

## **Orissa State Road Project**

### **Executive Summary of Environmental Management Plan of Anandpur-Bhadrak-Chandbali Road**

This is one of the oldest roads from Bhadrak to the erstwhile Chandbali river port connecting NH-5 with the coastal tracts of Orissa. Total distance from Bhadrak to the Baitarani river bridge at Chandbali covers km 51. This is one of the 9 road corridors. OSRP of Orissa Works Department has decided to develop in Phase-I project activity under Year-1 projects. This will be connected to SH-53 i.e. Bhadrak – Anandapur – Karanjia out of which the 1<sup>st</sup> package will cover 49.225kms from km0 to km49.225kms up to district border of Keonjhar and Mayurbhanj near Godabhanga. Thus the 1<sup>st</sup> package may be called ABC package i.e. Anandapur – Bhadrak – Chandbali covering 50 kms of SH-53 and 45 kms of SH-9. The balance will be taken up in phase-I, year-2, and project activity.

The environment and biodiversity studies for pre construction, construction and post construction period have been evaluated and summarized in the Biodiversity Assessment Management Plan Phase-I reports as well as draft final Environmental Assessment Report vividly.

This report further concentrates on site specific and corridor specific management action plan to meet the standards set forth in the reports earlier, so as to avoid, mitigate & minimize the various threats from environment and Biodiversity point of view through out the project period of 3 years and post construction monitoring there after as would be required from time to time.

Corridor connectivity is the link between NH-5, Dhamra and Paradeep port, POSCO as well as some local development that will come up in between in the coastal belt and the mining activity in Keonjhar & Mayurbhanj district. The industries being developed in Sukinda valley connected to the sea ports via SH-53 and NH-5 as well as SH-9 & 9A, when the entire corridor gets upgraded and improved.

The land acquisition proposal has been submitted to the district Collector Bhadrak containing the land ownership details of 34 revenue villages, which includes forest land over 0.04 acres in Arjunabindha village plot no. 621, (Gramya Jungle) and non-forestlands over 33.25 acres comprising of govt. and private land of agricultural and non-agricultural origin for SH-9. Similarly in case of Bhadrak to Anandapur the area proposed to be acquired for SH-53 portion up to Godabhanga will be 11.27 acres of private lands, 1.99acres of govt. land relating to Bhadrak district and 14.90acres of private land, 2.62acres of govt. land in Keonjhar district. Out of the govt. land indicated for Bhadrak and Keonjhar district portion of SH-53, there are 0.08acres of forest land pertaining to Anandapur village of Keonjhar district comprising of Gramya Jungle plot no.5130, 5148, 4944, 4308, 3389 and 3368 as per ROR details made available by the Tahasildar of Bhadrak, Bantho and Anandapur Tahasils of Bhadrak and Keonjhar district.

In case of SH-9 many such lands going to be acquired, are either ponds or wetlands owned by private and community agencies. The road passes through thick habitations and the flood plains of river Baitarani besides the inter-tidal flow of river mouth close to Chandbali up to Arjunabindha. In case of SH-53 portion i.e. Bhadrak

and Keonjhar district, the net land area going to be acquired is 13.26 and 17.52 acres respectively most of which comprises of agricultural land and few government land. Few irrigation channels which are running parallel and adjacent to Bhadrak – Anandapur road. The “blind” curves and “S” curves have been corrected and straightened requiring additional agricultural and non agricultural land at three locations. It has been proposed to develop these sites as utility zones for the commuters besides avenue planting and compensatory afforestation for the forest area and avenue plants those are proposed to be acquired and cleared.

In case of SH-9, the area relates to the location of Bhitari Kanika Wild life sanctuary and National Park within the impact limit of 10kms from Chandbali. The inter connectivity of road development related water pollution and soil erosion may influence the eco system of the National park down stream, which is famous for the salt water crocodile, mangroves, water birds, several kinds of fish and crustacean and mollusks besides the water monitor lizard and land monitor lizard. The flood plains act as the best breeding ground for the above-mentioned life forms and the ever-changing soil salinity and fertility of the area.

