PART D:
ASSESSMENT OF SPECIFIC PROJECT-SCALE AND TOLL FUNDING-RELATED ASPECTS

Part D of this report comprises two chapters providing an assessment of specific issues relating to vegetation and flora, aquatic ecosystems, social, traffic diversion, noise, air quality, tourism and economic aspects at a project scale and/or in relation to toll funding, as follows:

- **Chapter 14 – Vegetation and flora, aquatic ecosystems, social, traffic diversion, noise and air quality:** Assesses, as appropriate, specific issues relating to vegetation and flora, aquatic ecosystems, social, traffic diversion, noise and air quality aspects at a project scale and/or in relation to toll funding; and

- **Chapter 15 – Tourism and Economic:** Assesses, as appropriate, specific tourism and economic issues at a project scale and/or in relation to toll funding.

CHAPTER 14 VEGETATION AND FLORA, AQUATIC ECOSYSTEMS, SOCIAL, TRAFFIC DIVERSION, NOISE AND AIR QUALITY

This chapter assesses, as appropriate, specific issues relating to vegetation and flora, aquatic ecosystems, social, traffic diversion, noise and air quality aspects at a project scale and/or in relation to toll funding. The assessment of potential impacts is based on the findings of the relevant specialist studies undertaken during the EIA process. The proposed project is also evaluated in terms of ecological, social and economic sustainability in light of the findings of the assessment of potential impacts. The respective specialist reports provide detailed descriptions of the study approach followed, the identified risk sources and potential impacts – see Volumes 2 to 4.

14.1 VEGETATION AND FLORA

The following specific project-scale issues relating to vegetation and flora are highlighted below:

- Impacts associated with a reduction in the extent of components of the PCE;
- Impacts associated with a reduction in the opportunity to undertake effective conservation, biodiversity conservation planning or establish conservation areas in the region;
- Impacts associated with fragmentation of habitat and barriers to movement due to the road passing through areas of untransformed natural habitat;
- Impacts associated with the potential for ribbon development along new roads and in areas that would become accessible from new roads;
- Impacts associated with the reduction in resilience/stability of plant communities and ecosystems due to impacts generated by the road;
- Impacts associated with the disruption of the linear flow of nutrients and materials by road infrastructure leading to the interruption of biogeochemical cycles; and
- Ecological sustainability of the proposed project.

Impacts associated with a reduction in the extent of components of the Pondoland Centre of Endemism

Potential direct impacts of the proposed new road would not result in the reclassification of Pondoland-Ugu Sandstone Coastal Sourveld into a higher conservation category, but indirect and/or cumulative impacts (e.g. strip/ribbon/secondary development) may result in this vegetation type being reclassified from Vulnerable to Endangered. Some Transkei Coastal Belt forest will be lost between Ndwalane and Ntafufu, but this is insufficient to lead to a change in the conservation status of this vegetation type. Indications are that no species of special concern are likely to be impacted upon directly by construction of the proposed road to such an extent that they are re-categorised into a higher conservation category.

Impacts associated with a reduction in the opportunity to undertake effective conservation, biodiversity conservation planning or establish conservation areas in the region

As mentioned in Section 12.3.1, it is considered that both the SANRAL preferred and the Coastal Mzamba routes would not have a major impact on the potential to undertake biodiversity conservation planning in the PCE area. However, the Coastal Mzamba route would be more favourable in this regard.

Impacts associated with fragmentation of habitat and barriers to movement due to the road traversing areas of untransformed natural habitat

GIS analysis (see Section 6.4.4 of the vegetation and flora specialist report, Volume 2, Appendix 1) indicates that the PCE is already moderately fragmented and that neither the SANRAL preferred nor

Coastal Mzamba alignment would cause a great increase in the overall number of patches or "perimeter-to-area ratio" relative to the current situation, or a large decrease in the proportion of the PCE that is not directly influenced by a disturbance zone. The proposed new road would marginally reduce the proportion of the PCE occupied by the largest patch of untransformed vegetation (which includes the Mkambati and Tracor area). The proposed road is itself, however, a more significant barrier than those currently found within the study area. The continuous barrier posed by a highway and its associated zones of disturbance and related impacts, is much more problematic for maintaining ecosystem processes across these areas than the current disturbances found there. Plants and many animals are little affected by small fragments of cultivation and settlement. They have evolved to disperse/range across patches of unsuitable habitat. From this point of view, the fragmentation caused by the SANRAL preferred route is more severe than that posed by the Coastal Mzamba alignment.

