

N2 WILD COAST TOLL ROAD PROJECT

**A SYNOPTIC COMPARISON BETWEEN THE
PROPOSED TOLL ROAD ROUTE AND THE INLAND ROUTE
ALTERNATIVE:
MTENTU TO MTAMVUNA RIVER**

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1. Proposed Toll Road Route

The proposed toll highway alignment between the Mtentu River and the Mtamvuna River traverses the terrain from 14 km inland at the Mtentu River, gradually moving closer towards the coast as it proceeds towards the Mtamvuna River bridge. The alignment is a fairly direct greenfields route and has a route length of 32,6 km. Extensive technical investigations show that this alignment is the most direct and cost effective route between the above start and end points. The alignment traverses mainly cultivated and fallow lands, existing district roads and access tracks with minimal impact on grasslands in their natural state. Whilst significant impacts have been identified at the Mnyameni River crossing, the agreed alignment results in localised impacts considered acceptable by the environmental consultants. This alignment was investigated previously in the early 1990s, due to possible developments south of the Mzamba River.

Numerous realignments have been undertaken during the route location stage associated with this alternative, mainly to avoid highly sensitive areas in the Msikaba Formation, and to minimise impact on the river gorges.

The crossing of the Mzamba River results in a 330 m long high level bridge structure. This is the narrowest acceptable gorge crossing avoiding the coastal estuary, and is also the location where the Mzamba villagers and communities south of the Mzamba River cross the river gorge. Further inland the gorge widens from vertical cliffs to a valley frequently in excess of 1 km width. Between the Mzamba and the Mtamvuna Rivers the alignment follows the natural boundary of the Mzamba Village and the Wild Coast Casino

2. Alternative Inland Route

The alternative inland route alignment (originally investigated in the mid 1980s) from the Mtentu River, remains 12 to 17 km inland before crossing the Mzamba and Ntlakwe Rivers approximately 16 km from the coast. This alignment then links into the existing R61 some 14 km inland from Mzamba Village. The overall route length of this alternative is 42,0 km, of which 26,5 km is greenfields construction, all within the Pondoland Centre of Endemism.

The horizontal and vertical alignment cannot be comparable to the proposed toll highway alignment in 1 above. The terrain to be traversed is much more undulating and broken. The first 20,5 km between the Mtentu and Mzamba Rivers a reasonable horizontal and vertical alignment can be maintained. However, the remaining 6,0 km length of greenfields alignment from the escarpment above the Mzamba River gorge to the link with the existing R61, traverses extremely rugged terrain, with wide deeply incised gorges in the Mzamba and Ntlakwe River valleys. In order to avoid the possible sensitive flora in the valleys and maintain the 120 km/h design requirements, the bridges crossing the Mzamba and Ntlakwe River gorges will be in excess of 600 m long. The crossings will require some approach viaducts to the major bridges, as well as viaducts to traverse some valleys.

The alternative alignment postulated in earlier investigations following existing roads was a 70 km/h alignment over this rugged section, and upgrading this to 120 km/h will be more expensive than the proposed inland alignment on the attached plan.

The existing 15,5 km length of R61 will require widening from 8,4 m to 12,4 m and several sections will require horizontal and vertical upgrading. This is due to the existing road having extremely substandard vertical and horizontal alignments, as well as a light pavement in very poor condition. In addition, due to the peri-urban populations in Mahlatini, Seaview and Mzamba Village areas, dualling, safety aspects and pedestrian facilities will have to be incorporated in the design for the 6,0 km section from Mahlatini to the Wild Coast Casino boundary. The retro fitting of a major national route with an 80 m road reserve along this portion of the R61, which has developed on a linear, fairly high density residential corridor (with a number of businesses) will be highly problematic both from a technical and social perspective.

In order to control access onto the national route to locations that are safe and have good advance visibility, a parallel frontage road network will be required, either adjacent to the national road or some distance away. Either frontage road location will be difficult to achieve since the R61 and its associated housing tend to be located on the fairly flat watershed terrain and the frontage road would either require extensive expropriation of houses/ properties or the location of the frontage road into fairly rugged terrain which would be expensive to construct and environmentally intrusive. Thus in summary the

section from Mahlatini to the Casino will require extensive land acquisition and the relocation of more than 250 houses and businesses to obtain the 80 m road reserve width in the peri-urban areas traversed. In addition, an extensive frontage and access road system would have to be constructed to meet the local accessibility and safety needs of the local communities which would require further houses to be expropriated.

3. Alignment Comparison

The table below details the comparison between the two routes.

