

SECTION 1: INTRODUCTION

1.1 PROJECT BACKGROUND

The civil war in Sudan has resulted in disruption of social order, economic activities, and a decline in strength of state institutions. Basic governmental services and infrastructure, including roads, health care, education, and government office spaces, have been damaged or left to deteriorate beyond usable conditions.

Conscious of the over-centralization of government in the past led to marginalization of many parts and hence the war in Southern Sudan, the new Government of Southern Sudan (GoSS), through the CPA, has been trying to establish a more decentralized form of government so that Southern Sudanese can participate more in their political affairs. Thus, in addition to dividing Southern Sudan into 10 states, the states have been sub-divided into 60 counties. Unfortunately all the States of the Sudan does not have suitable road network for the transportation of men and goods. The objective of this project is construction and rehabilitation of 186 km of road from Yambio to Tambura, this will ensue the connection between the State Capita and Nzara, Ezo and Tambura counties of the state.

The United States Agency for International Development (USAID) had allocated funds for the maintenance and rehabilitation of 186 km road from Yambio to Tambura located within the Western Equatoria State of South Sudan. USAID has appointed the United Nations Office for Project Services (UNOPS) as the implementing agency for the project.

UNOPS has conducted field surveys for the preparation of the Feasibility Study and Detailed Engineering Design. The survey includes Topographic Survey, Material Analysis, Environmental Surveys, Public Consultations and assessment of the condition of existing bridges and other drainage structures. The location map of the Project road is presented in Figure 1.1.

1.2 ENVIRONMENTAL ASSESSMENT OF THE PROJECT

As part of the project preparation initial environmental assessment report and an Environmental Management Plan (EMP) has been prepared.

The detailed design of the project has been closely coordinated with the preparation of Environmental Management Plan. As part of the preparation of the EMP, environmental surveys have been carried to identify the potential environmental hazards. The EMP has addressed the feasible remedial measures (including avoidance, mitigation and enhancements) for the potential

environmental hazards identified during the surveys. EMP will form as part of Contract document between the Construction Contractor and Implementing Agency.

1.2.1 PROPOSED IMPROVEMENTS OF THE PROJECT ROAD

Road from Yambio to Tambura is considered as a high priority corridor, connecting state capital, Yambio to other eastern counties, Nzara, Ezo and Tambura. The road is also part of the National Road Network of Southern Sudan. The existing road of 2.5m to 3.5m will be widened to 6 m in rural areas and 9m in urban areas with lateral drains on both sides. Details of the proposed improvements and cross sections are presented in Table 1.1 and Table 1.2. Two types of cross sections have been adopted for the proposed improvement of the road based on the section(urban/rural) of the road. A summary of the proposed improvements is presented below

- Widening of existing carriageway from 2.5/3.5 m to 5.5 m
- Improvement of the vertical alignment
- Construction of new culverts
- Construction of lined drains in urban areas and earthen drains in rural areas
- Reconstruction of damaged culverts
- Construction of Side Drains
- Junction improvements
- Providing of signages

Table 1.1: Details of the Proposed Improvements

S. No	Chainage/ Section in km	Type of Cross section	Remarks
1	RURAL	RURAL	
2	URBAN	URBAN	

Table 1.2: Details of the cross sections Designed for the Project

Type of cross section	Carriageway in metres	shoulder in meters	Drain in meters (Ones side)	Type of drain	Slope
Rural	5.5	No	1/1.2	Earthen	1V:2H
Urban	7	1mX2	1/1.2	Lined/ Earthen	1V:2H

1.3 CLEARANCES REQUIRED FOR THE PROJECT

At Present no environmental clearances is required to be taken for the proposed road construction project. On the ratification of new legislation related to any of the following activities during the project implementation the Contractor should obtain required clearances. However the permission for the tree cutting will be taken by the Ministry of Physical Infrastructure from Forest Department, wherever required.

- Permission for withdrawal of ground water
- Permission for taking surface water
- Permission for Employing Labour
- Permission for opening of new quarries for aggregates, if any
- Permission for setting up of labour camps
- Establishment of Crusher, if required



Figure 1.1: Location Map of the Project

Section 2: BASELINE AND IMPACT SUMMARY

2.1 NATURAL RESOURCES

The Project road passes through plain terrain and elevation of the project road varies from 557 to 665 m above mean sea level. The proposed improvements involves raise of 0.2 to 0.5m above the existing pavement.

The soils encountered in the project road vary from the sandy loam to Murram. Soil is required from the borrow areas in addition to the materials generated from excavation. As short as possible materials will be obtained from the existing local borrow areas. The suitable materials generated from the cutting will be used for the embankment construction. All borrow areas operated will be redeveloped. Contractor may procure aggregates from existing quarries or open a new quarry.

2.2 AIR ENVIRONMENT

Air quality data has not been collected as part of this project as there are no considerable sources of pollution generating industrial operations within the project influence area and it is costly affair as the monitoring agencies have to be hired from far of places. The sources of pollution of the project area are vehicles, agricultural activities, charcoal firing, dust from the roads and burning of the vegetation during the summer. The pollutants such as Suspended Particulate Matter and Respirable Particulate Matter will be generated from the operation of borrow pits, haul roads, construction zones and operation of the construction machinery during the implementation phase of the proposed road construction project. The dust suppression can be achieved by regular water sprinkling.

The mitigation measures for the avoidance and mitigation of the air pollution are presented in Table 3.1 of Section 3.

2.3 NOISE LEVELS

Noise levels are not collected as part of this project as there is no considerable source of noise generating operations within the project influence area and it is costly affair as the monitoring agencies have to be hired from far of places. The adverse impacts from the increase of noise levels during the construction stage on the nearby community will be reduced by; locating the construction camp away from the settlements, limiting the working hours and using the quiet equipment available in the market. All possible mechanical and administrative controls will be practiced to reduce the adverse impacts due to noise on the workers, in unavoidable situations personal protective equipment will be provided to the workers based on the nature of works.

However the public will be advised to construct vegetative noise barriers and to construct new houses about 100m away from the project road. A campaign of the public awareness related to the health issues due to exposure of noise will be addressed through the news papers, consultations and distribution of pamphlets during the operation stage.

2.4 WATER ENVIRONMENT

Water quality data has not been collected as part of this project as there are no considerable sources of pollution generating operations within the project influence area and it is costly affair as the monitoring agencies have to be hired from far of places.

Forth three existing cross drainage structures are present across the canals, drains and water channel in the proposed project road. Some of these structures will be replaced and some will be maintained. Additional 41 cross drainage structures are proposed to have better cross drainage of water across the road. All construction works along the water course will be carried out during the non monsoon period. Channels or streams diversions will be constructed for maintaining the uninterrupted flow of the water for all the cross drainage structures, wherever required.

Degradation of water quality due to sediment transport may occur from activities like removal of trees, removal of grass cover, excavation for road and bridges and stock piling of materials during the construction activities. These will be prevented or reduced with proper stock piling and or using in the construction of embankment or by proper disposal.

Both the ground water and surface water can be used for the Project requirements based on the quantity and quality of water available and required for the Project works. The water required for the project is about 125 cum/day from various sources at various locations. There will be some negative impact on the ground water table as the ground water levels are about 40-70 meters. The Contractors are advised to install bore holes at different locations and at least one km away from the existing boreholes to avoid interference with the water regime of the existing bore holes and thus to reduce the negative impact.

Oil interceptors will be constructed in the construction camps for the reduction of contamination of water and due to oil spills.

Due to the proposed improvement of the project no hand pumps, tube wells and open wells are affected. However the bore holes drilled for the project will be left as it is for the public use after the completion of the project.

2.5 FLORA AND FAUNA

The project is passing adjacent to one protected teak forest at about km 174 admeasuring about 500m length along the road on the right hand side. This forest will not affect due to the proposed project as it is located 8m away from the centreline and the improvements are limited to 5m from the centre line. No other sensitive areas like natural habitats, bird sanctuaries, tiger forests, reserve forests, wet lands are present within the project influence area.

No endangered species, wild animals are present within the Project influence area, only domestic animals are observed along the Project roads.

The proposed project involves cutting of about 1000 trees.

The impacts on the flora and fauna are not significant and can be categorized as low.

2.6 SOCIO ECONOMIC ENVIRONMENT

2.6.1 Rehabilitation and Relocation

Socio economic aspects of the project areas were considered during the design phase and found that no property is affected due to the proposed Project and thus no person is affected by the Project directly. The proposed project does not envisage any land acquisitions as the road has about 45 meter wide right of way. The Project does not involve any Rehabilitation and Relocation activities, thus **no Resettlement Action Plan is required**.

2.6.2 Cultural Properties

The project road is not passing through any sites of national level heritage, cultural and religious structures. However about 39 churches located along the road at a distance of about 6m and 80m from the existing centreline of the road.

For the religious structures which are located near the project road and not affected by the Project will be enhanced by the plantation of the shrubs to reduce the dust and increase the aesthetic values.

2.7 SAFETY AND HEALTH ASPECTS OF THE PROJECT

Health/Safety Measures for Labours

Fist Aid Boxes with first Aid leaflets will be placed at all work places and at least two sets in each Construction Camp. Some of the workers will be given the First Aid training to enable them to treat some of the emergencies at the working zones and at auxiliary sites. Arrangements with nearby clinics or health centres and local doctors will be made for treating injuries which need

attention of specialist doctors. During the construction phase, workers will be provided personal protective equipment based on the nature of the work of workers.

Traffic Safety Plans

Safety during the construction will be considered as an integral part and high priority element of the road Project.

All safety precautions will be ensured during temporary and permanent works for the road construction.

For providing all required safety precautions the specific traffic management plans will be prepared and implemented during construction stage.

Handling of Petroleum Products

Petroleum products such as petrol and diesel will be handled, stored and used in such a manner that it will not cause any damage to the environment and reduce the probability of the occurrence accidents. Wastes generated from the use of the petroleum products will be disposed of safely.

SECTION 3: MITIGATION MEASURES

Details of various mitigation measures to be implemented during pre construction, construction and operation stage by various stake holders responsible for the implementation of the project are presented in Table 3.1.

Table 3.1: ENVIRONMENTAL MANAGEMENT MEASURES

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
PRE-CONSTRUCTION STAGE					
Pre-construction activities					
P.1	Land Acquisition	No land is required to be acquired as part of the proposed project as the project road has about 45 m Right of Way (ROW) and the proposed improvement needs only 10 meter Right of Way.		Ministry of Physical Infrastructure (MoPI)	UNOPS
P.2	Clearance of Encroachment/ squatters	No encroachment/ squatters are present within the Corridor of Impact (COI).		MoPI	UNOPS
Pre-construction activities by the Contractor/Environmental Specialist of Implementing Agency					
P.3	Field Verification and Modification of the Contract Documents				
P.3.1	Joint Field Verification	The Environmental Specialist of Implementing Agency and the Contractor will carry out joint field verification to ascertain the possibility of saving trees, environmental and community resources, as these activities are to be taken up by the construction Contractor. The verification exercise should assess 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. Proper documentation and justifications/reasons shall be maintained in all such cases where deviation from the original EMP is proposed.		Contractor/ Environmental Specialist of IA	Implementing Agency (IA)
P.3.2	Assessment of Impacts due to Changes/Revisions /Additions in the Project Work	The Environmental Specialist of Implementing Agency will assess impacts and revise/modify the EMP and other required sections of the project document/s in the event of changes/revisions (including addition or deletion) in the project's scope of work.		Contractor/ Environmental Specialist of IA	IA
P.3.3	Construction	For this project only a small mobile crusher may be installed and no other construction plants such as Hot-Mix Plants and Batching Plants are envisaged to be installed in this		Contractor/ Environmental	IA

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
	Plants	<p>project</p> <p>If the contractor plans to install the mobile crusher, in this case it will be ensured that the crusher will be sited sufficiently away (preferably 500 m) from settlements and agricultural operations and will be located in the downwind direction.</p> <p>Arrangements to control dust pollution through provision of wind screens/ water sprinklers will have to be provided at such sites.</p> <p>Specifications for crushers will comply with the requirements of the relevant current emission control legislations of the country or international standards.</p>		Specialist of IA	
P.3.4	Other Construction Vehicles, Equipment and Machinery	<p>All vehicles, equipment and machinery to be procured for construction will confirm to the relevant norms of the country or International Standards.</p> <p>The quiet equipment available in the market shall be used in the Project.</p>		Contractor	Environmental Specialist of IA
P.4	Identification and Selection of Material Sources				
P.4.1	Borrow Areas	<p>Finalizing soil borrow 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.</p> <p>The Contractor will not start borrowing earth from selected borrow area until the formal agreement is signed between land owner and Contractor and a copy is submitted to the Implementing Agency.</p> <p>Locations finalized by the Contractor shall be reported to the Environmental Specialist of Implementing Agency.</p> <p>Planning of haul roads for accessing borrow areas will be undertaken during this stage. The haul roads shall be routed to avoid agricultural areas as far as possible (in case such land is disturbed, the Contractor will rehabilitate it as per Borrow Area Rehabilitation plan) and will use the existing village roads wherever available.</p> <p>The environmental Specialist of the Implementing Agency will be required to inspect every borrow area location prior to approval. The Implementing Agency should include the Request for Inspection form for borrow area approval from the environmental angle.</p>	Appendix 1 ESM2 and ESM2A of Appendix-9	Contractor/ Environmental Specialist of IA	IA

