shall include description of stand-by arrangements, rescue of workers/people and salvage of hazardous chemicals/ materials in case of such eventualities. This plan shall be approved by the Supervision Consultant and the Environmental Officer of the OWD/PIU as per the standard practice adopted under labour welfare activities and Factories Act.</p>			
C.5.5	First Aid	<p>The Contractor shall arrange for -</p> <ul style="list-style-type: none"> ➤ A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zone with life saving first aid kits. ➤ Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital. ➤ Equipment and trained nursing /paramedical staff at construction camps. ➤ Periodic health checks for workers 	Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996	Contractor	Supervision Consultant; PIU/OWD
C.6	Cultural Property				
C.6	Chance Found Archaeological Property	All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the	Central and State Laws	Contractor	Supervision Consultant; PIU/OWD,

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				Execution / Civil Work	Supervision/ Monitoring
		<p>relevant legislation.</p> <p>The contractor will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or property. He will, immediately upon discovery thereof intimate the Environmental Officer of SC, local police and administration of such discovery and carry out the given instructions for dealing with the same.</p> <p>The SC will seek direction from the State Archaeological Department before instructing the contractor to recommence the work in the site.</p> <p>Till such time, the site and the findings shall be under strict watch and ward of the contractor, SC and local administration to prevent any pilferage, alteration of the findings by the workmen or locals as the case may be.</p>			State Archeological Department
C.7	Labor Camp Management				
C.7.1	Accommodation	<p>Contractor will follow all relevant provisions of the Factories Act, 1948 and the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp.</p> <p>The location, layout and basic provision of facilities at each labour camp site will be submitted to SC. The construction or hiring of such facilities shall commence only after the written approval from the SC.</p> <p>The Contractor will maintain necessary living accommodation and ancillary facilities (including provision of clean fuel to prevent damage to forests and to prevent fuel wood cutting and burning by labour) in functional and hygienic manner. Any non-compliance or damage shall be</p>	<p>Building and the other Construction Workers</p> <p>(Regulation of Employment and Conditions of Service) Act, 1996</p>	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		made good by the contractor at his own cost.			
C.7.2	Potable Water	<p>The contractor will also provide availability of potable water within the precincts of every workplace in a cool and shaded area, which is easily accessible as per standards set by the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.</p> <p>The contractor will ensure the fulfillment of the following conditions at all work places for the benefit of workers:</p> <p>a) Supply of sufficient quantity of potable water (as per IS) in every workplace/labor camp site at suitable and easily accessible places shall be made. Such facilities shall be regularly maintained from health and hygiene point of view.</p> <p>b) All potable water storage facilities will be on a safely raised platform that is at least 1m above the surrounding ground level.</p> <p>c) In the camp sites, water purifier units shall be installed for providing potable water.</p> <p>d) As far as possible shallow well will not be used as potable source of water. However, if water is drawn from any existing well, irrespective of its location from any polluting sources, regular disinfection of the water source (which may include application of lime, bleaching power and potassium permanganate solution) has to be ensured at weekly/fort nightly interval.</p> <p>e) All open wells will be entirely covered and will be provided with a trap door to prevent accidental fall and contamination from dust, litter etc. A reliable pump will be fitted to each covered well.</p>	Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>f) A drain shall be constructed around the well to prevent flow of contaminated water into the well from road, camp or other sources.</p> <p>g) The trap door will be kept locked and opened only for cleaning or inspection, which will be done at least once in a month.</p> <p>h) Water quality testing of all potable water sources will be done every month as per parameters prescribed in IS 10500:1991.</p> <p>Environmental Officer of SC will be required to inspect the labour camp once in a week to ensure compliance to these health and hygienic standards prescribed in the EMP. The camp-in-charge will be responsible for day-to-day monitoring.</p>			
C.7.3	Sanitation and Sewage System	<p>The contractor will ensure that -</p> <ul style="list-style-type: none"> ➤ The sewage system for the camp are designed, built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses takes place. ➤ Separate toilets and bathrooms for women workers wherever required, screened from those of men, are provided with markings in vernacular language. ➤ All such facilities must have adequate water supply with proper drainage and disposal facility. ➤ All toilets in workplaces are with dry earth systems which are to be maintained, cleaned and disinfected daily using proper disinfectants. The location of such provisions should not affect the air, surface water and ground water of the locality or the agricultural fields 	Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996	Contractor	Supervision Consultant; PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>located near-by.</p> <ul style="list-style-type: none"> ➤ Portable toilets may be brought to use and the night soil from such units has to be disposed through designated septic tanks so as to prevent pollution of the surrounding areas. ➤ In the main camp, no night soil or sewerage shall be disposed of at any place other than the septic tanks constructed at the site. <p>All these facilities shall be inspected on a weekly basis to check the hygiene standards.</p>			
C.7.4	Waste Disposal	<p>The Contractor will provide garbage bins in the camps and ensure that these are regularly emptied and disposed off in a hygienic manner as per the Comprehensive Solid Waste Management Plan approved by the Environmental Officer of SC.</p> <p>No incineration or burning of wastes shall be carried out by the Contractor. The disposal of kitchen waste and other biodegradable matter shall be carried out in pits covered with a layer of earth within the camp site. The contractor may use the compost from such wastes as manure in the plantation sites.</p> <p>Discarded plastic bags, paper and paper products, bottles, packaging material, gunny bags, hessian, metal containers, strips and scraps of metal, PVC pipes, rubber and poly urethane foam, auto mobile spares, tubes, tires, belts, filters, waste oil, drums and other such materials shall be either reused or will be sold / given out for recycling.</p>	Environment Protection Act, 1986 and Rules	Contractor	Supervision Consultant; PIU/OWD, SPCB, Local Authorities