Similarly for the road portion of SH-53 from km0 to km57 the corridor passes within 3kms from Hadagada wildlife sanctuary near Boncho and directly intersects a zone of elephant & bear movement between 49km to 54km i.e. from Toradia nala up to Gohirabani village limits. More specifically elephant herds are damaging the agricultural crops and houses of Bankhedi and Colony sahi villages on their migratory routes from Hadagada sanctuary towards Keonjhar across river Baitarani. A provision for bear and elephant pass has been suggested at 52.800kms, which is likely to require additional land acquisition to develop a corridor of movement for wildlife up to river Baitarani. An alternate suggestion is proposed to develop small water harvesting check dams on the beds of Toradia nala to prevent the wildlife coming across this nala for water and agricultural crops. The impounded water in the reservoir in Toradia nala check dams will help in conservation of wildlife, less acquisition of agricultural land of Tribals and agricultural crops besides vegetables grown along the flood plains of river Baitarani.

Considering the cost that will be involved in providing an elephant underpass and barricading the corridor, (from the forest up to Baitarani) river together with cost of land acquisition, which may come around Rs.1 crore, the development of check dams project in and around in Bankhedi before the Toradia bridge is an alternative to provide better opportunities for agriculture as well as wildlife conservation at less expenditure.

### **Adverse Impact on Environment**

The road development activity, which affect the environment in 3 stages i.e. pre construction, construction and post construction period shall affect the avenue plantations where trees more than 100 years old will be required to be removed, the green tunnels, the food sources and nesting areas will be lost. The low drainage system will get silted, the rich and fertile agricultural lands will be brought under non agricultural use, the ponds and wet lands, which are a cheap source of protein for the residents along the corridor, the houses, the drinking water sources, schools, colleges, market places and the open causeway allowing the flood water flow un obstructed shall come under stress and some of them may altogether get lost.

There is no scope of bringing in road construction materials from nearby locality in this corridor due to the absence of sand, Morrums, granular sub grade materials, bricks, hard stones, granites or fly ash along with soil of required quality from any quarry within 15 to 20 kms construction materials will be collected from quarries located 43km away at Bagudi quarry and sand from Baitarani river between Ambagadia to Anandapur at different places as would be allowed by the Tahasildar Anandapur or from Sathipur on NH-5 depending on the Hot mix and Batch mix plant proposed near Bhadrak.

Considering the above factors the effect of pre construction, construction and post construction activities, effects and assessment and monitoring mechanism precautionary measures, emergency action plan, soil and water conservation, development of habitat, avenue plantation, various cost components, conditions to be incorporated in the contract document, various stages of supervision and maintenance schedule all have been discussed after indicating the affected structures, locations, drainage systems along the corridor in the tables below. In all projects after completion of the project work much of the debris and ugly scars of development are a normal features under Indian conditions to avoid which care full action plan to record monitor and improve the activities have been duly conceived and put into this report.

**Table showing Land to be Acquired from Chandbali to Bhadrak (SH-9 Part) & Bhadrak to Anandapur (SH-53 Part)**

SH No.	Total no. of villages covered	No. of Tahasils	Name of the Revenue district	Land area to be Acquired in Acres			Name of the Forest division	Total Land to be acquired in Acres
				Govt.	Private	Forest		
SH-9 (Part)	23	3	Bhadrak	8.88	24.37	0.04	Bhadrak Wildlife division	33.29
SH-53 (Part)	12	2	Bhadrak	1.99	11.27	-	Bhadrak Wildlife division	13.26
SH-53 (Part)	14	1	Keonjhar	2.54	14.90	0.08	Keonjhar forest division	17.52
Total	49	6		13.41	50.54	0.12	2 Forest division	64.07

**Table showing the CPRs and Trees Likely to be Affected along with Location of Hot mix /Batch mix plants and Quarry sites of SH-9 from Bhadrak to Chandbali**

