

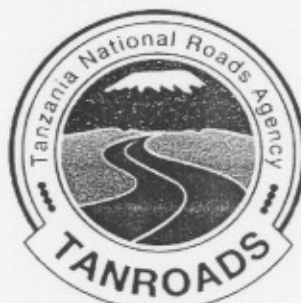
UNITED REPUBLIC OF TANZANIA
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TANZANIA NATIONAL ROADS AGENCY
(TANROADS)



Good roads for national development

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT,
FEASIBILITY STUDY AND PRELIMINARY DESIGN FOR NATTA –
MUGUMU – TABORA B – KLEIN'S CAMP – LOLIONDO ROAD
(239 KM) UPGRADING PROJECT.

VOLUME V
ENVIRONMENTAL IMPACT ASSESSMENT REPORT
Final Report

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EXECUTIVE SUMMARY IN ENGLISH.

EXECUTIVE SUMMARY

INTRODUCTION

The government of the United Republic of Tanzania through the Tanzania National Roads Agency (TANROADS) intends to upgrade the existing unpaved Natta - Mugumu - Tabora B - Klein's Camp - Loliondo Road to bitumen standard. The road project is part of the Government strategy to accelerate the development of its road network for the country's socio-economic development.

The objective of the project is to carry out technical and economic feasibility study for upgrading the existing gravel road to bitumen standard

This report presents Environmental Impact Assessment (EIA), the purpose of which is to incorporate environmental considerations into the road project design

In carrying out the study, the consultant has used desk work as well as ~~and~~ field surveys. During deskwork consultation was made to various documents, reports drawings and maps.

The field work involved visual surveys, interviews and focus group discussion with local communities along the existing road alignment as well as relevant authorities.

DESCRIPTION OF THE PROJECT

There is only one road route through which one can reach Arusha from Musoma. This is through Butiama, Natta (Serengeti district), Ikoma gate, via Seronera, across Serengeti National Park and Ngorongoro Conservation area before joining a trunk road at Karatu. The present route traverses through a 200 Km road stretch in Serengeti National Park, a national heritage containing a huge and rare nature preserve.

The Government of Tanzania has been looking for different alternative routes to mitigate the environmental impacts to Serengeti National Park, through realignment of the present route. It is expected that the proposed Natta - Mugumu - Klein's gate - Loliondo road project will reduce the current 200 Km stretch in Serengeti National Park to about 60 Km, which will in turn reduce adverse environmental impacts to the National Park, let alone facilitating socio-economic development growth of the corridor as well as surrounding villages. It is anticipated that the road will finally connect Serengeti District and Arusha through Mtowambu.

The road will have a single carriageway of bituminous surfacing of 6.5 m width and 1.5 m shoulders.

Implementation of the project will involve the following main activities:

- Mobilization/demobilization which will include construction campsites and construction units, materials preparation yards; transport of construction materials, machinery and equipment storage yard
- Transport of construction machinery, and equipment to the site
- Sourcing/preparation and transport of construction materials
- Construction and/or rehabilitation of bridges and culverts
- Earth works including excavation/and filling and compaction

- Creation of storm water drainage channels, intersection, etc

The following staffs are anticipated to be recruited for the project:

- Engineers for general supervising construction works
- Technicians for supervision of artisans
- Artisans specialized in woodwork, concrete works, metal work,
- Operators and drivers to operate construction machinery and equipment and heavy duty as well as light vehicles
- Supporting staff who will include accountants, account clerks

During project construction, the following construction materials will be required:

- Natural gravel from borrow pits
- Crushed aggregates from hard rock quarries
- Cement
- Sand from sand pits
- Base and sub-base materials from borrow pits
- Asphalt
- Water from river and or boreholes
- Timber as formwork and shutters for concrete works
- Steel as reinforcement for reinforced concrete works as well as shutters

The following facilities will be required during construction:

- Housing Facilities
- Power Plants
- Water Supply
- Diversions and Access Roads

The following machinery, equipment, and vehicles will be used during construction work:

- Earth moving equipment
- Construction machines
- Heavy duty trucks and dump trucks, and light duty vehicles
- Wood working machines and reinforcement working machines (bar benders/cutters etc)

The following infrastructures will be required during construction:

- Mechanical workshop for repair of construction machinery, equipment, and vehicles
- Fuel storage tanks for storage of fuel
- Water storage tanks for campsite use

- Housing, mostly for skilled labourers who are expected to come away from the neighbourhood of the villages for skilled labour.
- Storage facilities for construction machinery, equipment and vehicles, construction materials (cement, asphalt, paints, timber etc) etc

ENVIRONMENTAL SETTINGS

Topography: The topography of the project road is characterised by slightly undulating, rolling hills and an extensive relatively flat land. The altitudes vary from 1280 to 2,540 m ASL.