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.8	Contractor's Demobilization and Decommissioning of Established Setup				
C.8.1	Clean-up Operations, Restoration and Rehabilitation	<p>Contractor will prepare site restoration plan, which will be submitted for approval to the Resident Engineer of SC. The Resident Engineer and the Environmental Officer of SC will be jointly responsible for approving and monitoring these plans.</p> <p>The contractor needs to submit his plan at least 60 days prior to 'substantial handing over of the site.' All clean-up and restoration operations shall be completed by the contractor prior to demobilization.</p> <p>The contractor will clear all temporary structures; dispose all garbage, night soils and POL waste as per the approved Comprehensive Waste Management Plan. All disposal pits or trenches will be filled in disinfected and effectively sealed off. Residual topsoil, if any will be distributed or spread evenly at plantation sites, on adjoining/near-by barren land or affected agricultural land adjacent to the RoW that has been impacted on account of accidental spillage.</p> <p>All construction zones including river-beds, drainage channels, 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 entire satisfaction of Environmental Officer of SC and OWD/PIU.</p> <p>The Resident Engineer shall ensure that all clean-up and restoration operations are completed satisfactorily and written approval is given to the contractor before the 'works completion' is issued/recommended. The OWD/PIU shall ensure through site inspection that the Contractor and SC</p>	-	Contractor; Resident Engineer of SC; Environment Officer of SC	OWD/PIU

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		have complied with all these provisions.			

Table 3.3
ENVIRONMENTAL MANAGEMENT PLAN

Operation Stage

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
OPERATION STAGE					
Activities to be Carried Out by the OWD					
O.1	Monitoring and Evaluation of Operational Performance of Environmental Mitigation Measures provided in the Project	<p>The OWD/PIU will monitor the operational performance of the various mitigation/ enhancement measures carried out as a part of the project. Monitoring and performance indicators have been indicated in Chapter 4. These include</p> <p>–</p> <ul style="list-style-type: none"> ➤ Tree preservation and plantation ➤ Biodiversity Works ➤ Construction Camp Management ➤ Top Soil Preservation ➤ Borrow and Quarry Area Management ➤ Traffic Safety and Management ➤ Pollution Control and Waste Management 	-	OWD Field Divisions; OWD/PIU	OWD/PIU; Concerned Departments/Agencies