Sl. No.	Distance	Type of Structures	Numbers		No. of Trees		Location of Hot mix & Batch mix plant	Location of Quarry		Length & quality of Haul road
			Left	Right	Left	Right		Material	Location	
1	0-46	-	-	-	3488	1915	Right 0 to 5km either side	Sand	River Baitarani at Sathipur on NH-5	37 km from Bhadrak (0km) on way to Cuttack
								Morrum	Kupari on Bhadrak – Bontho Kupari road on SH-53 and MDR	32 km from Bhadrak (0km)
									GSB & Morrum Quarry, Stone Quarry	At Baghudi hill on NH-5 9km
2	0-46	Religious structures partially affected	8	18	-	-	-	-	-	-
3	0-46	Hospital partially affected	3	-	-	-	-	-	-	-
4	0-46	Schools Partially affected	8	5	-	-	-	-	-	-
5	0-46	Office building Partially affected	5	0	-	-	-	-	-	-
6	0-46	Banks partially affected	1	-	-	-	-	-	-	-

7	0-45	Passenger shed at bus stop fully affected.	3	2	-	-	-	-	-	-
		Partially affected	4	5	-	-	-	-	-	-
8	0-45	Spur junction	52	74	-	-	-	-	-	-
9	0-45	New bus bay provided	20	19	-	-	-	-	-	-
10	0-45	New Toll plaza	1	1	-	-	-	-	-	-
11	0-45	Ponds & water bodies	41	42	-	-	-	-	-	-
12	0-45	Hand pumps	27	13	-	-	-	-	-	-
13	0-45	Taps	8	8	-	-	-	-	-	-
14	0-45	Well partially affected	-	1	-	-	-	-	-	-

**Table showing the CPRs and Trees Likely to be Affected along with Location of Hot mix /Batch mix plants and Quarry sites of SH-53 (Part) from Bhadrak to Anandpur**

Sl. No.	Distance in km	Type of Structures	Numbers		No. of Trees		Location of Hot mix & Batch mix plant	Location of Quarry		Length & quality of Haul road
			Left	Right	Left	Right		Material	Location	
1	0-49.225	-	-	-	1482	1495	Left km21 /22	Sand	River Baitarani at Sathipur on NH-5	42 km from Bhadrak (0km) on way to Cuttack
							Left 45km		River Baitarani at Anandapur	1km unpaved Kuchha road

									Morrum	Kupari on Bhadrak _ Bontho Kupari road on SH-53 and MDR	32 km from Bhadrak (0km) Black top & WBM road
									GSB & Morrum Quarry, Stone Quarry	At Bagudi hill on NH-5 -9km	From Bhadrak (0km) .34 km on NH-5 and 9km on feeder road from NH-5 to quarry site
										Gohire on NH-215 towards Jajpur road	10km from Anandapur at km45 – 1.5km from NH-215 towards right
										Chhenapadi on SH-53	4km to the right on Hadagada WBM road approval to be taken
2	0-49.225	Religious structures partially affected	7	6	-	-	-	-	-	-	-
3	0-49.225	Hospital partially affected	2	1	-	-	-	-	-	-	-
4	0-49.225	Schools partially affected	9	4	-	-	-	-	-	-	-
5	0-49.225	Colleges partially affected	1	1	-	-	-	-	-	-	-
6	0-49.225	Office building Partially affected	1	4	-	-	-	-	-	-	-

9	0-49.225	Passenger shed at bus stop fully affected.	3	1	-	-	-	-	-	-
		Partially affected	3	3	-	-	-	-	-	-
10	0-49.225	Spur junction	60	55	-	-	-	-	-	-
11	0-49.225	New bus bay provided	11	10	-	-	-	-	-	-
12	0-49.225	New Toll plaza	1		-	-	-	-	-	-
13	0-49.225	Ponds & water bodies	11	6	-	-	-	-	-	-
There are 2 Ponds coming within the Centre on the RoW as per the proposed alignment at km2.448 and km17.100										
14	0-49.225	Hand pumps	25	15	-	-	-	-	-	-
15	0-49.225	Taps	6	5	-	-	-	-	-	-

As per the above table the fully affected structures are to be relocated in consultation with public and the concerned department such as, Urban development, CD & Panchayat Raj, Public Health department, Rural Water Supply & Sanitation Organization, Urban development department etc. or compensated.