Impacts associated with the potential for strip/ribbon/secondary development along new roads and in areas that become accessible from new roads

There are six sites within the PCE where there is a high likelihood of expansion of settlements due to the existing presence of roads and settlements and the proposed provision of intersections. Assuming that these expand on average by approximately 100-200 ha, this would result in approximately 600-1200 ha of direct habitat loss. Strip/ribbon/secondary development may also result along the coastline due to improved access resulting in increased coastal development. Assuming limited controls on coastal development and approximately 50 ha per site in the medium term, it is possible that up to 800 ha could become developed as resorts along the coast. The combined potential loss of habitat due to ribbon development and coastal resort development may be sufficient to reclassify Pondoland-Ugu Sandstone Coastal Sourveld from Vulnerable to Endangered vegetation type.

Impacts associated with the reduction in resilience/stability of plant communities and ecosystems due to impacts generated by the proposed new road

Secondary impacts, e.g. alien invasions, habitat fragmentation, and reduction in area of remaining patches, may promote reduction in resilience/stability of plant communities and ecosystems. If these secondary impacts can be controlled the overall impact on ecosystem resilience from the proposed new road would probably not be significant.

Impacts associated with the disruption of the linear flow of nutrients and materials by road infrastructure leading to the interruption of biogeochemical cycles

If mitigation measures for direct impacts on linear flows can be implemented then the overall impact of the proposed new road on the linear flow of nutrients and materials would probably not be significant. This would involve simple design issues, which would be relatively easy to implement, and potentially some additional construction costs.

Ecological sustainability of the proposed project

The findings of an evaluation of the ecological sustainability of the proposed project against a number of criteria (see Section 6.7 of the vegetation and flora specialist report, Volume 2, Appendix 1) is provided in Table 14.1:

Table 14.1: Evaluation of the ecological sustainability of the proposed project

SUSTAINABILITY FACTOR	EFFECT OF PROPOSED ROAD
Lead to loss of biological diversity - species, ecosystems	The proposed new road could potentially lead to some loss of biological diversity: unlikely to lead to change in conservation status of any species but may lead to change in conservation status of a vegetation type (Pondoland-Ugu Sandstone Coastal Sourveld) if all secondary impacts are realised. Consideration of the Coastal

SUSTAINABILITY FACTOR	EFFECT OF PROPOSED ROAD
	Mzamba alignment may also result in a change in conservation status in time.
Threaten key ecological processes	At a local scale, the road may threaten some key ecological process (increased runoff and disruption of the flow of nutrients and materials). This would occur to a greater degree for the proposed Coastal Mzamba alignment. At a regional scale the road may disrupt dispersal and migration processes in a coastal-inland direction.
Exceed thresholds, capacities, safe minimum standards, regenerative and/or assimilative capacities of natural systems	At a local scale, potential impacts (alien invasion, increased runoff and disruption of the flow of nutrients and materials) may result in thresholds being exceeded, but these can be controlled by the implementation of mitigation measures. At a regional scale the loss of habitat within Pondoland-Ugu Sandstone Coastal Sourveld could lead to a change in conservation status (Vulnerable to Endangered), which indicates that the threshold beyond which ecosystem processes and patterns can be maintained is being approached. This effect may be marginally less for the proposed Coastal Mzamba alignment.
Threaten life support systems	At a local scale, the proposed new road may threaten some key ecological process linked to life support systems, but this effect would dissipate quickly with distance from the road. At a more regional scale this effect would be less significant.
Threaten protected, important, unique, sensitive, irreplaceable, stressed, highly dynamic, rare or special areas	The potential threat of the road to *protected, important, unique, sensitive, irreplaceable areas* (the PCE and all its unique components) is potentially significant, especially in the absence of effective conservation management in the area. The effect would be the same for the proposed Coastal Mzamba alignment.
Exacerbate human-induced climate change	The proposed road cannot be considered potentially responsible for exacerbating human-induced climate change.
Lead to irreversible loss of natural capital	Due to the highly sensitive nature of the PCE as a whole, any loss of habitat may be considered to be incremental reduction in the ecological viability of the area. There would be loss of habitat due to direct and indirect impacts by the proposed new road which may be considered to be irreversible loss of natural capital that is potentially significant. The proposed Coastal Mzamba alignment would cause this to a lesser extent.
Impacts are unknown or uncertain; inadequate knowledge or information to predict them with confidence	There is high confidence in the belief that potential direct impacts are known. There is some uncertainty about impacts in the study area in the absence of the proposed project taking place.
Lead to substantial negative cumulative impacts	Construction of the proposed new road may lead to substantial negative secondary impacts primarily associated with strip/ribbon/secondary development and fragmentation and associated impacts. The proposed Coastal Mzamba alignment would cause this to a lesser extent. Cumulative impacts due to additional proposed projects in the study area make habitat loss more likely and impacts more serious, especially on components of the PCE. The proposed project is therefore likely to lead to significant negative cumulative impacts.