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		<p>➤ Site enhancements etc.</p> <p>Also, the rehabilitation works at degraded sites along nalas, streams and gullies after soil and water conservation measures has to be inspected, recorded and damages timely repaired for effective functioning and maintenance of such efforts in the field.</p> <p>All observations and data shall be added /updated in the Database/Information Management System developed for the project. This also covers other points given in this table.</p>			
O.2	Maintenance of Drainage	<p>OWD/ PIU 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 without damaging the spurs and check dams erected to stabilize the course and flow of all such drainage channels.</p> <p>OWD/PIU will ensure that all the sediment/oil and grease traps set up at the truck and bus lay bye are cleared once in every three months.</p>	MoRTH specifications; IRC guidelines	OWD Field Divisions	OWD/PIU
O.3	Pollution Monitoring	The periodic monitoring of the ambient air quality, noise level, water (both ground and surface water) quality, soil pollution/contamination are to be continued at pre-designated locations as identified in the Pollution Monitoring Plan and if necessary, at additional locations for comparative study of pre and post operation data in order to ensure further improvement/modification in similar future works. OWD/PIU will appoint specific pollution monitoring agency for this purpose.	Pollution Monitoring Plan (EMP)	Pollution Monitoring Agency; OWD/PIU	OWD/PIU
O.3.1	Atmospheric Pollution	Ambient air concentrations of various pollutants shall be monitored as envisaged in the pollution-monitoring plan at pre designated locations to compare the levels with the pre	Pollution Monitoring Plan (EMP)	Pollution Monitoring Agency; OWD/PIU	OWD/PIU

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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
		<p>construction data.</p> <p>Additional data at other location may be collected as per any site specific requirement.</p>			
O.3.2	Noise Pollution	<p>Noise pollution will be monitored as per monitoring plan at sensitive locations where pre-construction noise data was collected.</p> <p>The survival rate and functioning of the noise control plantations and noise control walls has to be specifically supervised and monitored for further improvement/replication at other affected points if necessary. The survival rate of dwarf bamboo plantation at such locations along the road avenue in this cyclone ravaged corridor needs to be specifically monitored.</p> <p>Signage indicating 'no horn zones' near sensitive locations shall be maintained and kept clean.</p> <p>Monitoring the effectiveness of the pollution attenuation barriers will be taken up thrice in the operation period.</p>	Pollution Monitoring Plan (EMP)	Pollution Monitoring Agency; OWD/PIU	OWD/PIU
O.4.	Soil Erosion and Monitoring of Borrow Areas	<p>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 before monsoon, during monsoon and after winter rains to record and monitor the effectiveness of such structures for five years after the completion of project, so as to evaluate the beneficial effects of each type of activity together with the cost involved.</p>	Frameworks on Prevention of Soil Erosion and Borrow Area Management (EMP)	OWD Field Divisions; OWD/PIU	OWD/PIU
O.5	Changes in Land Use Pattern	<p>OWD shall take initiative and act as a facilitator in preparing an action plan to encourage balanced, congestion free, safe, hygienic, environment friendly activity on either side of the developed highway during and after completion</p>	Legal Provisions under Prevention and Control of Ribbon Development Act	OWD/PIU, Local Authorities, Revenue Department and	OWD/PIU; Govt. of Orissa

