SUMMARY OF THE ENVIRONMENTAL IMPACT ASSESSMENT

N3 TOLL ROAD PROJECT

SOUTH AFRICA

March 1999
South Africa : N3 Toll Road Project
Environmental Impact Assessment Summary

The Project

The National Route (N3) is the most important commercial road in South Africa, carrying freight and acting as a tourism conduit between the two most important provinces in South Africa (see attached figure). In order to continue providing a high quality transport service, the South African National Roads Agency (NRA) has awarded the 30-year Concession to the N3 Toll Concession (N3TC) Ltd. to design, construct, operate, maintain and finance 420 km section of the N3 route between Cedara in KwaZulu-Natal and Heidelberg in Gauteng. The toll road concept makes the user pay principle, and in so doing, money can be borrowed to build the road. Over the period of operations and maintenance the toll money received goes towards maintaining and managing the road and the redemption of the loan. The improvement of the N3 Toll Road involves the following to be achieved during the initial 3 year of the Concession:

- Widening, rehabilitation and upgrading of certain sections of road such as the duelling of Heidelberg to Villiers;
- Realignment of certain existing provincial and access roads specifically between Heidelberg and Villiers;
- Construction of new toll plazas;
- Construction of auxiliary works, e.g., bridges and drainage structures;
- Routine maintenance; and
- Operation of toll road including the collection of tolls.

The project would also include the construction of a new alignment of road (98 km) between Keersfontein and Warden over De Beers Pass, if the traffic levels reach 13,900 vehicles per day. Under present traffic pattern forecast, the trigger traffic of 13,900 vehicles per day would be reached in the year 2008 or 2009.

The Bank plans to participate in the financing of the initial phase of the project only. The financing of the De Beers Pass section will either be financed by N3TC from its internal cash or arrange a new independent financing package acceptable to the present lenders including the ADB.

Statutory Requirements

Compliance with Environmental Requirements of the Concession Contract are governed by the principles of Integrated Environmental Management (IEM) and requires compliance with the South African Government’s Environmental Impact Assessment Regulations (Ref.1), Section 21, 22 and 26 of the Environmental Conservation Act (Act 73) of 1998.

To comply with this Act, N3TC in 1998 appointed an Independent Environmental Consultant (IEC) to carry out studies into two main areas of concern, social and biophysical. IEC together with a range of specialists have carried out the biophysical and socio-economic studies including the public consultations. As required by the Department of Environmental Affairs and Tourism (DEAT), a Scoping Report (Ref. 2) comprising significant specialist input has been submitted to them for environmental permits. An Environmental Management Plan (EMP) to accompany the Scoping Report has also been prepared by the IEC and
submitted for comments to the Concessionaire, NRA and various stakeholders. It is expected that the final EMP will be submitted to the DEAT by the middle of March 1999. It is anticipated that DEAT would evaluate the report and issue a permit.

**Project Alternative**

The traffic flow data for the N3 Toll road indicate that an improvement of the carrying capacity of the road network is essential. The macro-economic study reflects that the need for an upgrade of the existing N3 toll road is justified and failure to upgrade the road could cause unreasonably high adverse impact on the development potential of both the Gauteng and KwaZulu-Natal areas.

Several alternatives to the De Beers Pass route were investigated in terms of cost-effectiveness, achievable geometry, and environmental and social impacts. The De Beers Pass route was found to be the best alternative.

**Environmental Impact Assessment Approach**

An earlier report titled, “An Environmental Assessment of the Route Keeversfontein to Warden” prepared in September 1997 by the Institute of National Resources (INR) was valuable and facilitated the compilation of the current environmental investigation in that it identified critical environmental and cultural aspects that would be affected by the route. The approach, therefore, involved building on the INR’s findings. Twelve specialists were appointed to investigate further the environment and economic issues of the whole road with particular focus on the greenfield corridor “De Beers Pass Route”. An integration workshop was held with the specialists to ensure the integration of the multifaceted environmental issues.

The specialist studies (Ref. 3) that have been carried out for the project include the following Biophysical and Social studies:

*Biophysical* : Air Quality; Noise; Archaeology; Aesthetics; Geology and Soils; Biota and Wetlands; and Hydrology and Water Quality.

*Social*

The Social Impact Assessment study addresses all those aspects that relate directly to the social well being and cultural heritage areas through which the road will pass. A Public Involvement Program (PIP) was undertaken to identify, record and respond to the issues raised by the interested and affected parties (I&APs). The PIP process involved the development of a communication strategy covering press releases, distribution of pamphlets and newsletter, stakeholder liaison meetings, public meetings, liaison with interested and affected parties (I&AP), and setting up of a communications/public relations centre.