Of the criteria evaluated (excluding the degree of uncertainty in impacts), the analysis of the proposed new road leads to six sustainability criteria returning a negative assessment. On this basis, the proposed new road is considered not ecologically sustainable. However, if potential secondary impacts can be controlled and conservation measures can be put in place to effectively protect core components of the PCE then the assessment of five of these criteria may be reversed/become insignificant and the proposed new road could then be considered to be ecologically sustainable.

For four of the criteria, the Coastal Mzamba alignment would affect these criteria to a lesser extent and for one criterion the Coastal Mzamba alignment would have a slightly greater effect.

14.2 AQUATIC ECOSYSTEMS

Impacts on aquatic systems are definitely cumulative, particularly in terms of the longitudinal nature of rivers, with impacts ending up in estuaries. The cumulative nature of the proposed project would also be dependent on other impacting activities in the area, e.g. the proposed Xolobeni Heavy Mineral Mine. There is no doubt that cumulative impacts due to the disturbance of beds and banks and instream impacts due to bridge building, together with water abstraction and damming impacts of the mining activity, would potentially be severe on a regional and national level. Potential impacts from the proposed toll highway would, however, be shorter term impacts, with effective management and implementation of mitigation measures resulting in lowering impacts considerably.

Changes in channel structure and habitat availability, increased sedimentation into river channels, and changes in population structures in the short term are highly probable, particularly in the sensitive rivers and estuaries. Changing river mouth conditions, with subsequent impacts on the availability of nursery areas (for example) in estuaries, are likely to take place with increasing sediment loads moving down rivers. Again, effective management procedures and the implementation of monitoring programmes and detailed Construction and Operational EMPs, would reduce potential impacts.

The most important areas in terms of implementation of mitigation measures would be the “greenfields” sections of the proposed toll highway. These sections have been highlighted as “highly sensitive” in terms of their aquatic systems due to the large numbers of wetlands and rivers in the area. Mitigation would be achieved through the incorporation of best practice measures into a Construction EMP, monitored by a suitably qualified Environmental Control Officer (ECO).

However, the long-term sustainability of wetland systems would be in jeopardy. It is anticipated that wetlands would be most heavily affected by road-building, with permanent destruction of wetlands in road-building areas. Important habitats would be lost, and domestic patterns of water use would be disturbed. Alternative water supply options for domestic use may be needed. Due to the absolute dependence on wetlands in the wetland belt along the Coastal Mzamba route, it is recommended that the SANRAL preferred route be followed between the Mthentu and Mthamvuna Rivers as this would result in fewer wetland impacts. The disruption of wetland processes would consequently have a cumulative impact on the functioning of the rivers and then estuaries.

It is thus further suggested that detailed mapping of the wetlands within the section between the Mthentu and Mthamvuna Rivers should be undertaken. The wetland map should also indicate the intensity of water use and suitable buffer zones that would protect the functioning the wetland system. The final route selection should then be based on this map.

With implementation of suitable mitigation and proactive management most of the impacts related directly to the proposed toll highway could be managed. SANRAL should take as many precautions to manage and monitor all phases of the development and should form part of any forum to manage the region, i.e. possible increase in tourism.

14.3 SOCIAL

The following specific social issues are assessed at a project scale and/or in relation to toll funding:

- Increased regional economic development;
- Increased cost of doing business and concomitant loss of income;

- Increased cost of accessing services and employment for marginal communities;
- Increased cost of accessing services and employment for advantaged communities;
- Increased congestion on non toll roads and at critical access points; and
- Social sustainability of the proposed project.

A summary of the assessment of potential impacts, where appropriate, is provided in Table 14.2.

Increased regional economic development

It is anticipated that the proposed toll highway would strengthen transport linkages and increase the flow of traffic between the East London and Durban metropoles and beyond. The proposed toll highway has the potential to significantly improve safety for travellers, especially on the Eastern Cape portions of the existing N2 and R61 that would form part of the proposed toll highway. This would make the route more attractive to traffic which, for example, currently bypasses this area via the N1/N3 route between Cape Town and Durban and persons interested in doing business in the former Transkei. According to the economics specialist report the (1) agriculture, (2) forestry, (3) manufacturing, (4) construction (i.e. property development), (5) finance and real estate, and (6) trade, tourism and catering economic sub-sectors would enjoy increased income "due to the reduction of generalised travel costs, the generation of new business activity and additional land use development" (see Chapter 15).