(Sd/- J M Nayak)
Chief Engineer
World Bank Projects, Orissa

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
		<p>of the project. This to avoid irregular, ugly, unhygienic and destructive ribbon development, close to the road corridor which adversely affects agricultural and water harvesting capabilities and drainage system of the area.</p> <p>The OWD may consider effective promulgation through some legislation and guidelines controlling such unbridled activity, which are self destructive and distressful for the poor farmers and a drain on the state's economic resources.</p> <p>A state-wide anti-encroachment policy to ensure safety (of the residents and the road users), highway aesthetics and future possibilities for expansion of highway facilities should be considered by OWD. This could include notification and legal recourse against local authorities, which supply power, water, sanitary connections and register commercial activities to encroachers, squatters and illegal settlers on the OWD land. This policy should also cover religious structures, mandaps and puja pandals etc.</p> <p>A land use-zoning map may be developed, under which up to a particular distance from the RoW of the alignment especially in new bypass stretches, no development will be allowed.</p> <p>Necessary hoardings along the corridor will be provided to warn encroachers against any such activity (including punitive action such as forfeiture of the structures and belongings without prior notice, legal action in the court of law barring any stay over such action by the state from any court of law). Budgetary provisions may be made to control the ribbon development along project road.</p>		Local Civic Bodies, District Administration	
O.6	Road Safety and Maintenance of Assets	No advertisement/hoardings shall be allowed within the Right of Way limits of the project road.	-	OWD Divisions (and its contractors, if any), District	. OWD/PIU; Govt. of Orissa

(Sd/- J M Nayak)
Chief Engineer
World Bank Projects, Orissa

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
		Regular maintenance and cleaning of assets such as sign boards, bus stops, drains etc. shall be undertaken.		Administration/ Local Authorities, Local Police	

Table 3.4
BIODIVERSITY MANAGEMENT PLAN

Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
PRE-CONSTRUCTION STAGE				
Activities to be Carried Out by the OWD/Forest Department, GoO/Contractor				
B.1	Preservation of road side trees	<p>Cutting of trees along the avenue and those in the strips of land to be diverted from the forest area for road widening and strengthening, construction of bridges/culverts and for creating temporary diversions is required for the project. A total of 4000trees will be cut along Bhawanipatna- Khariar road for the purpose of the project.</p> <p>Attempts to minimize tree cutting particularly of green tunnels, giant healthy trees and young avenue plantation have been done to reduce the impact of cyclones, which are common to this belt of the state. A total of 664trees shall be preserved in this contract package. The location, no. and side to be saved as per the fringe benefit of retentions given to all sound and healthy plants above 30 cm girth at BH coming on the toe margin as per the horizontal drawing.</p>	PIU/OWD; DPR consultants; Tree Felling Contractor; Supervision Consultant	Project Director, PIU/OWD

(Sd/- J M Nayak)
Chief Engineer
World Bank Projects, Orissa

Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		<p>Saving or retaining at least one side of the green tunnels, avenue plantation giant trees and young plantation has not been done for facilitating nesting, parching, hunting and vintage observation points of aviary fauna, which also provides resting and breeding habitat for rodents, reptiles and amphibians. Besides this, protection of fruit bearing trees used by human beings and wildlife offers additional economic and ecological benefits, which is not projected here. In the event of design changes during the course of the project, additional assessments including the possibility to save trees shall be made by the PIU/OWD and the SC. Documentation of such exercises shall be maintained by the EMU of PIU /OWD. This includes evaluation of on-the-spot minor design adjustments (as applicable) to save trees. In the instant case trees which are located within or on the toe line of the embankments have been retained.</p> <p>Specific attention will be given for protecting giant trees, green tunnels and locally important trees (religiously important etc.). However, if necessary removal of hollow, rotten and dismembered giant old trees from the corridor of impact may be allowed after site verification by the Forestry Expert of OWD/PIU.</p> <p>As necessary, separate proposals for felling of such trees will be submitted to the concerned Divisional Forest Officer after joint enumeration exercises are completed.</p> <p>Systematic corridor level documentation for the trees to be cut and those retained shall be maintained by PIU. A separate list will be maintained by the PIU/OWD in a bound register for each contract package duly signed by the site-in-charge from OWD, the tree cutting Contractor and designed officer of the OFDC Ltd., so that no unmarked trees are cut or removed from the corridor.</p>		

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Chief Engineer
World Bank Projects, Orissa

Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
B.2	Transplantation	Wherever possible, all trees up to 30cm girth at breast height and naturally occurring medicinal shrubs/bushes/grass clumps within the ROW shall be uprooted mechanically with ball of earth intact for relocation and transplantation at various pre-identified locations such as degraded sites, embankments of road-side water bodies, temples, near-by market places, religious properties, schools and along road corridors for preventing loss of diverse vegetative cover and for reducing growth period subject to the choice of species, which are hardy and vigorous coppicers to with stand the shock of up rooting and relocation. A list of such species is there in the Annexure – xx.	PIU/OWD; Forest Dept., GoO; OFDC; Tree Felling Contractor	Project Director, PIU/OWD
B.3	Tree Cutting	Trees with bird nesting sites, shall not be felled between August to mid-April to facilitate the young birds/new generations to fly out. Additionally, all provisions stated under clause P.3 of Table 3.1 shall be adhered to.	PIU/OWD; Forest Dept., GoO; OFDC; Tree Felling Contractor	PIU/OWD
B.4	Nursery Creation	A nursery (preferably close to the road) will be created/raised for bud grafting, cleft grafting, rooting of off-sets of lesser found indigenous/exotic species available along the corridor so that these can be replicated and planted along the corridor for preserving biodiversity. Apart from this, saplings for plantation along the road or at various enhancement sites shall be raised to meet the plantation targets in a time bound manner. The type, size and treatment of saplings shall be as per the tree plantation strategy attached in Annexure 4.	PIU/OWD; Forest Dept., GoO	PIU/OWD; Forest Dept., GoO Supervision Consultant
B.5	Compensatory Afforestation	No forest land involved in acquisition.	District Administration, DFO, Executive Engineer having jurisdiction over the area so	PIU/OWD, Forest Department, GoO

(Sd/- J M Nayak)
Chief Engineer
World Bank Projects, Orissa

Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
			identified in the district, Forest Department Govt. of Orissa, MoEF, PIU of OWD	
B.6	Drainage	<p>Adequate number of drainage structures as per the list of culverts and bridges indicated with treatment to be carried out against each location in Chapter – 1 - Table 1.3, 1.4 and 1.5. Sufficient vantage to enable smooth flow of storm water and flood water have been provided together with specific measures for controlling velocity and scour protection masonry walls to ensure safety and security of the agricultural land on the up stream and down stream. Construction of drains where necessary along the road to facilitate quick drainage as per design drawing for different section of the road.</p> <p>If additional requirements for drainage emerge during the construction period, these will be properly assessed. Water flow modifications and drainage alterations resulting from such exercises shall not affect the forest and water ecosystems of the region.</p>	PIU/OWD; Supervision Consultant	PIU/OWD
B.7	Water holes for wildlife and birds	The existing water holes located deep within the forest areas on either side of the package beside the river Tel and Sunder , which are the perennial sources of water the wildlife and domesticated live stock are not going to be disturbed on account of development activity, except during storms and summer rains, when the water sources are likely to be affected due to surface erosions to which wildlife and domestic cattle are well acquainted in this zone. Since the forest department is taking up development of water holes and pasture within the forest areas under FDA activity, further repetition of the same from this road project has not been suggested.	PIU/OWD; Forest Dept., GoO	PIU/OWD; Forest Dept., GoO
CONSTRUCTION STAGE				

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Chief Engineer
World Bank Projects, Orissa

Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
Activities to be Carried Out by the OWD/Forest Department, GoO/Contractor				
B.8	Construction management and related aspects	The contractor shall adhere to all clauses /specifications covered under the contract including EMP requirements mentioned in Tables 3.1 and 3.2 (and the related frameworks) . Any non-compliance in this regard may lead to suspension/withholding of works and stoppage/deduction of payments or any other action as deemed appropriate within the contractual framework.	Contractor	PIU/OWD; Supervision Consultant
B.9	Preservation of Trees and Vegetation	All existing trees within the RoW but beyond the corridor of impact shall be protected /preserved during the construction of the road as per the enumeration list of trees to be retained. The contractor shall ensure that damages resulting from operation of machinery, dumping and stacking of materials etc. do not occur. Trees within the construction camps, borrow areas and those close to haul roads shall not be cut. These shall be integrated into the lay-out plan for such operations.	Contractor	PIU/OWD; Supervision Consultant
B.10	Underpasses or crossing sites for wildlife	Provision for construction of the embankment at the following locations shall be so made that the slide slopes are gentle with natural grass turfing to give it a natural look, so that the wildlife movement is continue after the construction activities are over. The minimum slope should be 1:6 and where reserved forests are involved it should be 1:4, so that Elephants, Bears, Ungulates can move about freely across such roads in course of their migration for food and shelter. Development of approaches to under mentioned corridors shall be by camouflage plantations within the forest either side, up to the base of the road, which will be taken up during construction activity in the area for an additional length of 50X100mtr on such sites at 2.5mtr spacing from plant to plant with the help of forest department by use of indigenous spices of plants preferred by wildlife. This work should be taken up by the EMU wing of the PIU for implementation by Forest department.	Contractor	PIU/OWD; Forest Dept., GoO ; Supervision Consultant

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Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		<ul style="list-style-type: none"> • 4.100, 18.850, 22.150, 54.35, 65.100, 67.850kms <p>The sequencing of construction activity for wildlife underpasses will be such that no two structures are opened for construction at the same point of time. Also, the construction timing and duration shall be closely monitored to reduce the distress period for wildlife.</p> <p>Advice and assistance will be sought from the Forest Department for undertaking plantation near wildlife underpasses and for the various soil and water conservation measures that will be required in the wildlife habitat/movement zones.</p>		
B.11	Material Stacking and Debris Management	<p>No materials or debris or silt (including excavated earth and waste materials) shall be stacked/dumped at the following locations at any point of time along Bhawanipatna - Khariar road:</p> <ul style="list-style-type: none"> • 6.00km Narayanpur • 7.2 to 8.3km Kamthana • 9.00 to 9.40km Sankharimala • 15.0 to 15.3km Pastipada • 20.5 to 21.5km Karlapada • 26.100km Borthopada • 27.100km Turkel • 30.200km Saipui • 33.100km Borbhata • 35.100km Salipada • 39.900km Borda • 43.600km Kursud • 50.000 to 51.400km Gandharla • 53.000km Tureikela • 57.500km Dohelpada • 61.500km Tukla 	Contractor	PIU/OWD; Forest Dept., GoO ; Supervision Consultant

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Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		<ul style="list-style-type: none"> • 62.500km Rishigaon • 65.000km Lachhipur • 69.000km Khariar • 4.100, 18.850, 22.150, 54.35, 65.100, 67.850 to facilitate movement of wildlife across the road by providing traffic calming measures. <p>Debris shall be directly loaded into dumpers/tractors and disposed at the pre-identified location/s. Construction management shall be such that operations are completed during the day and materials stacks are not left behind.</p> <p>All excavated boulders and rocks which are not fit for use in road construction should be used near streams, water bodies or wildlife underpasses to prevent scouring and to provide camouflage cover to animals.</p> <p>Uprooted stumps, discarded logs etc. can also be used at such locations without affecting the natural drainage or without causing pools of water by such activity, where accumulation of water is likely to induce slip circle and land slides. These stones and logs can also be placed at selected enhancement locations including abandoned roads to function as resting platforms.</p>		
B. 12	Water Pollution	Release of wastes (non-toxic and toxic) by the contractor into water bodies and drainage systems that may adversely impact the aquatic life both locally and in the downstream stretches shall be viewed as serious non-compliance of EMP since these may affect the eco-flow, aquatic life and livelihoods of people dependent on such resources.	Contractor	PIU/OWD; Supervision Consultant
B. 13	Damage to aquatic life in ponds	The construction of retaining walls in the ponds, bathing ghats, spillways, minor bridges etc., shall be in manner that causes minimal disturbance/damage to users and the aquatic life (like fish on which local people use for sustenance/livelihood).	Contractor	PIU/OWD; Supervision Consultant
B. 14	Fire Safety	No lighting of fire or setting-up of labour camps within one kilometer of the forest	Contractor	PIU/OWD; Forest Dept.;