Climate: The annual rainfall ranges from 600 mm - 1,200 mm. The average temperature of project area is 26^o C

Geology and Soils: The geology of the project area is dominated by granite rock. The soil along the project road is dominated by clay soil, mostly black cotton soil.

Land Use: The most common land uses along the corridor are grazing and wildlife conservation areas. Other land uses are residential, commercial and institutional, and to a small extent arable agriculture.

Flora: The natural vegetation of the project area is generally characterised by grasslands, bushed grasslands, wooded grassland, and woodlands mosaics. There is neither protected nor endangered species in the project area.

Fauna: The most important fauna of the project area is wildlife. Others are cattle and goats. The project road passes through three important ecological zones, which are very rich in wildlife. The zones include an open area between Natta-Mbiso village and River Robana; Loliondo Game controlled area and the Serengeti National Park.

Surface Water Resources and Hydrology: The project road traverses through four main river systems, namely Robana, Grumeti (located in Serengeti National Park), Manchira, and Polelet.

Ground water Resources:

There is an abundance of groundwater resources in most of the villages between Natta and Mugumu. This is evidenced by the presence of shallow wells and deep boreholes. However, most of the shallow wells provide water seasonally. This is an implication that water levels drop very significantly during dry seasons. The numbers of deep boreholes are limited, due to geological nature of the study area, that the parent granite rock materials create difficulties in drilling deep boreholes.

Public Utilities and Services: The main public utilities are water supply and electricity facilities. Major sources of potable water are deep boreholes, shallow wells, traditional open wells and open spring. However, most of the villages along the corridor do not have reliable domestic water supply. Regarding electricity supply, only Mugumu and Kisangula villages have reliable supply of electricity, since they are connected to TANESCO national grid.

Cultural and Archaeological Sites: The only cultural site along the road corridors are burial sites.

POTENTIAL ENVIRONMENTAL IMPACT AND MITIGATION

Positive Impacts

Improved Management of wildlife conservation area: Improvement of the road will improve management of the National park as well as game controlled area by improving the mobility of the management team of the national park and reserves, especially

the ant poaching team. This will be a high long term positive impact since it will be felt throughout the life time of the project.

Improve ambient air quality: Upgrading of the road to bitumen standard will improve ambient air quality, since generation of dust will be minimized.

Improved Roadside drainage: Improvement of such structures as bridges and culverts cross-drainage facilities as well as roadside drainage, will improve road side drainage since water stagnation within and on roadsides will be eliminated.

Reduced Operation and Maintenance cost: Upgrading of the road from gravel/earth road to a paved standard will result in the decrease in vehicle operational cost due to absence of potholes and corrugations.

Travel Time and Comfort: Upgrading of the road will very much reduce travel time between Musoma and Mtwambu, since vehicles will be able to travel at higher speeds, let alone due to shortening of travel distance. In addition, will improve comfort to passengers.

Creation of employment: The project will create employment to local people as well as new comers, for both skilled and unskilled labour.

Negative Impacts

Friction between local people and workers: This will be due to sharing of resources and social services between local and project workers. This can be minimized by sitting workers camp away from existing settlements. In addition, the camp should be furnished with all necessary services to avoid frictions

Production of noise and vibrations: This will be caused by construction machinery, equipment, and vehicles during transport, and processing of construction materials. Noise and vibrations will also be caused by construction activities, as well as blasting of rocks. Noise and vibrations may scare and cause migration of animals in national park and game controlled area. Increased traffic volume during operation phase of the project will also be increased. The impact can be minimized through the use of ear plugs, avoidance of blasting near human settlements as well as sitting of stationery machinery and equipment away from game reserves and national park.