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
P.4.2	Quarry	<p>Contractor will finalize the quarry for procurement of construction materials after assessment of the availability of sufficient quantity and quality of materials and other logistic arrangements.</p> <p>In case the contractor decides to use quarries other than recommended in DPR(Appendix 2), then the contractor should give substantiation.</p> <p>Contractor will also work out haul road network and report to Environmental Specialist of Implementing Agency and the same will be inspected and approved by the Implementing Agency</p>	ESTS 1602 (e) and 1602(d)	Contractor	Environmental Specialist of IA and MoPI
P.4.3	Arrangement for Construction Water	<p>The contractor will use ground /surface water as a source of water for the construction and may set up own bore well facilities for construction work.</p> <p>To avoid disruption/disturbance to other water users, the contractor will extract water from fixed locations and consult the Environmental Specialist of Implementing Agency before finalizing the locations.</p> <p>The Contractor will provide a list of locations and type of sources from where water for construction will be extracted.</p>		Contractor	Environmental Specialist of IA and MoPI
P.4.4	Sand	<p>The sand will be procured from Identified sand mines as far as possible. If the Contractor wanted to obtain sand from source other than listed in DPR/EMP, substantiation shall be provided.</p> <p>The Contractor should obtain copy of the Lease agreement of the supplier and submit to Implementing Agency before procuring the sand, if required.</p>	Appendix 2	Contractor	Environmental Specialist of IA and MoPI
P.5	Labor Requirements	The contractor preferably will use unskilled labor drawn from local communities to give the maximum benefit to the local community.	Contract Document	Contractor	Environmental Specialist of IA and MoPI
P.6	Construction Camp Locations – Selection, Design and Lay-out	<p>Siting of the construction camps will be as per the guidelines below.</p> <p>Construction camps will not be proposed within 500 m from the nearest settlements to avoid conflicts and stress over the infrastructure facilities with the local community.</p> <p>Location for stockyards for construction materials will be identified at least 300 m away from water courses.</p> <p>The sewage and solid waste disposal systems for the camp will be designed, built and</p>	Appendix 3 ESM-1 of Appendix-9	Contractor	Environmental Specialist of IA

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
		operated. Arrangements for disposal of night soils (human excreta) suitably approved by the Environmental Specialist of Implementing Agency will have to be provided by the Contractor. The Contractor should submit general and specific Construction Camp Management Plan to Implementing Agency and obtain approval before putting the Camp site in Operation.			
P.7	Arrangements for Temporary Land Requirement	The Contractor as per prevalent rules will carry out negotiations with the landowners for obtaining their consent for temporary use of lands for construction camp /construction/ borrow areas etc.		Contractor	Environmental Specialist of IA
P.8	Orientation of Implementing Agency and Contractors	The Implementing Agency shall organize orientation sessions and regular training sessions during all stages of the Project. This shall include on-site training (general as well as in the specific context of project). These sessions shall involve all staff of Ministry of Infrastructure involved in the implementation of EMP, Environmental Specialists of Implementing Agency and Contractor.		Contacto, IA and MoPI	IA
CONSTRUCTION STAGE					
Activities to be Carried Out by the Contractor					
C.1	Site Clearance				
C.1.1	Tree Cutting	Trees will be removed from the Corridor of Impact during the construction and permission will be obtained from the Forest Department, if required. As part of this project about 1000 trees will be removed. Stacking, transport and storage of the wood will be done as per the relevant norms. Details of the tree cutting will be recorded and summary will be reported in the Format given in ESM 6 of Appendix -9	Ethiopian Standard Technical Specifications (ESTS) 2102	Contractor/ MoPI	UNOPS
C.1.2	Preservation of Trees	In the event of design changes, additional assessments including the possibility to save trees shall be made. Systematic documentation for the trees cut and those saved will be maintained by UNOPS. Marking of trees will be done by the contractor under the supervision of UNOPS. Trees		Contractor/ MoPI	UNOPS

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
		marked for cutting should only be cut			
C.1.3	Relocation of Community Utilities and Common Property Resources	<p>Community utilities such as hand pumps, open wells, buildings, grave yards, churches, schools, markets and health centres are not present within the Corridor of Impact. If any relocation is envisaged during the construction, the Ministry of Physical Infrastructure will assist in relocate these community utilities/community properties in consultation and written agreement with the agency/ owner/community. Relocations works will be carried out by the construction contractor</p> <p>Environmental considerations with suitable/required actions including health and hygiene aspects will be kept in mind while relocating community utilities and resources.</p> <p>If any religious structures are found to be relocated during the construction, sites for the relocation of these religious structures will be identified in accordance with the choice of the community. Ministry of Physical Infrastructure and the UNOPS in consultation with local people will finalize relocation sites and design of the structures.</p> <p>The entire process (i.e. selection of relocation sites and designs) will be under supervision of Environmental Specialist of Implementing Agency. The relocation will be completed before the construction starts in these sites.</p>		MoPI / UNOPS/ Contractor	UNOPS
C.1.4	Clearing and Grubbing	<p>Vegetation will be removed from the corridor of impact before commencement of construction. All works will be carried out such that the damage or disruption to flora other than those identified for cutting is minimized.</p> <p>Vegetation only with girth of over 100 cm will be considered as trees.</p>	ESTS 2102	Contractor	Environmental Specialist of IA and MoPI
C.1.2	Generation of Debris from dismantling structures, road surface and any other operations	<p>Debris generated due to the excavation of the existing road will be suitably used in the proposed construction such as in turfing/protection of the slopes of the culverts:</p> <p>The Contractor will suitably dispose off unutilized debris materials either through filling up of borrow areas located or will be given to the locals for their private use subject to the approval of the Environmental Specialist of Implementing Agency</p> <p>The pre-designed disposal locations will be identified as part of Comprehensive Solid Waste Management Plan to be prepared by Contractor in consultation with Environmental Specialist of Implementing Agency. Representatives of Ministry of Physical Infrastructure will help in this regard.</p>	ESTS1609 ESTS 2202	Contractor	Environmental Specialist of IA and MoPI

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
C.1.3	Stripping, stocking and preservation of top soil	<p>The top soil from all areas of cutting and all areas to be permanently covered will be stripped to a depth of 150 mm and stored in stockpiles. A portion of the temporarily acquired area and/or Right of Way will be earmarked for storing topsoil. The locations for stock piling will be pre-identified in consultation and with approval of Environmental Specialist of Implementing Agency.</p> <p>Such stockpiled topsoil will be utilized for -</p> <ul style="list-style-type: none"> ➤ Covering all disturbed areas including borrow areas ➤ Dressing of slopes of road embankment ➤ Agricultural fields of farmers, acquired temporarily land. 	ESTS 2102 ESTS 4104 ESTS 4500	Contractor	Environmental Specialist of IA and MoPI
C.1.4	Accessibility	The contractor will provide safe and convenient passage for vehicles, pedestrians and livestock to and from roadsides and property accesses connecting the project road, providing temporary connecting road.	ESTS 1502(d) Contract Document	Contractor	Environmental Specialist of IA and MoPI
C.1.5	Planning for Traffic Diversions and Detours	<p>Temporary diversions will be constructed with the approval of the Resident Engineer and Environmental Specialist of Implementing Agency, if required during the Construction.</p> <p>Detailed Traffic Control Plans will be prepared and submitted to the Environmental Specialist of Implementing Agency for approval, five days prior to commencement of works on any section of road. The traffic control plans shall contain details of temporary diversions, traffic safety arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, safety measures undertaken for transport of hazardous materials and arrangement of flagmen.</p> <p>The Contractor will provide specific measures for safety of pedestrians, cyclists and workers at night as a part of traffic control plans. 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 to traffic routes, conditions and pedestrian access arrangements with assistance from Ministry of Physical Infrastructure. The temporary traffic detours will be kept free of dust by sprinkling of water three times a day/ as required under specific conditions (depending on weather conditions, construction in the settlement areas and volume of traffic). No separate payment shall be made for traffic diversions. This work is incidental to whole work.</p>	ESTS 1500	Contractor	Environmental Specialist of IA and MoPI

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
C.2 Procurement of Construction Material					
C.2.1	Earth from Borrow Areas for Construction	<p>No borrow area will be opened without permission of the Environmental Specialist of Implementing Agency. The location, shape and size of the designated borrow areas will be as approved by the Environmental Specialist of Implementing Agency.</p> <p>The haul roads of borrow pits, if passing through the settlements or habitations; will be maintained dust free by the Contractor. Sprinkling of water will be carried out thrice a day or as instructed by the Environmental Specialist of IA to ensure dust suppression on such roads during their period of use.</p> <p>Contractor will rehabilitate the borrow areas as soon as completion of borrowing of soil from a particular borrow area in accordance with the approved borrow area Redevelopment Plan.</p>	ESTS 4200 and ESTS 4300 ESM 2 and ESM2A of Appendix-9	Contractor	Environmental Specialist of IA and MoPI
C.2.2	Quarry Operations	The contractor will operate the quarry with the proper authorization from the relevant Government Departments/ Obtain aggregate from the authorized suppliers only. The Contractor shall submit copies of the licenses of the authorized supplier to the Implementing Agency before procuring the materials, if any are required.	ESM 2 and ESM2A of Appendix-9 ESTS 1602	Contractor	Environmental Specialist of IA and MoPI
C.2.3	Transporting Construction Materials and Haul Road Management	<p>Contractor will maintain all roads (existing or built for the project), which are used for transporting construction materials, equipment and machineries as précised. All vehicles delivering fine materials to the site will be covered to avoid spillage of materials, if the materials are dry.</p> <p>All existing roads used by vehicles of the Contractor or any of his sub-contractor or suppliers of materials and similarly roads, which are part of the works, will be kept clear of all dust/mud or other extraneous materials dropped by such vehicles.</p> <p>Contractor will arrange for regular water sprinkling as necessary for dust suppression of all such roads and surfaces.</p>	ESTS 1514 and ESTS 1602 (b) Clauses of Contract	Contractor	Environmental Specialist of IA and MoPI
C.3 Construction Work					
C.3.1	River Training and Disruption to Other Users of	<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 the dry</p>	ESTS 1603 and ESTS 1605	Contractor	Environmental Specialist of IA

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
	Water	<p>season. If construction work is expected to disrupt users of community water bodies, notice shall be served well in advance to the affected community.</p> <p>Wherever excavation for diverting water flow will take place, Contractor will ensure that the slopes are not steeper than 1:2 (vertical: horizontal) otherwise proper slope protection measures will be taken as approved by the Environmental Specialist of IA.</p>			and MoPI
C.3.2	Drainage and Flood Control	<p>Contractor will ensure that no construction materials like earth, stone, or appendage are disposed off into water courses so as not to block the flow of water of any water course and cross drainage channels.</p> <p>Contractor will take all necessary measures to prevent the blockage of water flow. In addition to the design requirements, the contractor will take all required measures as directed by the Environmental Specialist of Implementing Agency to prevent temporary or permanent flooding of the site or any adjacent area.</p>	ESTS 1605	Contractor	Environmental Specialist of IA and MoPI
C.3.3	Siltation of Water Bodies and Degradation of Water Quality	<p>The Contractor will not excavate beds of any stream/canals/ any other water body for borrowing earth for embankment construction.</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 course.</p>	ESTS 1605 ESTS 4104	Contractor	Environmental Specialist of IA and MoPI
C.3.4	Slope Protection and Control of Soil Erosion	<p>The contractor will construct slope protection works as per design, or as directed by the Environmental Specialist of IA to control soil erosion and sedimentation.</p> <p>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> <p>Contractor will ensure the following aspects:.</p> <ul style="list-style-type: none"> ➤ In borrow pits, the depth shall be so regulated that the sides of the excavation will have a slope not steeper than 1 V :2H, from the edge of the final section of the bank. ➤ Along sections abutting water bodies, pitching will be done as per design specification to protect slopes. 	ESTS 1603, ESTS 4500 and ESTS 4104	Contractor	Environmental Specialist of IA and MoPI
C.4	Pollution				
C.4.1	Water Pollution				

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
C.4.1.1	Water Pollution from Construction Wastes	The Contractor will take all precautionary measures to prevent entering of wastewater into streams, water bodies or irrigation system during construction. Contractor will avoid construction works close to streams or water bodies during monsoon.	ESTS 1605	Contractor	Environmental Specialist of IA and MoPI
C.4.1.2	Water Pollution from Fuel and Lubricants	<p>The contractor will ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites will be located at least 500 m away from rivers and irrigation canal/ponds.</p> <p>The Contractor will submit all locations and lay-out plans of such sites prior to their establishment and will be approved by the Environmental Specialist of IA.</p> <p>Contractor will ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Wastewater from vehicle parking, fuel storage areas, work shops, wash down and refuelling areas will be treated in an oil interceptor before discharging into on land or into surface water bodies or into other treatment system.</p> <p>If fuel storage and refuelling areas are located on agricultural land or areas supporting vegetation, top soil will be stripped, stockpiled and returned after cessation of such storage.</p> <p>Contractor will arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites. All spills and collected petroleum wastes will be disposed of in accordance with prevalent regulations of the country</p>	ESTS 1605 Appendix-4 (Oil Interceptors)	Contractor	Environmental Specialist of IA and MoPI
C.4.2	Air Pollution				
C.4.2.1	Dust Pollution	<p>The Contractor will take every precaution to reduce the level of dust from crusher, construction sites involving earthwork by sprinkling of water, encapsulation of dust source.</p> <p>The Contractor will procure machinery and equipment which will conform to the pollution control norms specified by the Country/ International Standards.</p> <p>Contractor will plant the shrubs along the sensitive receptors such as schools, churches and clinics</p>	ESTS 1606 Appendix-7	Contractor	Environmental Specialist of IA and MoPI
C.4.2.2	Emission from Construction Vehicles, Equipment and	Contractor will ensure that all vehicles, equipment and machinery used for construction are regularly maintained and ensure that emission levels comply with the relevant requirements of Country/ International Standards.	ESTS 1606	Contractor	Environmental Specialist of IA and MoPI

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
	Machineries				
C.4.3	Noise Pollution				
C.4.3.1	Noise from Vehicles, Plants and Equipments	<p>The Contractor will confirm the following:</p> <ul style="list-style-type: none"> ➤ All Construction equipment used in construction shall strictly conform to the Country/International Standards. ➤ All vehicles and equipment used in construction will be fitted with exhaust silencers. ➤ Servicing and maintenance 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 will be replaced. ➤ The quiet equipment available in the market should be procured, if the contractor plans to purchase new equipment. For the old equipment, necessary or possible alterations must be carried out to reduce the noise levels to the possible extent. <p>Where the construction sites are located within 150 m of the nearest habitation, noisy construction work such as operation of non silent DG sets, use of high noise generation equipment will be stopped during the night time between 9.00 pm to 6.00 am.</p> <p>Working hours of the noisy construction activities will be restricted to non working hours of the educational institutes/health centers (silence zones) up to a distance of 100 m.</p>	ESTS 1606	Contractor	Environmental Specialist of IA and MoPI
C.5	Safety				
C.5.1	Personal Safety Measures for Labour	<p>Contractor will provide:</p> <ul style="list-style-type: none"> ➤ Protective footwear, protective goggles and nose masks to the workers employed in concrete works, quarry etc. ➤ Welder's protective eye-shields to workers who are engaged in welding works ➤ Earplugs to workers exposed to loud noise, and workers working near machinery like compactor ➤ The contractor will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and exit. <p>The contractor will comply with all the precautions as required for ensuring the safety of</p>	Appendix -5	Contractor	Environmental Specialist of IA and MoPI