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Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		areas and wildlife movement zones shall be permitted.		Supervision Consultant
B. 15	Strengthening Forest Check Gates	The two existing forest check gates at the under-mentioned locations will be reconstructed along with provision of lay bye to enable proper checking of vehicles and prevent congestion on the highway : <ul style="list-style-type: none"> ➤ 47.375km ➤ 49.490km 	Plantation near underpasses and/or crossing sites	
B. 16	Informatory and Warning Signage	Signage (229nos.) regarding speed limits and protecting wildlife/environment shall be put-up along the road. This may include information/warnings about for preventing forest fires, hunting, snaring, encroaching, smuggling, obstruction of natural water courses, confrontation with wildlife etc. The content of such signage (samples provided in Biodiversity Assessment Report and in this report as Annexure - xx subject to any addition or alteration that may be effected by the forest department, while issuing the release order for non forest use of forest land.	Contractor	PIU/OWD; Forest Dept.; Supervision Consultant
B.17	Avenue or Road side Plantation Strategy	Avenue plantation at the edge of the RoW shall be undertaken to improve highway side aesthetics, reduce micro-climatic impacts of loss of roadside vegetation and provide for some livelihood benefits to the local communities. Additionally, some species that provide shelter and food to birds and small organisms shall also be planted to reduce ecological stress on such species in the medium and long run. The tree planting along the corridor within the RoW (but outside Forest Areas) shall be taken up by the Contractor assigned with the job of planting, which may be local Self help groups (SHG) or any other independent party. This works shall be undertaken in a phased manner and tied-up with the civil works schedule. A total of 3610 trees are going to be removed from the avenue to be replaced by 3 times the number 10830 plants and replanted along the avenue over 20km, covering 8000 plants only as per the Table -2.12 using poly pot seedling (1.5 year old) including 674 plants to be up rooted and re-planted. 10% additional planting stock	Contractor	Supervision Consultant; PIU/OWD

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			Execution/Civil Work	Supervision /Monitoring
		<p>shall be raised in the nursery for casualty replacement along the Right of Way. The balance 2830 plants shall be planted as site enhancement activity along the abandoned roads, ponds and other water bodies, camouflage corridor, toll plaza, bus stops, spur junctions and for the purpose of beautification and environmental up gradation along the corridor as per details in the Table on costing on Chapter - 5. A minimum of 75 percent survival rate of the saplings shall be required for the clearance of payments at the end of the 3rd year of maintenance. Any damage beyond this threshold shall be made good by the contractor at his own cost. The contractor will maintain the plantation for a minimum of three years beyond which it shall be handed over to the OWD for maintenance.</p> <p>The plantation shall be taken up in areas beyond the ROW inside degraded forest land by Forest Department, through a memo of understanding (MoU) between OWD and Forest Department as site enhancement for wildlife and environment. In case of Govt. waste land this will be taken up by local SHG, after signing MoU with OSRP of OWD.</p> <p>The species, spacing, age and height of the plant together with condition of seedlings at the time of plantation, shall be as per the Tree Plantation Framework provided in Framework - 1. All other conditions as mentioned in this framework including those of transportation, plantation, and maintenance shall be strictly adhered to.</p> <p>The Environmental Officer of SC and Forestry Expert of OWD/PIU(EMU Unit) will inspect and monitor regularly the plantation works, survival rate of all such plantations and record their observations in the plantation register at the time of inspection, besides making official correspondence on deficiencies or improvements or changes, as warranted in specific situations.</p>		
B.18	Site Enhancement Plantation	Plantation of trees such as Banyan, Pipal, Mango, Samania, Champa, Karanja, Anla, Harida, Bahada, Kadamba, Gulmohar, Bengal almond, Arjuna, and Tamarind along with medicinal plants and shrubs such as Adhatoda, Cassia fistula, Harasingar, Dhatuki, Ganiary (Premna), Barakoli etc. shall be undertaken near ponds and community gathering areas. The final plantation number will depend upon the interest and involvement of local communities	Contractor; PRIs; Local Communities/SH Gs/ Individuals	PIU/OWD; Supervision Consultant