At the social level this would be associated with enhanced access to natural, human, social, physical and financial capital (or resources) required for sustaining livelihoods. The expected long-term impact is assessed to be of ***POSITIVE HIGH*** significance in the road section between the Gonubie Interchange and Mthatha and ***POSITIVE MEDIUM*** significance in the other road sections of the proposed toll highway. Stakeholders in the immediate Durban area perceive potential increased regional development as being only marginally positive. However, some stakeholders along the lower South Coast perceive this potential impact as very positive as the lower South Coast is regarded as something of a "cul-de-sac". The potential positive social impact could be enhanced relative to the affordability of the proposed toll highway.

Increased cost of doing business and concomitant loss of income

It is considered that the tolling of the highway would have a negative impact on the cost of living and doing business. Stakeholders along the existing N2 in the Eastern Cape and existing R61 and N2 in KwaZulu-Natal argue that in some instances commercial farms that are now economic units would become marginal or unviable, should the proposed toll highway increase the cost of goods being transported in and out of the affected areas. This, in turn, would have the potential to lead to a loss of employment and consequently the reduction in community income, exacerbating poverty. It is anticipated that tolling would impact on those undertaking longer journeys and many travelling for work purposes. Businesses in the KwaZulu-Natal section of the proposed toll highway have, in particular, pointed to their dependence on imports from Durban. It is argued that tolling would lead to cost increases of all imported goods and would impact on the cost of doing business. For marginal operations this, it has been stated, could lead to their demise. In the Durban metropole, businesses have pointed to the fact that any operations located south of the proposed Isipingo Toll Plaza would be penalised with greater costs, through the toll fees, even for relatively short journeys.

The potential increased cost of doing business and concomitant loss of income is assessed to be of **medium** intensity and significance in the long term. Reducing the number of toll points, introduction of discounts for local businesses and expropriation of, and adequate compensation for, sub-economic farming units would reduce the potential impact to **LOW** significance.

Increased cost of accessing services and employment for marginal communities

It is considered that tolling would result in a negative impact on the cost of accessing points of employment and/or services for marginal communities. Additional costs incurred by marginal communities would have negative consequences for their viability. In this regard marginal communities are defined as those with relatively low levels of disposable income and dependent on public transport.

Very few residents between the Gonubie Interchange and Ngobozi would be travelling on a regular basis to the former Transkei or KwaZulu-Natal for these purposes, thus the potential impact is assessed to be of **LOW** intensity and significance. It is considered that tolling would impact on those communities between Ngobozi and the Mthamvuna River undertaking longer journeys and those travelling for work purposes. In the KwaZulu-Natal section the communities potentially most affected would likely be those in the dormitory suburbs and peripheries around Durban (including Umbumbulu and KwaMakhuta/Adams Mission). Also affected would be the marginal workforce who commute from northern and central Durban to the Prospecton area. The impact along these sections of the proposed toll highway is assessed to be of **medium** significance. Reducing the number of toll points and the introduction of discounts for public transport providers would reduce the significance of the potential impact to **LOW**.

Increased cost of accessing services and employment for advantaged communities

It is anticipated that tolling would result in a negative impact on the cost of accessing points of employment and/or services for all road users, even those regarded as wealthier and more advantaged. In this regard advantaged road users are defined as those with relatively higher levels of disposable income (and likelihood of access to private transport). The potential increased cost of accessing services and employment for advantaged communities is assessed to be of **medium** significance. Reducing the number of toll points and the introduction of discounts for local and frequent users would reduce the significance of the potential impact to **LOW**.

Increased congestion on non toll roads and at critical access points

It is considered that tolling of the proposed toll highway, particularly in the upper South Coast, would lead to congestion on available alternative routes as road users seek to avoid incurring the cost of the toll. Points of access to and from the alternative roads to the N2 could also become congested. Particular concern was expressed about sections of the existing R102, the M35 (Durban South), Prospecton and Kingsway (Amanzimtoti). Congestion would lead to increased incidences of road rage and time delays for road users. Increased use of alternative roads would also lead to increased wear and tear on these roads and higher maintenance bills for local municipalities. These increased costs are invariably passed on to ratepayers which, in turn, lead to reduced disposable incomes.