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
		<p>the workmen as per the International Labor Organization (ILO) Convention No. 62 as far as those are applicable to this contract.</p> <p>Contractor will provide facemasks for use to the workers when paint is applied in the form of spray or a surface having lead paint dry is rubbed and scrapped.</p> <p>The Contractor will mark ‘hard hat’ and ‘no smoking’ and other ‘high risk’ areas and enforce non-compliance of use of PPE with zero tolerance. These will be reflected in the Construction Safety Plan to be prepared by the Contractor during mobilization and will be approved by Implementing Agency.</p>			
C.5.2	Traffic and Safety	<p>The Contractor will provide, erect and maintain all traffic safety measures during construction such barricades, including signs, markings, flags, lights and flagmen as proposed in the Traffic Control Plan/Drawings and as required by the Environmental Specialist of IA for the information and protection of traffic approaching or passing through the section of any existing cross roads.</p> <p>The Contractor will ensure that all signs and barricades are provided as per the ESTS specifications. Before taking up of construction on any section of road, a Traffic Control Plan will be devised and implemented.</p>	ESTS 1500 Appendix - 6	Contractor	Environmental Specialist of IA and MoPI
C.5.3	Risk from Electrical Equipment(s)	<p>The Contractor will take all required precautions to prevent danger from electrical equipment and ensure that-</p> <ul style="list-style-type: none"> ➤ No material will be so stacked or placed as to cause danger or inconvenience to any person or the public. ➤ All necessary fencing and lights will be provided to prevent entry of public in construction zones. ➤ Bare wires should not pass on the ground ➤ Loose joints should not allow on the ground ➤ All the switch boxes and joints should be placed in weather protected box <p>All electric equipment to be used in the construction will be free from patent defect, will be kept in good working order, will be regularly inspected and properly maintained to the satisfaction of the Environmental Specialist of Implementing Agency.</p>		Contractor	Environmental Specialist of IA and MoPI

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
C.5.4	Risk Force Majure	The contractor will take all reasonable precautions to prevent danger to the workers and public from fire, flood etc. resulting due to construction activities. The contractor will make required arrangements so that in case of any mishap all necessary steps can be taken for prompt first aid treatment. Construction Safety Plan prepared by the Contractor will identify necessary actions in the event of an emergency.		Contractor	Environmental Specialist of IA and MoPI
C.5.5	First Aid	The contractor will arrange for - ➤ A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances shall be kept in every work zone ➤ Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital ➤ Equipment and trained nursing staff at construction camp.	Contract requirement	Contractor	Environmental Specialist of IA and MoPI
C.5.6	Informatory Signs and Hoardings	The contractor will provide, erect and maintain informatory/safety signs, hoardings written in English and local language, wherever required or as suggested by the IA.	ESTS 1500	Contractor	IA and MoPI
C.6	Flora and Fauna and Archaeological Property : Preservation/ Conservation Measures				
C.6.1	Road side Plantation Strategy	The compensatory forestation will be carried out by the Forest Department. Minimum 80 percent survival rate of the saplings will be acceptable otherwise the Contractor/ Forest Department will replace dead plants/shrubs at his own cost. The Environmental Specialist of IA will inspect regularly the survival rate of the trees planted by the Contractor.	ESM13 and ESM 14 of Appendix-9	Contractor	Environmental Specialist of IA and MoPI
C.6.2	Flora and Chance found Fauna	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. If any wild animal is found near the construction site at any point of time, the Contractor will immediately upon discovery thereof acquaint the Environmental Specialist of Implementing Agency and carry out the instructions for dealing with the same. The Environmental Specialist of Implementing Agency will report to the near by Forest Office (range office or divisional office) and will take appropriate steps/ measures, if		Contractor	Environmental Specialist of IA and MoPI

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
		required in consultation with the forest officials.			
C.6.3	Chance Found Archaeological Property	<p>All fossils, coins, articles of value of antiquity, structures and other remains or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the 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 thing. He will, immediately upon discovery thereof and before removal acquaint the Environmental Specialist of Implementing Agency of such discovery and carry out the Implementing Agencies instructions for dealing with the same, waiting which all work shall be stopped.</p> <p>The Implementing Agency will seek the direction from the Government of Western Equatoria before instructing the Contractor to recommence the work.</p>		Contractor	Environmental Specialist of IA and MoPI
C.7	Labor Camp Management				
C.7.1	Accommodation	<p>Contractor will follow all relevant provisions of contract for construction and maintenance of labour camp.</p> <p>The location, layout and basic facility provision of each labour camp will be submitted to Implementing Agency and Ministry of Physical Infrastructure prior to their construction.</p> <p>The Construction will commence only upon the written approval of the Environmental Specialist of IA.</p> <p>The Contractor will maintain necessary living accommodation and ancillary facilities in functional and hygienic manner and as approved by the Implementing Agency.</p>	ESTS 1300 Contract Agreement Appendix 3	Contractor	Environmental Specialist of IA and MoPI
C.7.2	Potable Water	<p>The Contractor will ensure all the time that uncontaminated water is available for drinking, cooking and washing at all accommodations and drinking water at all work places.</p> <p>The contractor will also guarantee the following:</p> <p>a) Supply of sufficient quantity of potable water in every workplace/labor camp site at suitable and easily accessible places and regular maintenance of such facilities.</p> <p>b) If any water storage tank is provided that will be kept such that the bottom of the tank is at least 1meter above the surrounding ground level.</p> <p>c) If water is drawn from any existing well, which is within 30meters proximity of any</p>	Contract Agreement	Contractor	Environmental Specialist of IA and MoPI

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
		<p>toilet, drain or other source of pollution, the well will be disinfected before water is used for drinking.</p> <p>All such wells will be entirely covered and provided with a trap door, which will be dust proof and waterproof.</p> <p>A reliable pump will be fitted to each covered well. 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>d) Testing of water will be done on half yearly basis for all essential characteristics and for some desirable characteristics as per the country specific standards/ International Standards.</p> <p>Environmental Specialist of IA will be required to inspect the labour camp once in a week to ensure the compliance of the EMP.</p>	Appendix 8A		
C.7.3	Sanitation and Sewage System	<p>The contractor will ensure that -</p> <ul style="list-style-type: none"> ➤ 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 take place ➤ Separate toilets/bathrooms, wherever required, screened from those from men (marked in vernacular) are to be provided for women ➤ adequate water supply is to be provided in all toilets and urinals ➤ Night soil can be disposed of by putting layer of it at the bottom of a permanent tank prepared for the purpose and covered with 15 cm. layer of waste or refuse and then covered with a layer of earth for a fortnight. 	ESTS 1605	Contractor	Environmental Specialist of IA and MoPI
C.7.4	Waste Disposal	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 Specialist of IA. Preferably Contractor shall operate a compost pit for the disposal of biodegradable wastes.		Contractor	Environmental Specialist of IA and MoPI
C.7.5	Continuous Community Participation	The Environmental Specialist of IA along with the representatives of the MoPI and Contractor will have continuous interactions with local people around the project area to ensure that the construction activities are not causing undue inconvenience due to noise,		Contractor and Environmental	Environmental Specialist of IA

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
		dust or disposal of debris etc.		Specialist of IA	and MoPI
C.8	Contractor's Demobilization				
C.8.1	Clean-up Operations, Restoration and Rehabilitation	<p>Contractor will prepare site restoration plans, which will be approved by the Environmental Specialist of Implementing Agency. The clean-up and restoration operations are to be implemented by the Contractor prior to demobilization. The Contractor will clear all temporary structures; dispose all garbage, night soils and POL (Petroleum, Oil and Lubricants) wastes as per Comprehensive Waste Management Plan and as approved by Implementing Agency.</p> <p>All disposal pits or trenches will be filled in and effectively sealed off. Residual topsoil, if any will be distributed on adjoining/ proximate barren land or areas identified by the Contractor and approved by the Environmental Specialist of IA in a layer of thickness of 75 mm-150 mm.</p> <p>All construction zones and facilities including culverts, road-side areas, camps and any other areas used/affected due to the project operations will be left clean and tidy, at the Contractor's expense, to the entire satisfaction to the Environmental Specialist of IA.</p>	ESM 1A of Appendix-9	Contractor	Environmental Specialist of IA and MoPI
C.9	Construction Activities by Implementing Agency/ Ministry of Physical Infrastructure				
C.9.1	Tree Plantation	The plantation at the following locations will be implemented by the Ministry of Physical Infrastructure through the Forest Department; i). Road side, ii). Forest land and iii). Community Forestation		Forest Department	MoPI
OPERATION STAGE					
Activities to be Carried Out by the Ministry of Physical Infrastructure					
O.1	Monitoring Operation Performance	<p>The MoPI will monitor the operational performance of the various mitigation/ enhancement measures carried out as a part of the project.</p> <p>The indicators selected for monitoring include the survival rate of trees; status of rehabilitation of borrow areas; and effectiveness of dust control barriers.</p>		MoPI	MoPI
O.2	Maintenance of	MoPI will ensure that all drains (side drains, mitre drains and all cross drainages) are periodically cleared especially before monsoon season to facilitate the quick passage of		MoPI	MoPI

S. No.	Environmental Issue	Management Measures	Reference document	Responsibility	
				Planning and Execution	Supervision/ Monitoring
	Drainage	rainwater and avoid flooding.			
O.3.	Soil Erosion and Monitoring of Borrow Areas	Visual monitoring and inspection of soil erosion at borrow areas, quarries (if closed and rehabilitated), embankments and other places expected to be affected, will be carried out once in every six months.		MoPI	MoPI
O.4	Changes in Land Use Pattern	Ministry of Physical Infrastructure shall take initiative and act as facilitator to prepare an action plan for balanced regional development in consultation with Local Development Authority and State Government to control the ribbon development along the project road. Necessary hoardings will be erected indicating the availability of RoW and legal charges for encroachment of RoW. Budgetary provisions are to be made to control the ribbon development along project road.		MoPI / Revenue Department and Local Civic Bodies	MoPI
O.5	Public awareness on Noise levels and Health Affects	However the public will be advised to construct the houses at least 100 meters away from the project road and to plant trees/shrubs between the roads and their property The public awareness is necessary regarding the human health through the news papers, consultations and distribution of pamphlets during the operation stage.		MoPI	MoPI

Section 4 : ENHANCEMENT MEASURES

Additional positive actions are encouraged to be taken up as part of the project apart from the remedial or mitigation measures that are being proposed to address the negative impacts due to the Project. These positive actions are in addition to several other enhancements that occur inherently because of the nature of the Project such as improved drainage, pedestrian facilities, prevention of erosion, overtopping and flooding etc. as these improvements are in-built in the Project design, as part of good engineering practices.

Environmental Enhancements specifically refer to the positive actions to be taken up during the implementation of the Project for the benefit of the road users and the communities living close to Project road. The enhancements will be carried out with the following objectives:

- To enhance appeal and aesthetics of Project road
- To generate goodwill amongst the local community towards the Project, by the enhancement of common property resources.

Enhancement measures have been suggested for the following environmental components:

- Enhancement of Cultural properties
- Enhancement of Schools/ Hospitals

4.1 Cultural properties

No cultural properties are required to be relocated as part of this project.

The scope for enhancement includes the possibility of any further improvement, availability of space for enhancements and the likely benefits for the local community as well as the road users.

Tree plantation near the community resources will be carried out only at those places where the local people are willing to take care of the trees, as maintenance of trees is a major issue. Shrubs will be planted between the road and churches to reduce the entry of dust levels and increase the aesthetics.

Some selected areas identified along the Project road rendered important for the local communities may be enhanced.

4.2 Enhancements Considered

The list of enhancement sites selected along project road is given in Appendix - 7. A total of 67 sites have been selected for the plantation of shrubs as part of the enhancements.

SECTION 5 : MONITORING PROGRAM

The monitoring program consists of performance indicators, reporting formats and necessary budgetary provisions. Monitoring plan for performance indicators and reporting system is presented in the following sub sections. Budgetary provisions are presented in Section 7. For the effective implementation of EMP, it is essential to design an effective monitoring plan with the following objectives

- To ensure effective implementation of the EMP
- To consider the public obligations and attend if feasible within the project scope
- To modify the mitigation measures or implementing additional measures, if required
- To comply with all applicable environmental, safety, labour and local legislations, if any

5.1 Performance Indicators

Environmental components identified of particular significance in affecting the environment at critical locations have been suggested as Performance Indicators (PIs). The Performance Indicators shall be evaluated under three heads as:

- (a) Environmental condition indicators to determine efficacy of environmental management measures in control of air, noise, water and soil pollution.
- (b) Environmental management indicators to determine compliance with the suggested environmental management measures.
- (c) Operational performance indicators have also been devised to determine efficacy and utility of the proposed mitigation measures.

The Performance Indicators and monitoring plans prepared for Yambio-Tambura section are presented in Table 5.1. Details of the performance indicative parameters for each of the component have to be identified and reported during all stages of the project.