#### **FOREST and PROTECTED AREAS:**

The presence of 2 protected areas i.e. Sanctuary and National park at Bhitarkanika and Hadagada wildlife sanctuary along with 1 Biosphere Reserve buffer area within 10kms radius of the project brings this projects under **category A** (as per the latest guidelines issued by government of India, Ministry of Environment and forest notification No.1433 dated 14/09/2006). There is proposal to limit the development activity under phase-I, Year-1 projects up to a distance where there is requirement for major decision on structural designs wildlife underpasses and long diversion of the road requiring fresh acquisition of land. In this case to negotiate the congested approaches up to Baitarani river bridge beyond Chandbali bazaar the requirement of one diversion from 46km up to the bridge approach is necessary. Similarly to avoid provision of a passage for movement of elephants, bears and other wildlife across SH-53 near Bankhidi at chainage km52.800 there is additional requirement of land acquisition for the road embankment and corridor development. The situation being volatile a hard decision has to be taken for developing one minor irrigation structure on Toradia nala in place of the road embankment and corridor development, so that the problem of tribal discontentment can be avoided together with benefits for the wildlife and agriculture. This requires avoiding elephant underpass with combined departmental action of Forest, Irrigation, Revenue and OWD for development of check dams for working as source of water for wildlife. This has limited the phase-I, year-1 project route of Bhadrak – Chandbali and

Bhadrak – Anandapur from 0km to 45km and 0km to 48km from Bhadrak, which reduces additional acquisition of tribal land and tribal resistance in Keonjhar district as well as local resistance around Chandbali. Since negligible forest land is involved within 48km of SH-53 except in Anandapur revenue village limits that too without involving reserve of protected forest proposal comes up with minimum acquisition of land tribal and non tribal and minimum non forest use of forest land under this proposal.

### **Major Environmental Structures**

The zone is prone to cyclone and flooding depending upon the weather the condition over Bay of Bengal. Care has been taken to retain as many numbers of giant trees and green tunnels at least in a single row of avenue plants, so that the force of cyclone and destruction will be limited and nesting, purchasing, and bidding un interrupted on SH-9 & SH-53.

Sufficient number of bridges and culverts with adequate and additional span and vantage are provided with improvement of black spots on the corridor by additional geometric correction of road alignment at sharp bends and “S” curves.

Submergible zones as per the HFL on Bhadrak – Chandbali and Bhadrak – Anandapur corridor data during last rains (2006) has been considered for designing the road embankment and drainage. Pedestrian and cattle movement zones are being provided on the bridges and culverts going to be constructed afresh.

Several structures are suggested with technical details and cost for avoidance, mitigation and minimization of the impact.

### **Action Plan for Environment Impact Mitigation**

The impact mitigation as discussed in fore going pages requires to be taken up in holistic manner with a sequence of operation so that adverse effects are not magnified rather reduced to negligible level.

### **Sequence of Construction to Minimize Adverse Impact**

The portions of the road which were previously getting submerged prior to this project are to be taken up first of all with adequate provision of diversion facilitating movement of traffic on a firm but stable temporary road with adequate vantage and above the HFL, where the entire road surface is now proposed to be cut off for constructing the bridges and culverts in place of cause way and old culverts between km 5.5-5.9, km 15-16, km 25.200 – 26, km 27.500 – 28.500, km 29.500 – 30.500, 31.600-32.700, km 33.700 – 36.500 and km 46.5 – 46.9 for Bhadrak – Chandbali portion. The non submergible zones can be developed latter on through similar sequencing keeping in view the working season and traffic load, so that over crowding is avoided as such location are inside or adjacent to market areas, thick residential areas and major road junctions at km 0-1, km 2.5-4, km 13-15, km 31-33, km 43-45, km 49-50.

Similarly in case SH-53 the submergible portion between 4km to 17km, 34km to 36km, 39km to 43km, 45km to 48km intermittently requires raising of embankments with additional and improve ventage.

The table showing the common property resources and sensitive receptors as indicated above relating to Schools, hostels, colleges, hospitals, Anganbadi and ANM centre, drinking water sources, temples, shrines are to be carefully treated at the time

of pre construction activity for allowing them the required compensation to relocate the structures away from the RoW at identified new locations before the actual construction activity starts, which will be on the basis of the progress made in settling of the compensation issue and the effective mobilization of machineries equipments to shift the utilities and come up with construction work.

Detail designs specifications have been provided in this report for implementation of various structural designs and precautionary measures in the form of guidelines and additional contract document for environment and biodiversity activity.