Table 1: Alternative Alignment Evaluation

Evaluation Criterion / Parameter	Proposed Toll Highway Alignment	Proposed Inland Alignment
Highway Criteria		
Route Length	32,6 km	42,0 km
Design Speed	120 km/hr (except last 2 km on existing R61)	120 km/hr (except last 2 km on existing R61)
River Structures (Deck length)	Mnyameni (210 m) Kulumbe (210 m) Mpahlane (145 m) Mzamba (330 m)	Mnyameni (±80 m) Mnyameni tributary (±40 m) Maqongwane (±60 m) Bazane (±100 m) Mzamba (±700 m) Ntlakwe (±600 m)
Total Bridge Deck Length	895 m (Accurate Survey, 1:1 000)	±1580 m (No Accurate Survey, 1:50 000)
Vertical Alignment	All grades less than 5% Generally less than 3%	Steeper grades on greenfields section, problematic on rugged mountainous section. Sub-standard steep grades on existing R61. (9,3% in sections).
Horizontal Alignment	Minimum radius 720 m except for last 2 km on existing R61 which is common to both alignments	Minimum radius 530 m, much more curvilinear alignment. Problematic to achieve required horizontal design standards on rugged and peri-urban sections.

Evaluation Criterion / Parameter	Proposed Toll Highway Alignment	Proposed Inland Alignment
Social Criteria		
Road Safety	Safer alignment, better horizontal/ vertical alignment characteristics and fewer pedestrian problems.	Pedestrian safety major problem in peri-urban areas of Mahlatini, Seaview and Mzamba
Social Impact	Impacts on <100 households	Impacts on >250 a few households and businesses
Cost-Economic Criteria		
Construction Costs	Least cost alternative	±R380 m more expensive than Toll Road Route (See Annexure 1)
Road User Costs	Least cost alternative	±R33 m more/ year than Toll Road Route ⁽¹⁾
Maintenance Costs	Least cost alternative	±R0,47 m more/ year than Toll Road Route ⁽¹⁾

(1) Road user and maintenance cost for the first year of operation, which would increase by between 3-4% per annum over 30 year concession period.

4. Conclusion

From the above comparative table it is clear that the proposed Toll Road Alignment is far superior to the Inland Route alignment. Some key points to note are:

- It is the more direct route being 9,4 km shorter, which has major construction cost, road-user and road maintenance benefits both from a regional and national perspective.
- The direct alignment will add to the regional network and not interfere the function of the existing R61 which acts as the local access route.
- It will be the safer route since it has better horizontal and vertical alignment characteristics and passes through areas of low residential densities.

ANNEXURE 1

N2 WILD COAST TOLL HIGHWAY COST COMPARISON – PROPOSED TOLL ROAD ALIGNMENT AND INLAND ROUTE ALTERNATIVE : MTENTU TO MTAMVUNA RIVER

1. Proposed Toll Road Alignment

Mtentu to Mtamvuna length is 32,6 km.

Deduct 895 m for length of structures, and 2,0 km for the common length of R61 from the Mzamba Village/ Wild Coast sun boundary to the Mtamvuna River.

Costs: Roadworks R10,0m/km, structures R10 000/m²

Cost Estimate :

Roadworks	29,7 x 10,0	R297,0 m
Bridges	13,6m x 895m x 10 000	<u>R121,72 m</u>
		<u>R418,72 m</u>

2. Inland Route Alternative

Greenfields lengths	26,5 km
Less	- 0,28 km small bridges
	- 0,40 km viaducts
	- 0,60 km large span bridges
	- 0,70 km bridges
	- <u>4,70 km</u> rugged terrain
Greenfields length	- <u>19,82 km</u>

Existing road length is common 2,0 km described above costs.

Roadworks	-	rolling terrain R10,0 m/km
	-	rugged terrain R15,0 m/km
Small structures	-	R8 000/m ²
Bridges	-	R10 000/m ²
Large span bridges	-	R20 000/m ²
Upgrade and realign existing R61	-	R8,0 m/km
Dual carriageway section – additional	-	R8,0 m/km
Frontage roads (surfaced)	-	R2,0 m/km
Internal roads to peri-urban area (gravel)	-	R0,3m/km
Pedestrian/cattle overpasses	-	R2,0 m
Agricultural overpass	-	R3,0 m
Houses	-	R20 000
Business	-	R100 000

Cost Estimate:

Roadworks - rolling	19,82 x 10,0	R 198,20 m
- rugged	4,7 x 15,0	R 70,50 m
Structures - small	280 x 13,6 x 8000	R 30,46 m
- viaducts & bridges	1100 x 13,6 x 10 000	R 149,60 m
- large span bridges	600 x 13,6 x 20 000	R 163,201 m
Upgrade existing R61	13,5 x 8,0	R 108,00 m
- dual section	6,0 x 8,0	R 48,0 m
- frontage roads	6,0 x 2,0	R 12,0 m
- internal roads	10,0 x 0,2	R 2,0 m
Relocate services – sum		R 2,0 m
Pedestrian overpasses	2 x 2,0	R 4,0 m
Agricultural overpasses	2 x 3,0	R 6,0 m
Land acquisition - houses	140 x 0,02	R 2,8 m
- businesses	10 x 0,1	R 1,0 m

R 798,47m

Additional estimate cost R798,47 m – R418,72 m = R379.75 m

The above comparative estimates are based on the following :

1. The greenfields sections will have similar costing for the rolling sections, as well as a similar number of cross accesses, intersections and similar small drainage.
2. The inland alternative measurements are established from 1:50 000 mapping information.
3. The 1:50 000 mapping and aerial photography show that the terrain to be traversed is much more rugged than where the proposed route is located. A comparable 120 km/h alignment may thus not be possible.