The social investigation covered potential loss and creation of business opportunities, employment opportunities during construction, spread of AIDS, and public’s input on all river crossings with special cognizance of wetland and other sensitive areas; public pedestrian and animal crossings in defined areas; and a traffic safety plan.
Environmental Impact Findings and Proposed Mitigation

Summary

In general, the Initial Works and the Upgrade, Repair and Replacement Works are likely to have relatively low environmental and social impacts. The majority of the works are located in the existing road reserve and they consist of widening the existing highway. The majority of the impacts are associated with encroachment on already degraded small-size wetlands in the road reserve areas. The mitigation would involve minor realignments to avoid the wetland areas or construction of new wetlands so that there is no overall loss of area. The works would also involve rehabilitation of already degraded wetlands. These works are not expected to result in any significant additional cost.

De Beers Pass route, on the other hand, can potentially result in significant impacts, as it will be a new road alignment through green-field corridor (essentially farms) in the countryside. The base route suggested in the bid document has received the benefit of a biophysical assessment carried out by the Institute for Natural Resources. Additional studies undertaken by the IEC have recommended possible minor modifications to the alignment to further reduce negative environmental impacts associated with the route selected by the NRA.

The project will not involve resettlement as most of the existing route is in the road reserve area. Some sections of the new road passing through farms would require relocation of farm houses and buildings. The project includes appropriate compensation for land expropriation/acquisition.

More detailed discussion of environmental and social impacts as well as the proposed mitigation is given below:

a) Air Quality

During the process of construction and operation of the N3 road, air quality will be adversely affected by dust primarily during construction period and by other petroleum emissions during operational period. Dust mitigation measures will be required during construction activities (e.g. regular wetting down of areas) to prevent dust levels exceeding South African Air Quality guidelines.

Under the operational condition impacts of CO and NO\textsubscript{2} would be confined to the road reserve and are unlikely to exceed South African Air Quality guidelines. The public will be informed not to use grass from the road reserve for grazing or cattle fodder due to contamination by particulate lead.

The most serious air quality impacts are associated with the toll plazas and a new tunnel. Mitigation measures would include maximizing plaza areas; ensuring smooth traffic flow during peak periods; ventilation for toll booths; and selecting plaza locations at sufficiently large distances from existing residential and industrial development. Ventilation fans will be installed in the tunnel to increase circulation of air so as not to adversely affect the motorists using the tunnel.

It is expected that the lead content in the vehicle fuel emissions will generally decrease by the time of construction and operation of the De Beers Pass route.
b) Noise

As is typical with road projects, increase in traffic on the N3 road will increase the noise level. This will be particularly felt along the proposed De Beers Pass route due to the existing rural acoustical environment compared to the business and industrial districts along the existing route. Towns along the existing Warden/Harrismith/Van Reenen/Keeversfontein route will benefit from reduced traffic noise once the new De Beers Pass route becomes operational.

While there is no ideal and inexpensive solution for the problem of road traffic noise, a number of practical solutions will be adopted. Interested and affected parties along the new De Beers Pass route will be advised to relocate noise sensitive facilities near the road reserve, and to refrain from developing any new noise sensitive facilities near the road reserve. For the existing facilities, which can not be avoided, construction of noise barriers (brick walls or earth berms) will be considered for certain sections to provide a screening effect.

The toll plazas would be manipulated to encourage heavy vehicles to use the new De Beers Pass route (especially during night-time) to further reduce the noise impact on towns like Warden, Van Reenen and Harrismith along the existing route. Permanent noise sources like ventilation fans in the tunnel will be subjected to acoustical analysis. The noise reducing asphalt road surfaces have been proposed but may not provide an economic solution.

The expected noise increase during construction period will be minimized by properly choosing construction camp sites, and selecting construction and maintenance equipment with optimum noise characteristics in mind.

c) Archaeology

The original archaeological survey recorded several archaeological sites along the proposed route. The archaeological sites are protected by two pieces of legislation: the National Monument Act of 1969, and the KwaZulu-Natal Heritage Act of 1998. The new re-aligned route only impacts nine archaeological or cultural sites. However, with a proper management plan, these sites can be saved. Only one site (Union Jack Plantation) is of high significance and it has been recommended that the road be re-aligned to bypass it.