Table 5.1: Performance Indictors and Monitoring Plans

S. No	Description of Item	Indicator	Stage	Responsibility
1	Verification and Identification of the soil borrow areas and quarries	Borrow Area and Quarries	Pre Construction	Contractor
2	Identification of location for the Construction camp	Construction Camps	Pre Construction	Contractor
3	Progress on the tree removal	Tree cutting	Construction	Contractor
4	Location of the temporary storage areas for storage of the excavated materials to be used in embankment	Storage of excavated materials	Pre Construction and Construction	Contractor
5	Implementation of mitigation measures specified in the Table 3.1	Prevention/ Control of Pollution	Construction	Contractor

6	Environmental parameter monitoring in accordance with the frequency and duration of monitoring as well as the locations as per the Monitoring Plan given in Table 5.2	Noise Quality Water Quality	Construction	Contractor
7	Before the onset of monsoon all the debris/excavated material shall be cleaned from the banks and streams and disposed/stockpiled properly away from the water bodies where the work is in progress	Silting of Water bodies	Construction	Contractor and should be supervised by the Environmental Specialist of IA
8	Compensatory Forestation and Reporting of the Survival Rate. The survival rate should be monitored and reported on quarterly basis.	Tree Plantation and Survival	Construction and Operation Stage	Forest Department and MoIP
9	Verification of the borrow areas redeveloped as specified in the redevelopment plan and satisfaction of the owners	Status of Borrow Area	Operation Stage	MoPI
10	Educating the public about the increase of noise levels and its impacts on the health of human with advises for reduction of the noise levels	Health of the public	Operation Stage	MoPI

5.2 Monitoring Plan for Environmental Conditions

For each of the environmental condition indicators, the monitoring plan specifies the parameters to be monitored, location of the monitoring sites, frequency and duration of monitoring and applicable standards. The monitoring plan and details of monitoring locations for environmental condition indicators of the project during the construction stage are presented in Table 5.2. The monitoring will be carried out by the Contractor on his own/ by engaging an external agency under the supervision of the Environmental Specialist of the IA.

Table 5.2: Environmental Monitoring Plan

Attribute	Parameter	Special Guidance	Standards	Frequency and type of sample	Location	Number of samples per season
Water	All essential characteristics and some of desirable characteristics as decided by the Environmental Specialist of IA	Grab sample collected from source and analyse as per Standard Methods for Examination of Water and Wastewater	Appendix – 8A	One in every six months Grab Sample	Drinking water samples from the labour camps and from hand pumps located near the project sites. Surface water from the water courses near the work sites	8
Noise	Noise levels on dB (A) scale	Free field at 1 m from the equipment whose noise levels are being determined.	Appendix –8B	One in every quarter . Day and Night Noise Levels	Free Field, near the construction camps, working zones and sensitive receptors	As desired

5.3 REPORTING SYSTEM

Reporting system for the suggested monitoring program operates at two levels:

- (a) Reporting for environmental condition indicators and environmental management indicators
- (b) Reporting for operational performance indicators at the Implementing Agency Level.

Environmental monitoring involves regular checking of the environmental management issues detailed in the EMP and to ascertain whether the mitigation measures are going according to the EMP along with the progress of the works. It provides the necessary feedback for Project management to keep the program on schedule. The evaluation is essentially a summing up of the project assessment and whether those activities have actually achieved their expected outcomes.

The Contractor, Implementing Agency and Ministry of Physical Infrastructure operate the reporting system for environmental condition and environmental management indicators. The reporting system to be operated by various stake holders is presented in Table 5.3. Reporting formats for Contractors and Implementing Agency have been prepared, which will form the basis of the implementation by the Contractor and monitoring by the Implementing Agency and Ministry of Physical Infrastructure. The list of reporting formats prepared for the Project is presented in Table 5.4 and formats are presented in Appendix 9.

Details of the set up for the implementation of the environmental management plan of the project is presented in Figure 6.1

- The reporting system will start from the Construction Contractor who is at the lowest rung of the implementation system. The Contractor will report to the implementing Agency, who in turn shall report to the Ministry of Physical Infrastructure and USAID.
- The Contractor will submit monthly and quarterly environmental compliance report along with formal monthly and quarterly report to the Implementing Agency.
- The Implementing Agency will submit quarterly environmental monitoring report to Ministry of Physical Infrastructure and USAID in addition to submission of the summary of the activities of the month in the formal monthly report including deviations and corrective actions
- Solutions for further effective implementation should also come out as a result of the compliance monitoring reports.
- Photographic records will also be established to provide useful environmental monitoring tools.

- A full record will be kept as part of normal Contract monitoring. Reporting and Monitoring Systems for various stages of construction and related activities have been proposed to ensure timely and effective implementation of the EMP.

Table 5.3: Stage Wise Reporting System

Item	Contractor	Implementing Agency		USAID
	Contractor to Implementing Agency	Supervision	Reporting to USAID and MoPI	Desired Supervision
Monitoring of Construction site and construction camp	Implementation	Regular	Quarterly	Half yearly
Pollution Monitoring	As required	As required	Quarterly	Half yearly
Monitoring of Enhancements	Implementation	Regular	Quarterly	Yearly
Top Soil preservations	Monthly	As required	Quarterly	Yearly
Borrow area	Regular	As required	Quarterly	Yearly
Tree cutting	Weekly	As required	Quarterly	Yearly
Tree plantation	Monthly	Monthly	Quarterly	Yearly

Table 5.4: Summary Details of Reporting Formats

Format No.	Item	Stage	Contractor	Forest Department	Implementing Agency	
			Implementation & Reporting to Engineer	Implementation & Reporting to Implementing Agency/Ministry of Physical Infrastructure	Supervision	Reporting to USAID
1	Identification of temporary storage yards and Management Plan	Pre-Construction	One Time	-	One Time	One Time
2	Approval of Construction Camp/ Plant site and its Management Plan	Pre-Construction	One Time	-	One Time	One Time
3	Approval of Borrow Management Plan(General and Specific)	Pre-Construction	General -One Time Specific redevelopment plan – one for each borrow area	-	Regular	Quarterly
4	Solid Waste Management Plan(General and Specific)	Pre-Construction	General -One Time Specific plan – one for each camp or plant site	--	Regular	Quarterly
5	Construction Camp Management	Construction	Monthly		Regular	Quarterly
6	Top Soil Management	Construction	Monthly		Regular	Quarterly
7	Pollution Monitoring	Construction and Operation	As Required	As Required	Quarterly	Quarterly
8	Vehicles and Pollution Control	Construction	Monthly		Regular	Quarterly
9	Details of the DG sets and Pollution Control	Construction	Monthly		Regular	Quarterly
10	Details of Oil Storage	Construction	Monthly		Regular	Quarterly
11	Working at Water courses and Pollution Control	Construction	Monthly		Regular	Quarterly
12	Details of Water Extraction	Construction	Monthly		Regular	Quarterly

Format No.	Item	Stage	Contractor	Forest Department	Implementing Agency	
			Implementation & Reporting to Engineer	Implementation & Reporting to Implementing Agency/Ministry of Physical Infrastructure	Supervision	Reporting to USAID
13	Details of Personal Protective Equipment	Construction	Monthly		Regular	Quarterly
14	Deviations and Corrective Actions	Construction	--	--	Monthly	Quarterly
15	Tree Plantation	Construction and Operation		Quarterly		Quarterly
16	Plantation of Shrubs	Construction and Operation	As applicable		As Applicable	As applicable
17	Status Regarding Rehabilitation of Borrow Areas	Operation				Half yearly
18	Survival rate of plants	Operation		Quarterly		Quarterly

The Environmental Specialist of Implementing Agency can make required changes in the formats specified in Appendix 9 of EMP to ensure effective reporting of environmental issues. Some of the formats should be included in the Request for Inspection such as borrow area approval request. For making any required change in the frequency of reporting and change in the contents of the report for effective and simple for implementation and monitoring, Implementing Agency should record the reason for the change and should discuss the reporting formats with Contractor and Ministry of Physical Infrastructure. These will not only ensure that the environmental provisions are addressed but also link the satisfactory compliance to environmental procedures prior to approval of the Interim Payment Certificate (IPC) by the Engineer. In the regular monthly meeting the environmental aspects should also be discussed and the staff responsible for the implementation of the environmental management from the Contractor, Client and Implementing Agency should also present.

SECTION 6 : Institutional Arrangements

USAID has entrusted the responsibility of successful implementation of Construction and Rehabilitation of Yambio- Tambura road to UNOPS.

UNOPS will be headed by the Team Leader who will be responsible for the successful implementation of the Project. The Team Leader will be assisted by Resident Engineer, Highway Engineer, Materials Engineer, Quantity Surveyor, Environmental Specialist and other Engineering and Administrative Staff. The nominated representative of the Director General of the Ministry of Physical Infrastructure will be responsible for the implementation of the Projects under his division. Institutional arrangements for the implementation of the EMP are presented Figure 6.1

6.1 INTEGRATION OF EMP WITH THE PROJECT

The environmental mitigation measures for the protection of the environment impacted by the project activities are presented in Table 3.1. Detailed environmental monitoring plans for noise, and water quality is presented in Table 5.2. Tentative reporting formats for the reporting of the environmental aspects of the Contract are also presented in the EMP in (Appendix 9), these reports must be reviewed by Implementing Agency and discussed with Contractor and Ministry of Physical Infrastructure within 2 months of mobilization of the Construction Contractor or before commencement of the works.

The environmental management measures have been incorporated into the permanent and temporary work items. Separate provisions have been made in the BOQ for the items which can be quantified separately such as environmental monitoring, tree plantation and purchase of equipment.

Appendix – 1: Selection and Management of Construction Camp

Selection of Construction Camp

The construction camps for labour accommodation, offices and vehicle parking area shall be identified based on the following guidelines. The construction site shall be located

At a minimum distance of 500 m away from any major settlement or village.

At a minimum distance of 300m of any major surface water course or body

If this is not possible the base camps should be located away from the settlements with the following precautions

1. The base camp should be enclosed with boundary wall.
2. Movement of the workers should be registered during the night time.
3. There should not be any disturbance to the local community.
4. Operation of the machinery should be restricted to 6 am to 10m
5. Care should be taken while starting and moving the heavy vehicles, there is a possibility that children of near by settlement may be playing with the machinery parked outside the camps.

Facilities at Workers Camps

During the construction stage of the Project the construction Contractor will construct and maintain necessary (temporary) living accommodation and ancillary facilities for labour. It will be ensured that all the temporary accommodation will be provided with uncontaminated water for drinking, cooking and washing. Adequate washing and bathing places shall be provided, and kept in clean and drained condition. Construction camps will be sited away from vulnerable people and adequate health care will be provided for the work force.

Sanitation Facilities: Construction camps shall be provided with sanitary latrines and urinals. Closed drainage systems and the proper treatment systems according to the local conditions should be constructed for the proper flow and effective treatment. The sewage system built for the camp will be operated properly to avoid health hazard, ground water and soil contamination. Compost pits will be constructed for the disposal of the garbage and other biodegradable wastes generated from the camps. Proper collection, transportation and disposal of the wastes will be ensured.

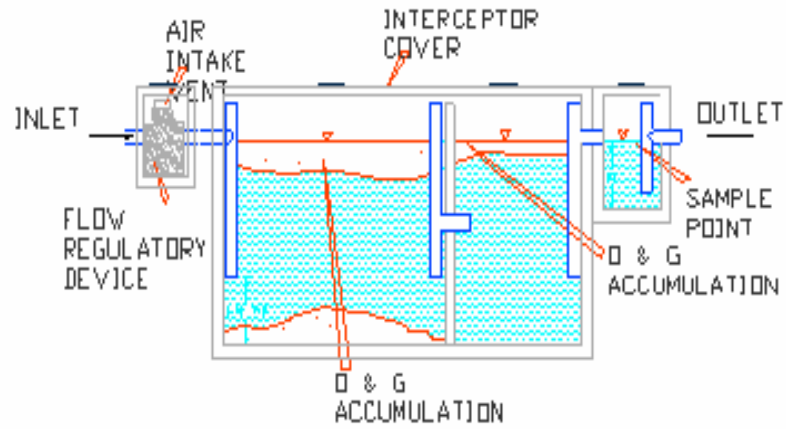
Shelter at Workplace: At such workplaces where the duration of the works will prevail for more than one month some form of shelters will be provided for meals, resting, change of clothes and for keeping the tools of the work and personal protective equipment. The height of shelter shall not be less than 3m from floor level to lowest part of the roof. Sheds shall be kept clean and the space provided shall be on the basis of at least 1m² per head.

Canteen Facilities: A cooked food canteen on a moderate scale shall be provided for the benefit of workers wherever it is considered necessary. All the wastes generated from the canteen will be treated/ disposed of as detailed in the other sections of waste disposal.

Health Care Facilities: Health problems of the workers should be taken care of by providing basic health care facilities through a health centre set up at the construction camps. The health centre will have at least a doctor (part time), nurses, duty staff, medicines and minimum medical facilities to tackle first-aid requirements for minor accidental cases. Some arrangements will be made with the nearest Clinic to refer patients of major illnesses or critical cases.

For ensuring the implementation of effective pollution control measures at the construction base camps, redevelopment/ closure plans for the closure of these sites are included in the Environmental Management Plan of the construction Contract.

Appendix -2: Oil Interceptor



Appendix 3 : List of Personal Protective Equipment

S. No	Part of the Body	Personal Protective Equipment
1	Eye	Safety Glasses, Goggles
2	Face	Face Shields
3	Nose	Nose Masks
4	Head	Helmets
5	Feet	Safety Shoes
6	Hands and arms	Gloves
7	Bodies	Vests
8	Hearing	Earplugs, Earmuffs

Appendix 4: List of Traffic Safety Equipment (Guideline)

S. No.	Signs	Length of Work Zone Considered		Minimum Quantity to be Procured	
		No Signs	Length in m	No Signs	Length in m
1	Barricading		130	2600 m	10000
2	Men at Work	5	500	100	10000
3	Keep Left	11	500	220	10000
5	Go Slow	8	500	160	10000
6	Flagmen	10	--	10	10000
7	Narrow Signs	4	500	80	10000
8	Lantern (Amber Blinker)	4	500	80	10000
10	Cones	15	500	300	10000

Note:

1. Safety Jackets and helmets should be provided to all the workers/engineers working on the road.
2. Fixed mobile solid barricades must be placed between the workmen and traffic or pedestrian and traffic.
3. Safety Equipment required for the Traffic Management to take up the Work in 10 km.