Increased Accidents: This will be due to increased movements and impairment of vision due to dust during construction. Increased accidents will be due to speeding vehicles during operation phase of the project. Accidents will cause mortalities to human beings, animals in the national parks as well as game reserves. The following are suggested to abate the impact:

- Installation of sign boards to warn the public about the dangers
- Restriction of public from coming close to operational plants
- Shielding of moving plants and machinery for safety
- Provision of "zebra" crossing in potential "black spots"
- Provision of speed humps before and after resettlements, and national park and game reserves

Deterioration of Air Quality: This will be due transport, stockpiling of construction materials, and fumes and dust from construction machinery, equipment, and vehicles. The impact can be mitigated through:

- Sprinkling water on the construction site to reduce dust

- Switching off machinery, equipment, and vehicles when not in use
- Locating bituminous mixing plants away from residential houses
- The use of masks by workers to prevent them from inhaling dusts and fumes

Loss of scenic and Visual Quality: Loss of scenic and visual quality will be caused by stockpiling of construction materials and borrowing activities. The impact can be mitigated by locating borrow pits so that they are not visible from the road, landscaping should be done on the sides of the road

Loss of Vegetation and Farmlands: This will be due to camp sitting, road expansion, creation of diversions, borrowing activities. To reduce the impacts, it is proposed that unnecessary removal of vegetation cover should be avoided. If removal of vegetation can not be avoided then cleared vegetation to be reinstated with natural species immediately after construction

Loss of Properties: This will also be caused by displacement, and resettlements as a result of widening of the road. To mitigate the impacts it is proposed that existing laws pertaining to construction along road alignments should be enforced. Where necessary, negotiable compensation should be done before project's implementation. In addition, affected people to be given time for salvaging useful materials

Surface water and Soil Pollution: This may be due to accidental spillage/leakage of hazardous materials, and sedimentation into rivers during construction along/across rivers. To mitigate the impact, it is proposed that:

- To avoid concrete works close to water courses. In addition, concrete handling equipment and vehicles should be done away from water courses
- Servicing and re-fuelling of equipment to be done at contractor's yard
- Machinery and equipment working near water courses should be properly serviced to avoid oil spillage

Modification of water table: This may be due to excessive excavation or construction of embankments structures. To reduce the impact, it is proposed that whenever possible, fill materials should be imported from high areas rather than adjacent to the road alignment

Disruption/destruction of public utilities and services: Construction activities may call for relocation of such public utilities as water wells, and power utilities, construction of detours or access roads (to construction materials) may disrupt or destroy the services. To mitigate the impact, where possible all public facilities likely to be affected should be relocated before start of construction activities. Domestic water wells should be compensated.

Increased consumption of energy and natural resources: Increased consumption of energy during construction may be in the form of fuel, lubricants for construction machinery, equipment, and vehicles uses. Increased consumption of natural resources during construction will also be in the form of charcoal and fuel wood fuel. During operation phase of the project, access to natural forests will be improved. Increased consumption of natural resources will be in the form of fuel wood and timbers. To mitigate the impact, the following are proposed:

- Unnecessary idling of construction machinery, equipment, and vehicles should be avoided

- Encouraging carpooling or van pools among construction workers
- Construction staging areas should be located as close as possible to work sites
- Existing legislation pertinent to management of forestry should be enforced,

Destruction of grave yards: This will be due to widening, construction of detours, and access roads. The mitigation measure should be excavation and relocation of the graves to new site.

Impact to Wildlife: With improved road as well as shortened travel distance, a lot of traffic will be diverted to this new road. This may lead to increased poaching activities as well as disposing of solid wastes from park visitors unless management strategies are adopted to prevent environmental damage caused by off-road driving. Road improvement may also result into increased disruption of wildlife corridor, hence resulting into:

- Animals ceasing to use the corridor as they become reluctant to cross the road
- Increased mortality due to collision with speeding vehicles;
- Delays in animal migration leading into fragmentation of animal habitats and so weakening or disappearance of an entire generation of a given population.

It is recommended that a series of three bumps spaced at 100 m apart be constructed across the road. Other mitigation measures should be to install road signs as well as constructions of underpasses to allow animals to cross the project road, especially at migration routes.

Increased poaching activities: Improvement of the road will improve access to national parks and game reserves, which may cause increased poaching activities. The proposed mitigation measure is to enforce existing laws and by laws pertaining to management of wildlife

Road destruction by wild animals: During operation, migrating animal groups may cause road destruction at points where the animal migration routes intersect with the project road. Road destruction will be caused by impacts of animal hooves/weight, especially wildebeest. It is recommended that special design (extra strength), in terms of road strength be made at points where migration routes intersect with the project road. In addition, it is suggested that approach roads of about 6 metres be provided on both sides of the project road at the intersection points.

CONCLUSION

The study has showed that the project will have both positive and negative impacts. However, the negative impacts can be mitigated. In addition, comparison of "NO Project" and "Project" alternatives indicate that the "No Project" alternative will have highest impact as compared to the "Project" alternative. The study has concluded that upgrading of the road to bitumen standard is the best option compared to the existing gravel road. A total of Tshs 317,800,000/= will be required to mitigate potential environmental impacts.