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Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		/groups / individuals.		
B.19	Flora and Chance found Fauna	<p>The contractor will take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal whether in forest or non-forest land along the corridor. Only permissive activities like fishing may be allowed in the local non-forest areas with prior written consent of the local authorities and villagers. Copies of such permission shall be submitted to the Supervision Consultant.</p> <p>Collection of specimens, hunting, snaring, shooting, mining, fishing and burning fire in an around wildlife movement zones and, protected or reserved forest areas is strictly prohibited under law. Any such action by the contractor (and his staff) or the Supervision Consultant (and his staff) shall be reported to Forest Department, GoO and the local police/administration.</p> <p>If any wild animal is found near the construction site at any point of time, the contractor or his representative will immediately upon discovery thereof inform the Environmental Officer of SC, the Resident Engineer and the local forest authority and will abide by the necessary action/s as suggested by these officials.</p> <p>The Environmental Officer of SC will report to the near by DFO, Bhawanipatna North, Bolangir and Khariar respectively and Forest Range Office or local Wildlife Warden and as per their advice will take appropriate steps/measures, if required in consultation with the Forest Officials – this could include rescue, first-aid or sending back the animal towards the forest as would be decided.</p>	Contractor; Supervision Consultant	PIU/OWD; Supervision Consultant; Forest Dept., GoO
B.20	Involvement of Local Communities	As far as possible, employment to local people/communities/SHGs should be provided for the plantation (including raising of saplings in the nurseries and maintenance), enhancement and other environmental works along the corridor.	Contractor; Supervision Consultant	PIU/OWD; Supervision Consultant
B.21	Awareness Generation	Leaflets and/or booklets for generating awareness among the public including road users on do's and 'don'ts' during the various stages of the project shall be prepared and distributed.	PIU/OWD; Supervision	PIU/OWD

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Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
			Consultant	
OPERATION STAGE				
Activities to be Carried Out by the OWD/Forest Department, GoO				
B.22	Immunization of Cattle	Mass immunization of cattle in villages within 5 km aerial distance on either side of the corridor, adjoining the forest and wildlife movement zones may be taken-up by the Forest Department, GoO in association with the local animal husbandry wing to prevent spread of communicable diseases.	Forest Department, GoO (District Level); Animal Husbandry Wing	Forest Department, GoO
B.23	Monitoring and Evaluation of Operational Performance of Biodiversity Protection Measures provided under the Project	<ul style="list-style-type: none"> ○ The completion of wildlife passage routes as per design and specifications with signage and development of camouflage plantation with its rates of success to be monitored together with placement of discarded near the approach into a wildlife corridor shall be closely monitored and evaluated. ○ Monitoring of the wildlife movement (type, frequency and season) along the identified wildlife corridors shall be undertaken at fixed intervals. ○ The function and stability of water holes provided to remove distress to the wildlife shall be monitored for five years. ○ The avenue plantation and site enhancement plantation raised under the project and the old avenue trees retained /saved are to be checked every year with respect to the details in the plantation register for evaluating their survival and benefits to the local community. <p>All these observations and data (including number, condition/status and utility/benefits) shall be systematically recorded for assessment and evaluation.</p>	PIU/OWD; Forest Department, GoO	EMU of PIU/OWD; Forest Department, GoO

Note: The complete EMP Document may be read alongwith the above stipulations which is available on our official website at <http://osrp.gov.in>

(Sd/- J M Nayak)
Chief Engineer
World Bank Projects, Orissa