Appendix 5 : Standards for Drinking Water

SI No	Substance or Characteristics	Requirement (Desirable Limit)	Undesirable Effect Outside the Desirable Limit	Permissible Limit in the Absence of Alternate Source	Remarks
Essential Characteristics					
1	Colour, Hazen units, Max.	5	Above 5, consumer acceptance decreases	25	Extended to 25 only if toxic substances are not suspected, in absence of alternate sources
2	pH Value	6.5 to 8.5	Beyond this range, the water will affect the mucous membrane and/or water supply system	No relaxation	-
3	Total hardness (as CaCO ₃) mg/l, Max	300	Encrustation in water supply structure and adverse effects on domestic use	600	-
4	Iron (as Fe) mg/l, Max	0.3	Beyond this limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures, and promotes iron bacteria	1	-
5	Chlorides (as Cl) mg/l, Max	250	Beyond this limit, taste, corrosion and palatability are affected	1000	-
6	Residual, free chlorine, mg/l, Min	0.2	-	-	-
Desirable Characteristics					
1	Dissolved solids mg/l, Max	500	Beyond this palatability decreases and may cause gastro intestinal irritation	2000	-
2	Sulphate (as 200 SO ₄) mg/l, Max	200	Beyond this causes gastro intestinal irritation when magnesium or sodium are present	400	May be extended up to 400 provided (as Mg) does not exceed 30
3	Nitrate (as NO ₂) mg/l, Max	45	Beyond this, may cause methaemoglobinemia	100	-
4	Fluoride (as F) mg/l, Max	1	Fluoride may be kept as low as possible. High fluoride may cause fluorosis	1.5	-
5	Cyanide (As CN), mg/l, Max	0.05	Beyond this limit, the water becomes toxic	No relaxation	To be tested when pollution is suspected
6	Lead (as Pb), mg/l, Max	0.05	Beyond this limit, the water becomes toxic	No relaxation	To be tested when pollution is suspected

Source: Indian Standard Drinking Water Specification-IS10500:1991

Appendix 6: Noise Level Standards

	Noise level for Day Time Leq dB(A)	Noise level for Night Time Leq dB(A)
Construction Camps Site	75	70
Work Zones	65	55
Residential area/ Silent Zones	55	45
<i>Day time - 6.00 am - 9.00 pm (15 hours)</i> <i>Night time - 9.00 pm - 6.00 am (9 hours)</i>		

Appendix 7 : Formats for Environmental Monitoring

EMS 1: CONSTRUCTION CAMP/ PLANT SITE MANAGEMENT PLAN

S.NO	Description	Compliance
1	Name of the location	
2	Nearest road chainage.	
3	Name of the owner	
4	Area involved	
5	Arrangements with the owner (agreement with land owner, including the restoration aspects, should be attached as an Annexure)	
6	Existing land use	
7	Photographs depicting the present condition of the construction camp and access road.	
8	Land use of the area surrounding the borrow area including a map	
9	Site layout plan of the construction camp	
10	Establishment and maintenance of demarcated and labelled different areas within the camp	
11	Number of trees to be removed, if any, along with compensation measures	
12	Proposed top soil management	
13	Activities planned in the construction camp	
14	Machinery & equipment to be used on site	
15	Labour camp facilities onsite	
16	Health facilities	

S.NO	Description	Compliance
17	Site drainage provisions	
20	Staff strength and details such as contractor staff vs sub contractors, women labour, migrant vs local labour and skilled & unskilled labour	
21	Access road condition and proposed maintenance	
22	Safety provision such as fire protection equipment and personal protective measure.	
23	Closure / completion plan	Format EMS: 1A

EMS 1A: Closure Plan Construction Camp and/ Plant Site

S. No	Description	Compliance
1	Name / identity of location	
2	Distance from the Project Road and side	
3	Name of the owner	
4	Details of the Land i. Survey Number/Identification Number ii. Boundaries	
5	Details of settlements, sensitive areas, water bodies, wells and bore wells with in 500 m Population in Numbers Name of the Village Distance from the construction camp Details of water bodies/ sensitive areas/ wells/ bore wells	
6	Physical Details Number of Labour Stationed Number of Dwellings Constructed Number of toilets provided Were dwellings demolished	

S. No	Description	Compliance
	<p>Was the wastewater treatment facilities demolished and cleared</p> <p>Was the solid waste generated cleared and disposed of properly, if yes specify the location and quantity.</p> <p>Whether any soil was contaminated with oils and waste oils was cleared and disposed safely, if yes specify the location and quantity.</p> <p>Was scrap generated while the construction removed, if yes specify the details such as where, when, to whom and quantity.</p>	
7	<p>Land Use before Establishment</p> <p>Proposed Use after completion of works</p> <p>Details of surroundings</p>	
8	Drawing showing the details of the camp facilities, access roads and features of surrounding	Appendix- 1
9	Number of trees removed(girth>300mm), if any along with the compensation measure adopted	
10	<p>Details of disposal of soil contaminated with waste oils</p> <p>Was clay layer placed at the bottom</p> <p>Whether the wastes compacted properly</p> <p>Depth and type of cover material provided on top of waste materials</p>	Appendix- 2
11	Photographs depicting the original condition, during the operation, and after closure	Appendix-3
12	Copy of the agreement with the Owner	Appendix-4
13	Land use after closure of the works	
14	Satisfaction certificate from the owner	Appendix-5
15	Details of the practical problems faced and solutions adopted, if any during the operation phase	
16	Details of the AIDS control measures taken and summary sheet of the AIDS tests carried out	Appendix-6

Note: The details have to be appended.

EMS 2: BORROW AREA Management Plan

S.No	Description	Compliance
1.	Name / identity of location	
2.	Nearest project road chainage	
3.	Name of the owner	
4.	Area involved/capacity/quantity	
5.	Type of material proposed to be taken	
6	Arrangement with the owner including restoration aspect.	
7.	Existing land use	
8.	Land use of the area surrounding the proposed area	
9.	A map of the area	
10.	Number of trees to be removed, if any along with the compensation measure	
11.	Top soil management if required	
12.	Access road condition and proposed maintenance	
13	Photograph depicting the present condition of the proposed area and access road	
14.	Closure / completion plan	EMS 2A

EMS 2A: CLOSURE PLAN FOR BORROW AREA

S. No	Description	Compliance
1	Name / identity of location	
2	Nearest Project chainage, distance from the Project Road and side	
3	Name of the owner	
4	Details of the Land i. Survey Number ii. Boundaries	
5	Details of settlements, sensitive areas, water bodies within 500 m Population in Number Name of the Village Distance from the borrow area Details of water bodies/ sensitive areas/ wells/ bore wells	
6	Physical Details Length and width in meters Depth excavated in meters Quantity Excavated in cum	

S. No	Description	Compliance
	Type of materials excavated	
7	Land Use before Opening Proposed Use before opening Details of surroundings	
8	Drawing showing the dimensions of the borrow areas, access roads and features of surrounding	Appendix- 1
9	Number of trees removed(girth>300mm), if any along with the compensation measure	
10	Details of top soil Quantity excavated in cum Where was it used	
11	Initial access road condition and final access road condition	
12	Photographs depicting the original condition, during the operation, top soil management, and after closure	Appendix-2
13	Copy of the agreement with the Owner Details of the agreed redevelopment if any	Appendix-3
14	Land use after rehabilitation Details should be submitted if the final land use changed from the original land use	
15	Satisfaction certificate from the owner	Appendix-4
16	Details of the practical problems faced and solutions adopted, if any during the operation phase	

EMS 3: Construction Camp and Environmental Management (During Construction)

S. No	Issue	Status	
		Camp –1	Camp –2
1	Drainage System 1 . Closed drainage		
2	Disposal for Wastewater 1. Kitchen wastewater 2. Wastewater from water closets 3. Wastewater from bathrooms 4. Wastewater from the vehicular washings.		
3	Collection and Disposal of Solid Waste 1. Waste from the office 2. Waste from the kitchen 3. Waste from sweeping		
4	Drinking Water facility Source with quantity No of bore wells with capacity Location of the well and bore well Any treatment facility No of overheads tanks Test results of the Drinking water Any license obtained		
5	First Aid Facility		
6	Roads in Camp Site Type of road Dust suppression practicing or not, if the roads are not tarred. Condition of the road.		
7	Fuel Storage 1. Impervious Base 2. Spills and Wastewater will be collected in a sump 3. Number of drums where wastes are collected. 4. Number of drums disposed		
8	Garbage & Night Soil 1. Provision of Garbage Bins 2. Separation of Polythene materials 3. Records of solid waste removal from septic tanks .		

EMS 4: Top Soil Management

S. No	CHANINAGE IN KM	Quantity in cum	Whether Preserved in accordance with specifications	Remarks
1				
2				
3				
4				
5				
6				
7				

EMS 5: Machinery/ Vehicles and Pollution Control

S. No	Machinery/ Vehicles with capacity	Diesel Consumed during the month	Engine Oil Consumed during the month	Status of Pollution control (Good/ Bad)	Machinery New/ Old	Remarks
1						
2						
3						
4						
5						
6						
7						
8						

ESM6: Details of the Trees Affected due to Proposed Project Roads

Chainage (km)	Girth (cm)				
Yambio-Tambura					
1-10					
10-20					
20-30					
30-40					
40-50					
50-60					
60-70					
70-80					
80-90					
90-100					
100-110					
110-120					
120-130					
130-140					
140-150					
150-160					
160-170					
170-180					
180-186					

EMS 7: Details of the DG Sets with the Pollution Control Equipment

S.No	Capacity in KVA	Vertical Stack If provided height in m	Noise Control System	Remarks
Camp –I				
Camp –II				
Construction Works				

EMS 8: Details of Oil Storage

S. No	Type of Product	Location	Number of Barrels	Capacity of barrels in Liters	Increase/ Decrease in Storage	Stored on Impervious base (Yes/ No)	Remarks
	Diesel						
	Petrol						
	Engine Oils						
	Lubricants						

EMS 9: Working at Water course and Pollution Control Measures

S.NO	Location	Type	Stream/ Canal Diversion	Remarks

EMS 10: Details of the Ground Water Extraction

S. No	Location	Capacity of Motor Installed in HP	Quantity of water drawn in Kilo liters			Type of source
			During the month	Up to end of last month	Total	
1						
2						
3						
4						
5						
6						
7						

EMS 11: Personal Protective Equipment

S. NO	Details of Equipment	Total Procured in No	Distributed in No	Available in Store in No	Remarks
1	Helmets				
2	Safety Shoes				
3	Safety Shoes				
4	Nose Masks				
5	Hand Gloves				
6	Goggles				
7	Safety Belts				
8	Ear Plugs				
9	Reflective Jackets				
10	Gum Boots				

EMS 12: Deviations with Corrective Actions

S.No	Deviation	Corrective Actions	Schedule

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**Construction and Rehabilitation of Dabio –Tambura section
(105 km) of Yambio to Tambura Road
Construction of Roads and Related Infrastructure**

DRAFT ENVIRONMENTAL MANAGEMENT PLAN



UNOPS 

United Nations Office for Project Services
Sudan Operations Centre (SDOC)



Environmental Review Form

A. Applicant information

Organization	UNOPS	Project Name	Accelerated Infrastructure Project – Activity 1: Construction of Health Facilities
Individual contact and title	Mr. Surendra Singh, Project Manager	Address, phone & email	UNOPS-Sudan Operations Centre , Ministry of Roads and Transport, Yei Road, Juba, Sudan Phone Number: +88 216 43098411 Email : surendras@unops.org
Proposed activity (brief description)	Construction and Rehabilitation of Yambio to Tambura road	Location of proposed activity	Western Equatoria State in South Sudan
		Start and end date of proposed activity	Scheduled Start Date 01/12/2008 Scheduled End Date 30/06/2009

B. Activities, screening results, and recommended determination

Proposed activities <i>(Step 2 of instructions. Include all phases: planning & design, construction, operation, handover, decommissioning)</i>	Screening result <i>(Step 3 of instructions)</i>			Recommended Determinations <i>(Step 6 of instructions. Complete for all moderate/unknown and high-risk activities)</i>		
	Very Low Risk	Moderate or unknown risk*	High-Risk*	No significant adverse impact	With specified mitigation, no significant adverse impact	Significant Adverse impact
1. Planning and Design	X					
1.1 Site Selection	X					
1.2 Topographic Surveys	X					
1.3 Materials Survey	X					
1.4 Environmental and Hydrology Survey	X					
2.Construction		X			X	
2.1 Land Acquisition, Clearance of Squatters and Relocation of Community Properties	X					
2.2 Site Clearing including Tree Cutting		X			X	
2.3 Clearing and Grubbing		X			X	
2.4 Operation of Borrow Areas and Quarries		X			X	
2.5 Excavation for Road construction, cross drainage and lateral drainage		X			X	
2.6 Construction of Embankment		X			X	
2.7 Construction of Wearing Course/ Sub Base		X			X	
2.8 Compaction of Materials	X					
2.9 Construction of Cross Drainage Works		X			X	

Construction and Rehabilitation of Yambio to Tambura Road

2.10 Construction of Lateral Drains		X			X	
2.11 Operation of Machinery and Vehicles		X			X	
2.12 Extraction of Ground Water		X			X	
2.13 Operation of Construction Camp		X			X	
2.14 Acquisition of Land		X			X	
2.15 Construction of Traffic Diversion		X			X	
2.16 Transportation of Materials		X			X	
2.17 Operation of Haul Roads		X			X	
2.18 Traffic Safety		X			X	
2.19 Waste Disposal		X			X	
2.20 Operation of Sanitation and Sewage Facilities		X			X	
3.0 Decommissioning		X			X	
3.1 Demobilization of Equipment		X			X	
3.2 Clean-up Operations, Restoration and Rehabilitation		X			X	
4 Operation/ Maintenance		X			X	
4.1 Increase of Noise Levels		X			X	
4.2 Operation of Borrow Areas		X			X	
4.3 Disposal of Solid wastes		X			X	
4.4 Extraction of Ground Water		X			X	

*These screening results require completion of an Environmental Review Report

C. Summary of recommended determinations (check all that apply)

The proposal contains. . .		(equivalent Regulation 216 terminology)
X	Very low risk activities	<i>categorical exclusion(s)</i>
	After environmental review, activities determined to have no significant adverse impacts*	<i>negative determination(s)*</i>
X	After environmental review, activities determined to have no significant adverse impacts, given specified mitigation and monitoring*	<i>Negative determination(s) with conditions*</i>
	After environmental review, activities determined to have significant adverse impacts*	<i>positive determination(s)*</i>

*for these determinations, the form is not complete unless accompanied by Environmental Review Report

D. Certification:

I, the undersigned, certify that:

1. the information on this form is correct and complete
2. The following actions have been and will be taken to assure that the activity complies with environmental requirements established for this Project:
 - Those responsible for implementing this activity have received training in environmental review AND training and/or documentation describing essential design elements and best practices for activities of this nature.
 - These design elements and best practices will be followed in implementing this activity.
 - Any specific mitigation or monitoring measures described in the Environmental Review Report will be implemented in their entirety.
 - Compliance with these conditions will be regularly confirmed and documented by on-site inspections during the activity and at its completion.