It is possible that additional archaeological or palaeontological finds may be discovered during construction, for example along the new road from Warden to Keeversfontein. The mitigation required will vary from site to site. The project has made provision for archaeological inspection at critical areas during commencement of earthworks. If such sites are discovered, they will be fenced off and access to them will be forbidden. Small-scale test pits will be excavated and all the structural details will be accurately mapped and photographed before relocating the discoveries. Furthermore, monitoring of archaeological sites is the responsibility of the heritage agencies in the respective provinces, the agencies will ensure that the work will be performed correctly and that the developer has complied with the permit requirements.
d) Aesthetics

The toll road and the associated structures will exert a major influence on the visual environment of certain sections of the road, particularly the De Beers Pass route. This is because visual quality of the route has a high aesthetic value created by the dramatic mountains, valleys, ridges, waterfalls, wetlands, etc. The greatest contribution to the visual impact in the daytime will be the new landforms that will be created by cuts and fills and the construction of new toll plazas. The mitigation would require that the new landforms be formed so as to blend into the existing landforms. This may take the form of flatter slopes but generally the interface of the cut and fill area will be contoured to blend visually with the existing landforms.

At night the lights of vehicles and the floodlights of the toll plazas interchange will detract from the rural ambience. The design requires that at the new toll plazas, the lighting be directed downwards. The safety and security lighting will be specified to limit “light spoil” beyond the defined area of effectiveness. The toll plaza structures and buildings would be designed so as to be effective and of appropriate colours to blend in with the surrounding environment. Where necessary, the toll plazas will be relocated to less visible position on the road.

There is one area of De Beers Pass where the existing alignment would have a significant visual impact in an area with high scenic value. This area is located to the north of the tunnel where the alignment runs along the top edge of a deep gorge and requires a retaining wall. One possible realignment may involve a longer tunnel that would result in substantial additional costs, as well as expropriation of additional land. N3TC is further evaluating this alternative.

On a positive aspect, the new route having dramatic views of the landscape opens up large areas previously not generally accessible to the road users and tourists.

e) Geology and Soils

The geology and soils along the entire route, but more particularly along the De Beers Pass route, are vulnerable to erosion once disturbed. The critical period in the road development is therefore the construction phase. The most critical and sensitive area along the entire route during the construction, will be the section from the Lincoln interchange to Warden north. This area is susceptible to sheet and gully erosion. There are also areas along the route from the Keeversfontein to the De Beers Pass tunnel where the balance between the vegetation and soil is delicate.

The recommended mitigation include vegetation removal and the erection of buildings to take place simultaneously and in stages, to ensure that no large tracts of land are left exposed. Vegetation clearance will be kept to a minimum during October – March (rainy season) on steep slopes. In all cases, velocity of surface run-off will be decreased. All outlets to drains will be designed to dissipate the energy of water at exit of the structure. This would be done using gabions or special mattress at the point of discharge. Soil stabilization using erosion control fabric or grass seeding and mulch would be used to hold the material in place.
f) Biota and Wetlands

The project does not traverse any formally protected areas, or national monuments, nor South African Heritage sites. The project route passes through wetlands on the De Beers Pass route, but none of which is of National or International importance. However, as the wetlands constitute valuable wildlife habitats that could be affected by the construction and operational activities, project design will incorporate appropriate mitigation.

The wetlands will be avoided by re-routing sections of the road, where possible, and minimised by realigning the road out of the valley bottoms. Where it may not be possible to realign the route, bridges/culverts/drains will be constructed to fit landscape profile to reduce erosion and wetland destruction. Mitigation would also include opportunity of creating in other nearby locations, wetlands similar to those that have been impacted or rehabilitating existing wetlands in other locations. Management plan would include the implementation of alien plant control.

No Red Data animal or plant was identified in the path of the project. However, among South Africa’s rarest birds – the Whitewinged Flufftail – has been recorded near the project area, in Kiesbeen-van Reenen district. A pair of Endangered Wattled Crane was recently reported in the same district. Trespassing and hunting activities would be strictly forbidden in these areas.

The other sensitive area is the Grootvlei Pan, which is a bird sanctuary. This will be preserved by rerouting the road to the west.

g) Hydrology and Water Quality

The entire route lies within the area having most of the water resources of South Africa. Major catchments include the Mgeni, Tugela, Klip (Ladysmith), and Vaal and Wilge Rivers. Although the normal operations of the road on its own are not expected to threaten these resources, the significance of these nationally important resources was borne in mind when designing the project.

Impacts due to the existing sections are expected to be small. With the exception of hazardous spillages and road refurbishment activities, the impacts will generally be limited to ongoing localised problems.

Impacts due to new section of the road will be more significant during both the construction and operation of the road. The areas likely to be impacted include wetlands, upland watercourses, and farm reservoirs in particular. Impacts on groundwater resources are likely to be localised if they occur.

Mitigation therefore will focus on management and maintenance actions that should be adopted. Hence, the establishment of various management plans will be undertaken at an early stage to ensure the proper maintenance of the mitigation facilities. The management plans will include maintenance, construction and incident (hazardous spillage) management.

More specifically, maintenance of the drainage system and watercrossings will be planned for at road design stage. Direct discharges/oufalls to watercourses will be avoided. Oil traps
would be incorporated into the drainage system at road junction and high risk ‘hot spots’. Silt traps will be considered where there is risk of high sediment loading.