The use of ground water resources as drinking water source is liable to be affected during dismantling of bore wells and taps to minimize which provision for sealing up of tube wells and taps after extracting the usable materials and fittings has been suggested. Additional provision of better sanitation facility in this poor drainage basin has been suggested by going for a raised CC platform around the bore wells or stand posts with connectivity to a soak pit for ground water recharge and plantation for site enhancement.

There are 7 wildlife underpasses at wetlands, creeks, drainage channels submergible areas such as at km 26.43, 28.83, 30.15, 31.7, 35.8, 40.9, 43.2 on SH-9 and 5 wildlife underpasses on SH-53, where amphibians, reptiles and rodents crossings are proposed in shape of trap drains with hume pipe viaduct connectivity for preventing death of t wildlife under the wheels of first moving vehicles. This is an agrarian economy where lots of carts, domestic cattle and pedestrian movement with head loads of agricultural products. Therefore some of the existing old bridges and culverts and all the new constructions shall have additional provision for a footpath for facilitating pedestrian and domestic cattle movement.

The proximity of the protected area and the movement of tidal water within 30km to 51km on SH-9 and presence of water bodies causing submergence from 0km to km17, km34 to km36, km39 to km43, km45 to km48 on SH-53 through drains, creeks and canals has encouraged existence of numerous ponds, wet lands, which provide employment and food to local people for traditional fishing and Pisci culture. Therefore all efforts have been made to locate the labour camps, machinery and equipments, stores as well as POL in non-flood prone areas i.e. in between km 21 to km 22 besides temporary camps of men, machineries and equipments.

The abstract cost of the project for environment and biodiversity action plan with management and monitoring devices comes to Rs. 57144011.00 for SH-9 & SH-53 Phase-I, Year-1 package, furnished with drawings, locations and estimation of cost for each of the items of activity, which is liable to vary in case of appreciation or depreciation of the units of activity.

Avenue plantations to replenish the lost vegetation along the corridor shall be taken up by contractor using 1½-year-old Polly pot plants not below 0.7mtrs in height planted on mounds of earth in case of wet lands and on level ground above HFL in pits of 45X45X45cm size.

The carpeting of the slopes on embankments shall be taken up through showing of Cassia tora, Tephrosia villosa, Vertiver species etc. spaced at 30cm interval from row to row.

Last but not the list almost the entire quarry material shall be transported from far of places beyond Bhadrak on the NH-5 and SH-53 as a result of which lot of stock piling has to be carried out to make an inventory of materials which shall be located on high land with slope protection measures and water spray where necessary besides anti erosion mulch covering of grass carpets / coir carpets /silt fencing as the case may be that will be decided by the Supervision consultant and environment expert depending upon the location and weather condition of the zone during construction activity.

The hazards that may arise out of equipments, machineries, POL, chemicals, highly inflammable materials and poisonous substances with residual effect has to be addressed as per emergency procedure for countering and neutralizing the effect on the eco system.

The following quantities of natural occurring minor minerals are estimated to be required for the road development process in a nut shell.

#### **Approximate quantity of road construction materials.**

<b>Item</b>	<b>Quantity</b>	<b>Ton</b>
Earth Work from Borrow pits	443329 M <sup>3</sup>	618377 MT
Sand & Crusher dust	388722M <sup>3</sup>	59935MT
GSB & Morrum	285405 M <sup>3</sup>	523242 MT
Course Aggregate	388722M <sup>3</sup>	589837 MT
Bitumen	1561203 SQM	520.8 MT

**Water 1,580 KL,**

**Filter Material 114258 MT,**

**Cement 210 MT**

Most of these materials shall be procured from quarries except bitumen, PC and TAC, cement, HYSD bars, POL etc. from manufacturers.

All disposable debris and utilizable waste products shall be properly recycled at appropriate channel through public auction sale of the material at site by the contractor at pre construction, construction and post construction period depending upon the agencies involved as would be decided by the site engineer, the supervision consultant and the environment of the PIU in consultation and prior approval of the State Pollution control board and the local administrative authority. No garbage, sewerage and drain water shall be allowed to a free flow that may contaminate the surrounding and therefore has to be impounded effectively through ponding as per the approved plan of action agreed upon by the local authorities of SPCB, Panchayat Raj institutions, District administration and the Supervision consultant.