Construction and Rehabilitation of Yambio to Tambura Road

(Signature) _____ (Date) _____

(Print name) Surendra Singh

BELOW THIS LINE FOR USAID USE ONLY

Clearance record

USAID Project Officer <input type="checkbox"/> Clearance given <input type="checkbox"/> Clearance denied	(print name)	(signature)	(date)
USAID MEO <input type="checkbox"/> Clearance given <input type="checkbox"/> Clearance denied	(print name)	(signature)	(date)
USAID REO* <input type="checkbox"/> Clearance given <input type="checkbox"/> Clearance denied	(print name)	(signature)	(date)
USAID BEO* <input type="checkbox"/> Clearance given <input type="checkbox"/> Clearance denied	(print name)	(signature)	(date)

*REO & BEO approval required for all "high risk" screening results and for determinations of "significant adverse impacts". If clearance is denied, comments must be provided to applicant.

Environmental Review

For Construction and Rehabilitation of the 186 km Yambio-Tambura Road section

1. General Background of the Project

The civil war in Sudan has resulted in disruption of social order, economic activities, and a decline in strength of state institutions. Basic governmental services and infrastructure, including roads, health care, education, and government office spaces, have been damaged or left to deteriorate beyond usable conditions.

Conscious of the over-centralization of government in the past led to marginalization of many parts and hence the war in Southern Sudan, the new Government of Southern Sudan (GoSS), through the CPA, has been trying to establish a more decentralized form of government so that Southern Sudanese can participate more in their political affairs. Thus, in addition to dividing Southern Sudan into 10 states, the states have been sub-divided into 60 counties. Unfortunately all the States of the Sudan does not have suitable road network for the transportation of goods and people. The fund provided for this project will be used for the construction and rehabilitation of 186 km of road from Yambio to Tambura.

2. Location of the Project

Terrain along the road is flat over 90% of the length and steep slopes are observed at few locations particularly at locations where swampy lands are preset. Mean sea levels of the road vary from 549 to 650. The fund provided for this project will be used for the construction and rehabilitation of 186 km of road from Yambio to Tambura, this will ensue better connectivity and fast travel between the State Capita and its counties i.e., Nzara, Ezo and Tambura. The present condition of the road is very bad with deep and big size pot holes, gross in the middle of the project and with bad lateral and cross drainage.

GPS coordinates of the Yambio – Tambura road are presented below.

GPS Co-ordinate of Ymabio(Starting Chainage)

Latitude: N 4°34'04"

Longitude: E 28 °24'02"

MSL : 665

GPS Co-ordinates of Tambura(End Chainage)

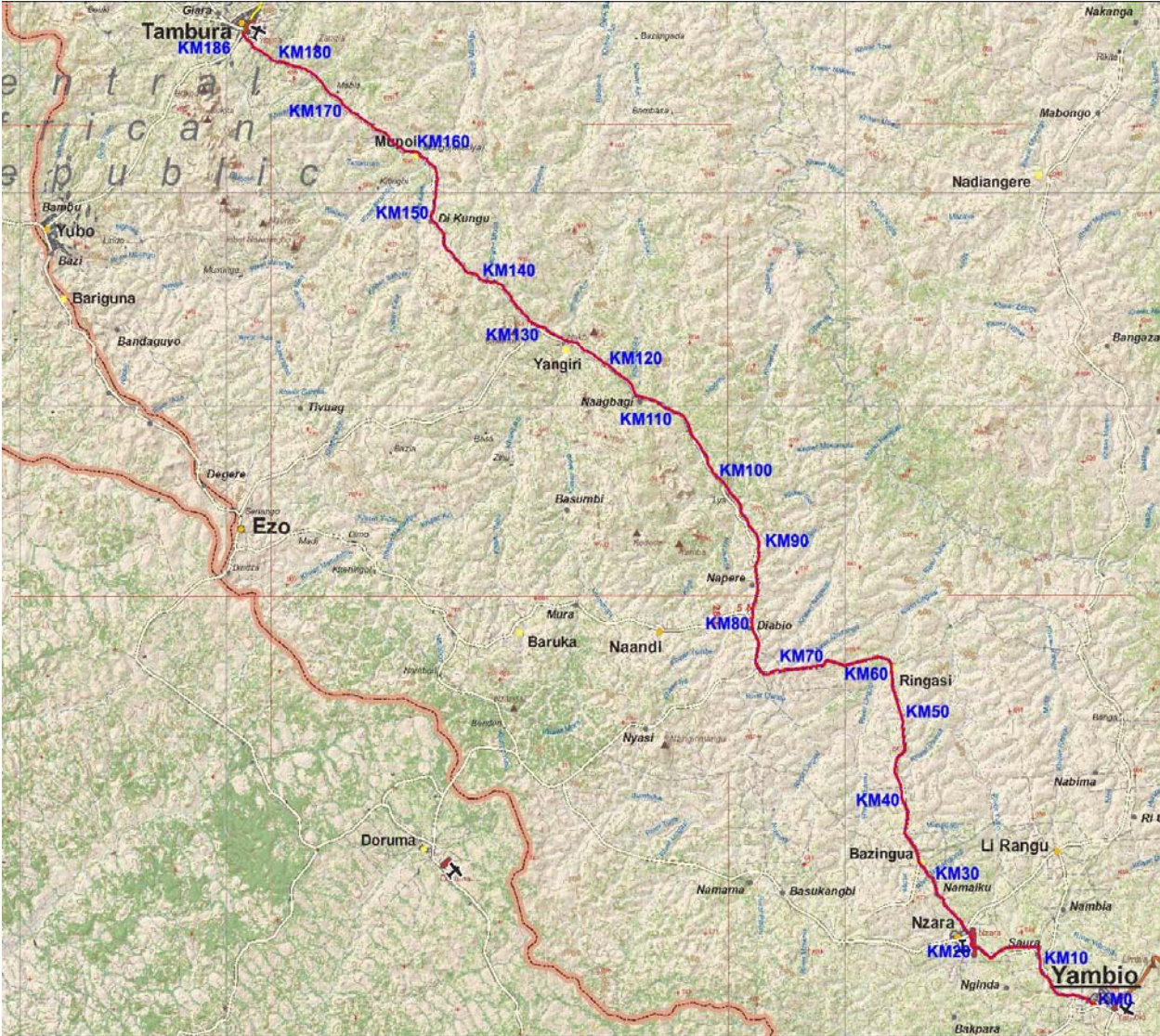
Latitude: N 05°36'23"

Longitude: E 27 °28'21"

MSL: 630

The topographic map presented below shows the physical location map of the proposed project road of Yambio-Tambura section.

Construction and Rehabilitation of Yambio to Tambura Road



Location Map of the Project Road (Not to Scale)

The photographic Records of the present road condition are presented below



Good Road Section in Yambio Town



Potholes Formed on the Road

Construction and Rehabilitation of Yambio to Tambura Road



Road Section Passing Through the Vegetation



Rutting Formed due to Lack of Drainage



Deck of the Damaged Bridge Replaced with Wooden Logs to Keep Traffic Flow



One of the Bridge in Good Condition



Bridge in Dangerous Condition



Burning of Vegetation During Summer to Catch Animals Present in the Vegetation

3. Baseline Information on the Affected Environment

Road from Yambio to Tambura is considered as a high priority road network, connecting state capital, Yambio to other eastern counties, Nzara, Ezo and Tambura. The road is also part of the National Road Network of the Southern

Construction and Rehabilitation of Yambio to Tambura Road

Sudan. The existing road of 2.5m to 3.5m will be widened to 6 m in rural areas and 7m in urban areas with lateral drains on both sides on most of the sections. A summary of the proposed improvements is presented below

- Widening of existing carriageway from 2.5/3.5 m to 5.5 to 6.0 m
- Improvement of the vertical alignment
- Construction of new culverts
- Construction of lined drains in urban areas and earthen drains in rural areas
- Reconstruction of damaged culverts
- Construction of side Drains
- Junction improvements
- Providing Traffic Signs

The sensitive receptors identified along the road sections are Protected Forest (Banambiro Reserve), Private Forests, Schools, Churches, Clinics, Swampy Lands, Water Channels/ Rivers, Air Strip, Grave Yards, Bore Wells, Agricultural Lands, Grazing Lands and Human Habitations and related activities

Due to the proposed project first most affected environmental component is natural environment; in particular clearing of vegetation present within the corridor of impact and for the extraction of soil and murrum.

It was gathered from the locals residing along the road and the Engineers of Ministry of Infrastructure working with UNOPS, that most of lands present along the road and outside the Right of Way are private, thus trees present outside the Right of Way belongs to owners of the land. But for new travelers on this road sections it gives the impression that road is passing through the Forests, in fact it is passing along private lands having trees. It was also gathered that most of trees have been grown during war time i.e., in past 25 years

It was gathered from the Officials of the Forest Department of Tamura County that only about 25 hectares of the Teak plantation called Banambiro Reserve is present along the road from km 174/000 to km 174/500(from Yambio) at distance of 8m from the center line. No tree of this forest will be cut due to the proposed improvement.

Natural Resources

The soils encountered in the project road vary from the sandy loam to Murrum. Soil is required from the borrow areas in addition to the materials generated from excavation. As short as possible materials will be obtained from the existing local borrow areas. The suitable materials generated from the cutting will be used for the embankment construction. All borrow areas operated will be redeveloped. Contractor may procure aggregates from existing quarries or open a new quarry.

Construction and Rehabilitation of Yambio to Tambura Road

Air Environment

Air quality data has not been collected as part of this project as there are no considerable sources of pollution generating industrial operations within the project influence area and it is costly affair as the monitoring agencies have to be hired from far of places. The sources of pollution of the project area are vehicles, agricultural activities, charcoal firing, dust from the roads and burning of the vegetation during the summer. The pollutants such as Suspended Particulate Matter and Respirable Particulate Matter will be generated from the operation of borrow pits, haul roads, construction zones and operation of the construction machinery during the implementation phase of the proposed road construction project. The dust suppression can be achieved by regular water sprinkling. The photographic records of the sensitive receptors where shrubs will be planted for the control of dust during the operation phase of the project are presented.



Church Present Along the Road



School Present Along the Road

Noise Levels

Noise levels are not measured as part of this project as there is no considerable source of noise generating operations within the project influence area and it is costly affair as the monitoring agencies have to be hired from far of places. The adverse impacts from the increase of noise levels during the construction stage on the nearby community will be reduced by; locating the construction camp away from the settlements, limiting the working hours and using the quiet equipment available in the market. All possible mechanical and administrative controls will be practiced to reduce the adverse impacts due to noise on the workers, in unavoidable situations personal protective equipment will be provided to the workers based on the nature of works.

However public will be advised to construct vegetative noise barriers and to construct new houses about 100m away from project road. A campaign of the public awareness related to health issues due to exposure of noise will be addressed through the news papers, consultations and distribution of pamphlets during the operation stage.

Water Environment

Water quality data has not been collected as part of this project as there are no considerable sources of pollution generating operations within the project influence area and it is costly affair as monitoring agencies have to be hired

Construction and Rehabilitation of Yambio to Tambura Road

from far of places. 43 existing cross drainage structures are present across canals, drains and water channel crossing the proposed project road. Some of these structures will be replaced and some will be maintained. Additional 41 cross drainage structures are proposed to have better cross drainage of water across the road.

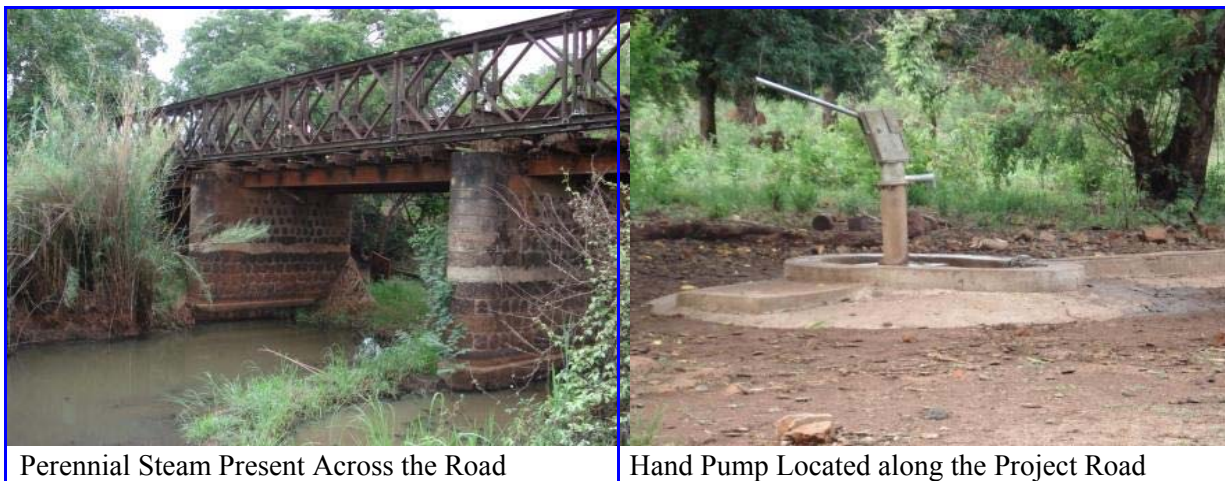
All construction works along water course will be carried out during non monsoon period. Channels and streams diversions will be constructed for ensuring the uninterrupted flow of the water for all cross drainage structures, wherever required.