Construction sites will be secured, and fuel, cement, bitumen, waste and other storage areas will be properly controlled. Fuel and oil storage sites will be bunded. Major construction activities will be restricted to dry seasons.

h) Social Assessment

There are no social issues of highly negative significance, which should prevent project authorization. Nevertheless, a range of issues was identified during Social Impact Assessment and Public Involvement Program (PIP). These have been categorized into four themes, economic, safety, environment, and water. The negative economic issues include impact on local business, increase in toll fees, decrease in arable and grazing land, disruption of farming activities, induced migration, etc. Positive economic impacts include employment creation, opportunities for small to medium size enterprises and tourism.

The negative safety issues include increase in crime, fencing, fire hazards, and pedestrian traffic. Positive safety impacts include higher road safety and better traffic flow.

Related to environmental and water issues, negative impacts include loss of cultural-historic sites, noise, loss of privacy, borrow pits, construction camps, loss of farm reservoir, water pollution, silting of wetlands, etc.

The mitigation actions have been incorporated into the Environmental Management Plan to minimise negative impacts, optimise positive issues and guide planning and decision making in changing environment, and undertaking effective monitoring throughout the project life cycle.

The Public Involvement Program (PIP) was conducted in line with environmental legislation to inform and seek input to the social impact findings. The PIP has provided the majority of interested and affected parties (I&APs) with the opportunity to participate meaningfully in the development of the Integrated Environmental Management process. Goodwill has been generated amongst I&APs as they are relieved that information regarding the upgrading of the N3 and the proposed De Beers Pass route has been made public after a long time lapse from when they first heard about the project.

Some environmental groups had earlier perceived that impacts on wetlands and associated ecosystems have not received sufficient attention. Representatives of these groups were given the opportunity to visit the existing road and the proposed new route through the De Beers Pass. It was observed that the EIA has taken into consideration the wetlands, their role in the hydrological cycles of the affected areas and the existing ecosystems. These site visits have put the minds of the representatives of the environmental groups to rest.

The PIP will run the full 30-year concession period. Procedures will be established for I&APs to continue to have input into the project design, any future environmental investigations, and management and monitoring of impacts.
Environmental Management and Monitoring

As required by the environmental act, an Environmental Management Plan (EMP) has been drawn up by the IEC. The plan outlines in detail mitigation measures to be undertaken for environmental impacts likely to result during the construction, operational and maintenance phase of the project. The EMP also incorporates social change programs to manage the impacts and issues identified in the Scoping Report.

The Environmental Officer (part of N3TC), Independent Consultant and Independent Engineer will monitor the implementation and effectiveness of the mitigation measures.

The EMP and its implementation will be audited by the External Reviewer for effectiveness and quality control.

Project Permitting Risks

The main project risk centre on potential delays and possible additional costs in obtaining the necessary permits and additional construction costs incurred through realignment or mitigation works. The risk related to potential delay in obtaining environmental permits for the Initial Construction Works is considered to be low as the N3TC has addressed all the relevant issues supported by detailed specialist studies and associated design changes.

The delays in obtaining environmental permits for De Beers Pass could result from the authorities requiring additional time to consider any new public challenges. As the construction of De Beers Pass is not expected to commence until approximately 8 years, there is a risk of public challenges to the existing scheme at anytime in that period. However, considering that the N3TC has a high level of professional competency and has set up a monitoring process, this risk is considered to be of medium ranking. The Concession Contract contains provision for the Concessionaire to use all reasonable endeavours to procure the permits and to expend up to ZAR 10 Million in this process.

Environmental Loan Conditions

A loan condition will be included in the Bank’s appraisal report on N3TC’s obligation to the implementation of the mitigation measures laid out in the Environmental Management Plan.

Conclusions and Recommendations

N3 Toll road is certainly a major undertaking by N3TC. The project can potentially result in a wide range of adverse environmental and social impacts. However, N3TC in compliance with the environmental regulations of the Government of South Africa, has diligently performed detailed environmental and social impact assessment studies to address all the relevant issues. The studies have been released to the Department of Environmental Affairs and Tourism for permit application. The information has also been provided to all the stakeholders in accordance with the environmental regulations related to public consultations. The EMP provides further assurance that N3TC will carry out the project in environmentally and socially sustainable manner.
It is recommended that Bank’s supervision mission ensure that the EMP is implemented properly. Furthermore, the Bank should conduct an environmental audit 2 to 3 years after the project completion.

References

3. N3 Toll Road Specialist Reports, Volumes 1, 2 and 3, Prepared by Cave Klapwijk and Associates for the N3 Toll Road Concession (LTD), January 1999.