The potential social impacts associated with increased congestion on non-toll roads and at critical access points are deemed to be of **medium** intensity and significance. Reducing the number of toll points and the introduction of discounts for local and frequent users, setting of tolls at rates that would encourage road users to take advantage of time and associated cost savings and an education campaign on time and cost savings associated with the proposed toll highway would reduce the significance of the potential impacts to **LOW**.

Social sustainability of the proposed project

Community empowerment

The Wild Coast is home to some of the most extreme poverty within the Eastern Cape Province. The Eastern Cape itself is among the three poorest provinces in South Africa. Of the 6.3 million population in the Eastern Cape Province, former Transkei accounts for approximately 4.5 million with a population density of around 135 persons per km^2. The proposed toll highway would have both positive and

negative impacts on this impoverished population. SANRAL should ensure that any promises of empowerment actually materialise. Not to do so would potentially equate to a reputation risk.

In this regard it is potentially problematic to think that the construction of the proposed toll highway would automatically translate into benefits to the affected communities. In terms of the greenfields sections, the proposed new road would bring not only access and possibly foster private investment and development, but it could potentially bring an increase in crime. Stiffer economic competition could potentially undermine local productive enterprises and this may further marginalise local communities. In terms of converting already existing road sections into the proposed toll highway, it means potentially increased costs of transport, increased levels of noise and pollution, and in some cases loss of alternative modes of transport to places of work (bicycles and walking). For these reasons, SANRAL must become actively involved in community empowerment in order to compensate and mitigate losses communities feel would accrue as a result of the proposed project.

Ownership of land along the Wild Coast is an issue of concern. Whilst government claims that they have settled more than 60% of the total land claims lodged since 1996, most rural claims in the former Transkei have not yet been settled and these include those from communities along the Wild Coast. The land required for the proposed toll highway, which would be alienated from the local communities, is likely to add to the controversy and complications of land holding along the Wild Coast. This land is almost exclusively held in trust and rights to usufruct are made through tribal allocation processes.

Much of the issue with the proposed new road along the greenfields sections has to do with land availability and usage. This has been researched extensively by the NGO sector and government. If the proposed project were implemented, SANRAL should consider working in collaboration with established NGOs and the government in supporting, building and strengthening the capacity of democratic communal property institutions (e.g. Land Claims Forums and Land Claim Lobby Groups). The promotion of conflict resolution within and between communities, and with the respective local government structures with respect to accessing and management of both land and other natural resources would also greatly assist SANRAL in the resettlement aspect of the proposed project while simultaneously assisting with community development. Further, SANRAL should assist and enhance effective participation of affected communities, allowing them to play an active role in the management of the land, particularly in relation to the proposed highway.

Further, although the creation of an effective and efficient transport system has the possibility of improving access and therefore services to the rural poor, it can equally cut off services and distance impoverished rural communities from each other and the rest of the country. The distancing aspect is particularly important for towns and villages that would now be bypassed by the construction of the proposed toll highway whereas the existing N2 alignment passed through or close to them. Specifically, Kokstad and smaller towns such as Mount Frere, Mount Ayliff and Harding would be negatively impacted upon by the loss of a portion of the current traffic along the existing N2. In a similar vein, villages not given appropriate access to the proposed new road would also be geographically and spatially "'cut off", despite the proposed new road passing by their location. The latter could be mitigated through sufficient and adequate forms of access to and passage over or under the proposed new road.

Although towns such as Kokstad, Mount Frere and Mount Ayliff would be negatively affected the findings of the economic specialist study indicate that long-distance travellers are not captive purchasers in towns along the present route - their on-route transactions are incidental and voluntary. Traffic between the Eastern Cape and the Pietermaritzburg area will still use the existing N2 as first-choice route, while the existing link between Mthatha-Kokstad-Durban remains intact – neither its mobility nor its accessibility function will disappear. Although the proposed new link between Mthatha and Port Edward would attract

traffic away from the existing N2 route, the newly generated traffic benefits on the proposed toll highway would by far exceed any reduction of business on the existing road section.

It should be ensured that the proposed project is planned in such a manner that communities along the proposed toll highway between Mthatha and Port Edward via Lusikisiki would be able to benefit from the proposed new road. This is critical to ensure that any advantages that have been mooted would not potentially be lost to the rural populace. Community infrastructure *vis-à-vis* the proposed toll highway is particularly important in this regard. Underpasses, overpasses and access points need to be sufficient for the uses of the communities so that they are able to benefit from the proposed toll highway.