Degradation of water quality due to sediment transport may occur from activities like removal of trees, removal of grass cover, excavation for road and bridges and stock piling of materials during the construction activities. Degradation of water quality will be prevented or reduced with proper stock piling and using of these materials in the construction of embankment and or by proper disposal.

Oil interceptors will be constructed in the construction camps to reduce contamination of water due to oil spills.

Both the ground water and surface water can be used for the Project requirements based on the quantity and quality of water available and required for the Project works. The water required for the project is about 125 cum/day from various sources at various locations. There will be some negative impact on the ground water table and the ground water levels are about 40-70 meters. The Contractors will be advised to install bore holes at different locations and at least one km away from the existing boreholes to avoid interference with the water regime of the existing bore holes and to reduce the negative impact due to the extraction of ground water.

Due to the proposed improvement of the project no hand pumps, tube wells and open wells are affected. However the bore holes drilled for the project will be left as it is for the public use after the completion of the project. The photographic records of the perennial streams and hand pumps located within the project area are presented below.



Construction and Rehabilitation of Yambio to Tambura Road

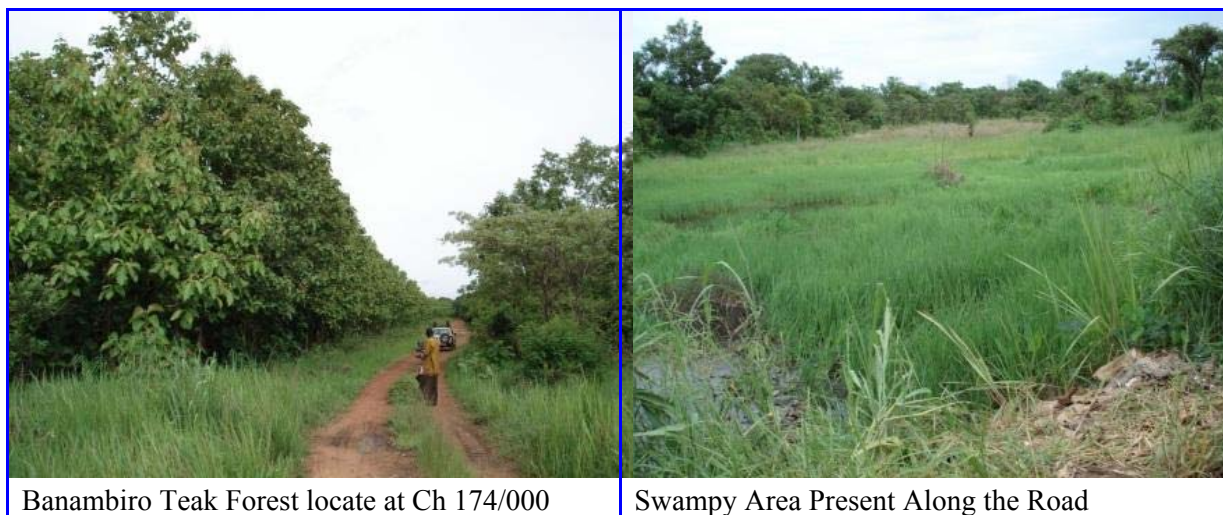
Flora and Fauna

The project is passing adjacent to one protected teak forest at about km 174 admeasuring about 500m length along the road on the right hand side. This forest will not affect due to the proposed project as it is located 8m away from the centre line and the improvements are limited to 5m from the centre line. No other sensitive areas like natural habitats, bird sanctuaries, tiger forests, reserve forests, wet lands are present within the project influence area.

No endangered species, wild animals are present within the Project influence area, only domestic animals are observed along the Project roads.

The proposed project involves cutting of about 1000 trees. The compensatory forestation will be taken up by the Forest Department.

The impacts on the flora and fauna are not significant and can be categorized as low. Photographs of Banambiro Forest and Swampy areas are presented below.



Socio Economic Environment

Rehabilitation and Relocation

Socio economic aspects of the project area were considered during the initial environmental surveys, design phase and found that no property is affected due to the proposed Project and thus no person is affected by the Project directly. The proposed project does not envisage any land acquisitions as road has about 45 meter wide right of way. Details of the social and environmental features located along the project road are presented in table below.

Construction and Rehabilitation of Yambio to Tambura Road

List of Sensitive Receptors Present Along the Road

S.NO	Type of Structure	80/300 to 186/000	Distance from Centre Line in meters	Remarks
1	Air Strip		Adjacent	
2	Bank		9	
3	Church	8	7 and 80	
4	Church+ Grave Yard	3	6 and 18	
5	Clinic	4	25 and 53	
6	Court	1	30	
7	Grave yard	13	5.5 and 24	
8	Hand Pumps	15	6 and 50	
9	Markets	6	6 and 50	
10	Petrol Pump			Abandoned
11	Play Ground	1	7	
12	Road Junctions	14		
13	Schools	4	17 and 108	
14	Swampy areas	10		
15	Teak Forests	1		

Cultural Properties

The project road is not passing through or near by any sites of national heritage, cultural and religious structures. However about 39 churches of local importance are located along the road at a distance of about 6m and 80m from the existing centre line of the road.

For the religious structures which are located near the project road and not affected by the Project will be enhanced by the plantation of the shrubs to reduce the dust and increase the aesthetic values. The photographs of the public consultations and the other social aspects are presented below.

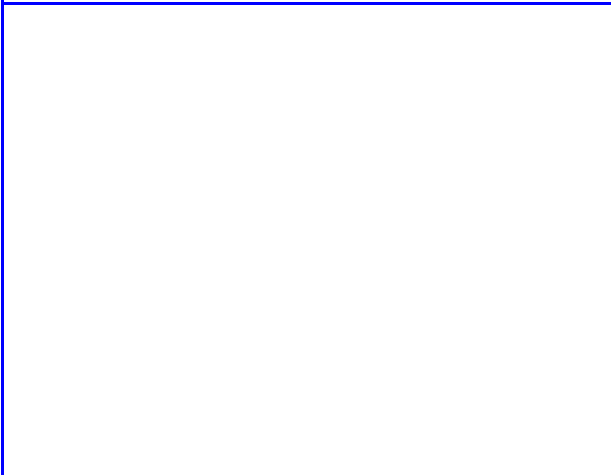
Construction and Rehabilitation of Yambio to Tambura Road



Public Consultation Conducted at Daibio



Consultation with the Commissioner of Forest, Tambura County



Grave Yards Present Along the Road



Clinic Present Along the Road



Houses of the Sudanese people

4. Evaluation of Activities, Environmental Impact Potential and Proposed Mitigation Actions

Refer the Attached Environmental Management Plan. This Environmental Management Plan will form as Part of Contract Documents.

5. Findings

The evaluation recommends a negative determination with conditions, therefore no significant adverse impacts given specified mitigation and monitoring. The project can proceed subject to the mitigation actions stated in section 4(Environmental Management Plan) above.

6. Standards

Specifications for the environmental management and safety management are in Division 1600, Division 1500 and other relevant divisions of Ethiopian Standard Technical Specifications and contract clauses.

The guidelines designed by ENCAP (Environmentally Sound Design and management Capacity Building for Partners programs in Africa) will be used for this project. To be specific, Part II Chapter 14: Rural Roads of EGSSAA will be used in this project. EGSSAA guidelines are available at www.encapafrika.org/egssaa.htm

Construction and Rehabilitation of Yambio to Tambura Road



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**Rehabilitation and Construction of Dabio – Tambura section
of (105 km) Yambo - Tambura Road
Construction of Roads and Related Infrastructure**

**ENVIRONMENTAL REVIEW FORM
AND
ENVIRONMENTAL REVIEW REPORT**



UNOPS 

United Nations Office for Project Services

Sudan Operations Centre (SDOC)

ENVIRONMENTAL DESIGN CHECKLIST

Stretch Number: 2	Feature at Start: Dabio	Feature at end: Tambura			
Distance from Origin at Beginning of Stretch	km 80+000				
Distance from Origin at end of Stretch	km 185+000				
Total distance of this stretch		km 105			
Total travel time of this stretch		Minutes 420			
Towns + Mileage Marker Along the Stretch					
Class of Road(check one)	Major Trunk	Trunk <input checked="" type="checkbox"/>		Feeder	
Present Surfacing(check one)	Gravel <input checked="" type="checkbox"/>	Dirt		Sand	
Present Road condition (check one)	Smooth	Rough	Distorted <input checked="" type="checkbox"/>	Loose	Muddy
Grade	Level		Rolling <input checked="" type="checkbox"/>		Steep
Environmental Conditions/Management Mitigation Recommendations along the Stretch					
Predominant Land Use Categories(rough estimate)	Forest	Bush <input checked="" type="checkbox"/>	Farmed	Pasture	Wetland
<p style="color: #A52A2A;">Indicate Source of Water for Construction purpose (wet compaction or for mixing concrete)</p>	<p>Ground Water is most suitable source for use during the construction stage of the proposed project. It was gathered from the agencies executing bore holes drilling and installation of hand pumps in the project area that the ground water levels are present at about 40-70 meters below the ground level with yield varying from 1000 liters to 4000 liters/hour.</p> <p>The Contractors will be advised to install bore holes at different locations and at least one km away from existing boreholes to avoid interference with the water regime of existing bore holes and to reduce negative impact due to extraction of ground water.</p>				
<p style="color: #A52A2A;">Road passes through or closely adjacent to Protected Area (PA)</p>	<p>The project is passing adjacent to one protected teak forest at about km 174 admeasuring approximately 500m length on the right hand side of the road. This forest will not affect due to the proposed project as it is located 8m away from centre line and improvements are limited to 5m from centre line. No other sensitive areas like natural</p>				

	<p>habitats, bird sanctuaries, tiger forests and reserve forests are present within the project influence area.</p> <p>The Protected Forest is under the administrative control of Forest Department, Tambura Country.</p> <p>The contractor will take reasonable precaution to prevent his workmen or any other persons involved in the project activities from removing and damaging any flora (plant/vegetation) and fauna (animal) from the protected forest and other locations and also take reasonable precautions for prevention of fishing in any water body.</p> <p>If any wild animal is found near the construction site at any point of time, the Contractor will immediately upon discovery thereof acquaint the Environmental Specialist of Implementing Agency and carry out the instructions for dealing with the same. The Environmental Specialist of Implementing Agency will report to the near by Forest Office (range office or divisional office) and will take appropriate steps/ measures, if required in consultation with the forest officials.</p>
<p>Note areas of Potential erosion problems</p>	<p>The terrain of the land is flat along most section of the road. Longitudinal section of the road is moderately steep near the swampy areas and at few other locations.</p> <p>Masonry wing walls will be constructed for the bridges and culverts. Lateral earthen drains will be constructed for collection and disposal of the storm water generated from the road.</p>
<p>Note Each crossing of potential stream or river</p>	<p>Perennial stream located at km 156+600.</p>

<p>Note each crossing of seasonal water course</p>	<p>There will not be considerable impacts due to proposed construction works at these seasonal streams as following precautions will be taken to minimize negative impacts.</p> <p>Construction over and close to the non-perennial streams shall be undertaken in the dry season. If construction work is expected to disrupt down stream users of water bodies, notice shall be served well in advance to the affected community.</p> <p>Wherever excavation for diverting water flow will take place, Contractor will ensure that slopes are not steeper than 1:2 (vertical: horizontal) otherwise proper slope protection measures will be taken up by the Contractor as approved by Environmental Specialist of Implementing Agency.</p> <p>All materials generated from excavation will be kept away form water course as part of excavation.</p>
<p>Note each wetland area being crossed</p>	<p>21 swampy areas with few or no trees are present along the road. With the proposed improvements, drainage system of swamps will be improved.</p> <p>The negative impacts during the construction will be minimized by taking the following precautions.</p> <p>As far as possible construction of cross drainage structures of the swamps will be undertaken during dry season.</p> <p>Wherever excavation for diverting water flow will take place, the Contractor will ensure that slopes are not steeper than 1:2 (vertical: horizontal) otherwise proper slope protection measures will be taken</p>

	<p>up by the Contractor as approved by the Environmental Specialist of Implementing Agency.</p> <p>All materials generated from excavation will be kept away from the water course as part of the excavation.</p>
<p>Indicate sources of murram from probable borrow pits along the stretch</p>	<p>During the Design 25 borrow pits have been identified and actual number of borrow pits required may vary and can be confirmed on the completion of the construction.</p> <p>Haulage distance has been included in BOQ rates for embankment construction and wearing course construction and no extra payment will be made for additional haulage. The contractors will be advised to procure materials between 200m and 5000 meters from the project road.</p> <p>The Contractor is responsible for the searching and finalization of borrow pits during pre construction and construction stage. Details of the borrow pit management is presented in Appendix- 3A. Cost for the preparation of borrow pit management plan has been included in BOQ. Cost of construction of embankment and wearing course is inclusive of cost for redevelopment of borrow pits.</p>
<p>Identify likely site(s) for road camp along the stretch, if any</p>	<p>Cost for clean up and decommissioning of construction camps has been included in BOQ.</p>
<p>Which towns, villages or establishments along the road may be affected by dust</p>	<p>Details of the villages, towns and sensitive receptors are presented in Appendix- 2.</p> <p>Water sprinkling will be done during the construction phase for dust</p>

	<p>suppression. Rate for dust suppression has been included in the construction costs for the embankment construction and wearing course construction.</p>
<p>Note probable areas of traffic safety</p>	<p>List of the villages, towns and establishment are presented in Appendix -2 and details of junctions are presented in Appendix-3. Road sections in Yambio Town will be wider to cater needs of high traffic compared to other sections and same is case with Tambura town. Traffic Signs will be placed wherever required and details are provided in the detailed design drawings.</p>
<p>Note the potential for the spread of contagious disease, particularly HIV/AIDS</p>	<p>HIV/AIDS awareness programs are being organized by other UN agencies and the Government of South Sudan.</p>

Appendix 1: Environmental Management of Perennial Streams

Present Status and Proposed Improvements

A stream located at km 156+605 is perennial stream present with in the project area. Details of the stream and proposed improvements are presented below.

Stream Located at km 156+605

The bridge located at km 156+605 is decked with medium size logs and wooden planks placed horizontally and supported by 4 pieces of equally spaced 160mm x 460mm steel I-Beams. It is supported by an 800mm thick masonry abutments and piers. It has two spans of 7.60m and 5.70m. The clear width of the bridge is 3.50m. At present only light vehicles can pass over this wood logged deck bridge.

During the summer season, flow of water with very low velocity was observed under the bridge. Clearance between the river bed and the bridge decks was measured to be 4.30m. It was observed that trees growing on the banks of the river.

It is recommended to construct a concrete bridge. Considering the natural waterway of 18.00m wide, a better option is to consider 2- span bridge of 9.00m.

Environmental Management during Construction

While working across or close to any perennial water bodies, contractor will not obstruct or prevent the flow of water.

Contractor will ensure that no construction materials like earth, stone, or appendage are disposed of into water courses so as not to block the flow of water of water courses and cross drainage channels.

Contractor will take all necessary measures to prevent blockage of water flow. In addition to design requirements, the contractor will take all required measures as directed by the Environmental Specialist of Implementing Agency to prevent temporary or permanent flooding of the site or any adjacent area.

The Contractor will not excavate beds of any stream/canals/ any other water body for borrowing earth for the construction of embankment and wearing course.

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 course.

Wherever excavation for diverting water flow will take place, Contractor will ensure that the slopes are not steeper than 1:2 (vertical: horizontal) otherwise proper slope protection measures will be taken up by the contractor as approved by the Environmental Specialist of Implementing Agency.

All materials generated from the excavation will be kept away from water course as part of the excavation for structural works.

All precautions required will be taken during the construction to avoid degradation of water quality during the construction activity as the people are using these rivers for the cattle feeding and bathing.

APPENDIX 3A: BORROW PIT MANAGEMENT

Borrow pits will be finalized either from the list of locations recommended in the Design Reports or Environmental Management Plan or new pits can be identified by the Contractor. The finalization of locations identified in the design reports depends upon the formal agreement between the landowners and the Contractor.

The Contractor in addition to the established practices, rules and regulation will also consider following criteria before finalizing the locations.

- 1) The borrow pit should not be located in agriculture field unless barren land is not available.
- 2) The borrow pits should not be located within 50m from the toe line of any road.
- 3) The loss of productive and agriculture soil should be minimum.
- 4) The loss of vegetation should be minimal.
- 5) Sufficient quantity meeting the quality criteria is available.

The Contractor shall obtain representative samples from each of identified borrow pits and have these tested in the laboratory in accordance with test program approved by the Implementing Agency.

After identification of borrow pits based on guidelines. Contractor will fill reporting format presented in Appendix 3C and submit the same for approval to the “Implementing Agency”. After receiving the approval, contractor will begin operations keeping the following precautions in mind;

- 1) Haulage of material to embankments or other areas of fill shall proceed only when sufficient spreading and compaction plans are operating at place of deposition.
- 2) No excavated acceptable material other than surplus to requirements of the Contract shall be removed from the site.
- 3) Where excavation reveals a combination of acceptable and un-acceptable materials, the Contractor shall, unless otherwise agreed by the Implementing Agency, carry out excavation in such a manner that acceptable materials are excavated separately for use in permanent

works without contamination by un-acceptable materials. The acceptable material shall be stockpiled separately.

- 4) The Contractor shall ensure that he does not adversely affect the stability of excavation or fills by the methods of stockpiling materials, locating the temporary buildings or structures.

Borrow Areas located in non Agricultural Lands

- i) 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1V:2H.
- ii) Borrowing of earth will be carried out up to a depth of 1.5m from the existing ground level.
- iii) The slope of the edges will be maintained not steeper than 1:4 (vertical: Horizontal).

Borrow Areas located in Agricultural land where un-avoidable

- i) 15 cm topsoil will be stripped of from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1V:2H.
- ii) The depth of borrow pits will not be more than 30 cm after stripping the 15 cm topsoil aside.

Borrow Areas located in Elevated Lands

- i) 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1V:2H.
- ii) At location where private owners desire their fields to be leveled, the borrowing shall be done to a depth of not more than 1.5m or up to the level of surrounding fields

Borrow Areas near Settlements

- i) 15 cm topsoil will be stripped of from borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1V:2H.
- ii) Borrow pits shall be located at least 0.75 km from villages and settlements. If unavoidable, the pit will not be dug for more than 30 cm and drains will be cut to facilitate drainage.
- iii) Borrow pits located in such location will be re-developed immediately after borrowing is completed.

Borrow Pits along the Road

- i) 15 cm topsoil will be stripped of from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1V:2H.
- ii) Borrow pits along the road shall be discouraged.
- iii) It permitted by the Implementing Agency; these shall not be dug continuously.
- iv) Ridges of not less than 8m widths should be left at intervals not exceeding 300m.
- v) Small drains shall be cut through the ridges to facilitate drainage.
- vi) The depth of the pits shall be so regulated that the bottom does not cut an imaginary line having a slope of 1 vertical to 4 horizontal projected from edge of final section of bank, maximum depth of any case shall be limited to 1.5m.
- vii) No pit shall be dug within the offset width from toe of embankment required as per consideration of stability with a minimum width of 50m.

Re-development Borrow Pits

The objective of the rehabilitation program is to return the borrow pit sites to a safe and secure area, from which the general public should be able to safely enter and enjoy. Securing borrow pits in a stable condition is fundamental requirement of rehabilitation process. This could be achieved by filling the borrow pit floor to approximately access road level. Re-development plan will be prepared by the Contractor before the start of work inline with the owners will and to the

satisfaction of owner. The borrow area redevelopment plan (Appendix 3D) shall be submitted by the Contractor to the Implementing Agency for the approval and the same should be approved by the Implementing Agency after physical verification of the borrow pit.

Borrow areas might be used for water storage ponds in case landowner/community wants such development. In that case, such borrow area will be photographed after their post use restoration and Environment Specialist of the Implementing Agency will certify the post use of borrow pit.

The Contractor will keep record of photographs of various stages i.e., before using materials from the location (pre-project), for the period of borrowing activities (construction Phase) and after rehabilitation (post development), to ascertain the pre and post borrowing status of the area.

Appendix 3B: Borrow Pit Management and Formats

S.No	Description	Compliance
1.	Name / identity of location	
2.	Nearest project road chainage	
3.	Name of the owner	
4.	Area involved/capacity/quantity	
5.	Type of material proposed to be taken	
6	Arrangement with the owner including restoration aspect.	
7.	Existing land use	
8.	Land use of the area surrounding the proposed area	
9.	A map of the area	
10.	Number of trees to be removed, if any along with the compensation measure	
11.	Top soil management if required	
12.	Access road condition and proposed maintenance	
13	Photograph depicting the present condition of the proposed area and access road	
14.	Closure / completion plan	Appendix 3D

Appendix 3C: Closure Plan for Borrow Pits

S. No	Description	Compliance
1	Name / identity of location	
2	Nearest Project chainage, distance from the Project Road and side	
3	Name of the owner	
4	Details of the Land i. Survey Number ii. Boundaries	
5	Details of settlements, sensitive areas, water bodies within 500 m Population in Number Name of the Village Distance from the borrow area Details of water bodies/ sensitive areas/ wells/ bore wells	
6	Physical Details Length and width in meters Depth excavated in meters Quantity Excavated in cum Type of materials excavated	
7	Land Use before Opening Proposed Use before opening Details of surroundings	
8	Drawing showing the dimensions of the borrow areas, access roads and features of surrounding	Appendix- 1
9	Number of trees removed(girth>300mm), if any along with the compensation measure	
10	Details of top soil Quantity excavated in cum Where was it used	
11	Initial access road condition and final access road condition	

S. No	Description	Compliance
12	Photographs depicting the original condition, during the operation, top soil management, and after closure	Appendix-2
13	Copy of the agreement with the Owner Details of the agreed redevelopment if any	Appendix-3
14	Land use after rehabilitation Details should be submitted if the final land use changed from the original land use	
15	Satisfaction certificate from the owner	Appendix-4
16	Details of the practical problems faced and solutions adopted, if any during the operation phase	

Appendix 2: Sensitive Receptors and Villages along the Road

S.NO	Chainage in km	Side (LHS/RHS)	Type of Structure	Name of the Village	Distance from Center Line in meters	Length of Structure in meters
1	2+200	RHS	Church	Yambio	61	57
2	2+300	RHS	Church	Yambio	30	50
3	4+900	RHS	Church	Yambio	37	55
4	7+700	LHS	Church	Yambio	23	30
5	8+100	LHS	Church	Yambio	24	21
6	10+400	LHS	Church	Saura	67	31
7	13+300	LHS	Church	Nagero	23	159
8	14+900	LHS	Church	Nagero	39	32
9	17+300	RHS	Church	Yabua	33	45
10	21+500	LHS	Church	NZara	80	35
11	24+400	RHS	Church	Nzara	26	50
12	27+900	RHS	Church	Nammaku	11	117
13	28+200	RHS	Church	Nammaku	10	100
14	32+500	LHS	Church	Sasa	34	32
15	32+900	LHS	Church	Sasa	12	14
16	33+900	LHS	Church	Sasa	56	82
17	36+300	LHS	Church	Sasa	41	23
18	36+500	LHS	Church	Sasa	34	35
19	47+300	RHS	Church	Diabio	23	65
20	53+800	LHS	Church	Ringasi	8	20
21	56+900	LHS	Church	Ringasi	20	35
22	57+000	RHS	Church	Ringasi	40	52
23	59+200	LHS	Church	Ringasi	25	44
24	59+400	LHS	Church	Ringasi	32	50
25	70+200	LHS	Church	Diabio	12	30
26	74+600	RHS	Church	Diabio	27	21
27	80+200	LHS	Church	Diabio	>50	40
28	84+600	RHS	Church	Dabio	20	40
29	104+300	LHS	Church	Yangiri	>10	20
30	109+300	RHS	Church	Yangiri	>15	30
31	135+900	RHS	Church	Mupoi	13	70
32	141+800	RHS	Church	Mupoi	18	100
33	149+100	RHS	Church	Mupoi	6	30
34	158+600	RHS	Church	Mupoi	25	100
35	161+100	RHS	Church	Mupoi	12	80
36	174+600	RHS	Church	Mabia2	7	30
37	178+100	RHS	Church	Tambura	16	60
38	180+500	RHS	Church	Tambura	15	9
39	1+100	RHS	Court	Yambio	30	20

S.NO	Chainage in km	Side (LHS/RHS)	Type of Structure	Name of the Village	Distance from Center Line in meters	Length of Structure in meters
40	17+800	LHS	Clinic	Yabua	53	29
41	35+700	LHS	Clinic	Sasa	35	15
42	80+100	LHS	Clinic	Diabio	27	60
43	141+600	RHS	Clinic	Mupoi	50	60 and 12
44	159+800	RHS	Clinic	Mupoi	26	60
45	177+100	LHS	Clinic	Mabia2	25	10
46	185+480	LHS	Clinic	Tambura	28	26
47	1+100	RHS	Court	Yambio	30	15 and 20
48	185+850	RHS	Court	Tambura	38	21
49	0+100	LHS	Foot Ball Court	Yambio	9	110
50	107+400	RHS	Play Ground	Yangiri	>6	20
51	1+200	RHS	School	Yambio	108	107
52	5+000	RHS	School	Yambio	37	124
53	10+700	LHS	School	Saura	29	52
54	13+300	RHS	School	Nagero	52	24
55	17+600	LHS	School	Yabua	38.5	85
56	21+400	LHS	School	Nzara	31	39
57	27+400	LHS	School	Nzara	35	75
58	28+100	RHS	School	Nammaku	84	122
59	32+700	LHS	School	Sasa	37	20
60	33+900	LHS	School	Sasa	18	82
61	57+200	RHS	School	Ringasi	6	44
62	58+400	LHS	School	Ringasi	69	34
63	70+200	RHS	School	Diabio	41	52
64	141+800	LHS	School	Mupoi	20	100
65	177+000	RHS	School	Mabia2	40	80
66	180+800	LHS	School	Tambura	20	60
67	184+900	LHS	School	Tambura	80	80

Appendix 3: List of Road Junctions

S.NO	Chainage in km	Side	Locations	Width of Junction in Meters	Remarks
1	0+300	LHS	Yambio	13	
2	0+500	RHS	Yambio	9 and 13	2 Road
3	0+700	LHS and RHS	Yambio	17(LHS) and 13(RHS)	
4	1+400	RHS	Yambio	13	
5	2+100	RHS	Yambio	12	
6	4+200	LHS	Yambio	3	
7	4+500	LHS	Yambio	3	
8	4+700	LHS	Yambio	5	
9	5+100	LHS	Yambio	4	
10	5+300	RHS	Yambio	5	
11	6+700	RHS	Yambio	5	
12	11+200	RHS	Saura	5	
13	22+400	LHS	Nzara	10 and 5	
14	74+400	LHS	Daibio	4	
15	80+200	LHS	Diabio	5	
16	159+300	RHS	Mupoi		
17	184+915	RHS	Tambura	8	
18	185+020	RHS	Tambura	15	
19	185+244	RHS	Tambura	15	
20	185+244	LHS	Tambura	15	
21	185+269	RHS	Tambura	5	
22	185+422	RHS	Tambura	10	
23	185+474	RHS	Tambura	10	
24	185+511	RHS	Tambura	5	
25	185+541	RHS	Tambura	11	
26	185+586	RHS	Tambura	16	
27	185+642	RHS	Tambura	9	
28	185+666	LHS	Tambura	12	
29	185+753	RHS	Tambura	4	
30	185+800	RHS	Tambura	10	

APPENDICES



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**Construction and Rehabilitation of Dabio –Tambura Section
(105 km) of Yambio to Tambura Road
Construction of Roads and Related Infrastructure**

DRAFT ENVIRONMENTAL DESIGN CHECK LIST



UNOPS 

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