In this regard SANRAL should ensure that empowerment projects are practical, sustainable and fiscally realistic. Insufficient financial input to empowerment projects is likely to result in their failure and subsequent reputation risk to SANRAL in terms of its social commitments. At the same time SANRAL should be wary of creating unhealthy dependencies among the communities that are assisted through empowerment projects. The sustainability of empowerment projects is possibly the hardest aspect to achieve, as empowerment through job creation, which is the simplest to institute, is unlikely to be sustainable post-construction. In this regard then the developer should look beyond the promise of employment opportunities as its empowerment brief.

Currently public support for the proposed toll highway is mixed. While there is enthusiastic support in some sections of the former Transkei, environmental, social and economic issues raised by some sectors of the public point to disapproval and condemnation. In Durban and its environs there is little or no support. By implementing a number of empowerment projects, particularly in the greenfields sections, SANRAL may go some way towards improving public perception of the proposed project. SANRAL may have to go beyond its normal mandate in this regard. If the development of the proposed toll highway is seen as genuine development of the area and people along the Wild Coast, it is likely to receive considerably more support from the public.

It is recommended that SANRAL formulates a transparent policy towards community empowerment. This would spell out the actions to be taken to ensure that communities benefit from the creation of the toll road through job creation and community upliftment. This would serve as a benchmark against which successes and failures can be monitored.

Tolling

It is clear from the findings of the social specialist study that the issue of tolling along the section of road between Hibberdene and the Isipingo Interchange is controversial and that this controversy focuses on the economic effects that tolling would have on the local community. In this regard a number of issues regarding toll roads have been raised both internationally and with specific reference to the proposed project, as follows:

- Toll roads have a disproportionate impact on lower-income commuters if their workplaces are not accessible by transit;
- The poor bear an unfair burden if they have to shift to congested roads to avoid the toll;
- Low-income drivers may be priced out of discretionary trips (e.g., shopping trips and recreational trips) or be forced to use less attractive modes (e.g., transit, bicycling, or walking) to satisfy their transportation needs when charged a toll.

A number of business organisations such as the South Coast Chamber of Commerce, businesses in the South Durban Industrial Basin and the Umzumbe and Hibberdene Farmers' Associations have all raised

concerns that tolling would raise the costs of doing business and the potential threat that this may have for jobs in the area.

The issue of tolling was also raised at a political level with the eThekwini Municipality taking a clear stand against the option of tolling and certain members of the community indicating that tolling was a means of collecting funds in KwaZulu-Natal in order to subsidise the construction and maintenance of the road through the Eastern Cape Province.

In some parts of the project area these issues have been highlighted as the most project-critical. As such, without appropriate mitigation strategies or, a convincing argument conveyed by SANRAL that the benefits of the proposed toll highway outweigh the disadvantages even for poorer transport users, resistance is almost guaranteed.

The potential economic costs and benefits associated with tolling are discussed in Section 15.2.

Local government capacity limitations

Due to the varied nature of the municipal areas that the proposed toll highway would traverse, there are several different aspects regarding the proposed toll highway which may need to be controlled by local government or nominated agents. Although SANRAL and/or its agents retain primary control over the road and its servitude there are aspects of the road that intersect with the need for control with other authorities. Some of these authorities, in particular those in the O.R. Tambo DM, have limited capacity. For instance, O.R. Tambo DM is classified as a Category C2 municipality, indicating a largely rural character and low urbanisation rate, as well as limited municipal staff and budget capacity. All, except King Sabata Dalindyebo, local municipalities are classed as Category B4 (rural, mainly subsistence) reflecting limited institutional capacity and areas characterised by small centres, limited SMMEs and market opportunities, dependence on public support and local economic development activities that are principally at the level of the small project. The situation is somewhat better in the more urbanised areas stretching from Port Edward through to Isipingo, where although the local municipalities would have to deal with certain levels of control, they are more likely to have better capacity to be able to perform this function. The local Traditional Authorities may also have to exercise certain controls in rural areas between the Kei Cuttings and Mthatha, and Mthatha via Lusikisiki to Mthamvuna and they, too, would have to rely on limited resources.

Notwithstanding the fact that the situation is better between Port Edward through to Isipingo, in interviews with the eThekwini Transport Authority it became apparent that local municipalities expect to be faced with the burden of dealing with the negative impacts on traffic and road usage that may arise from tolling of the existing road. In this regard the municipality has expressed concern with the level of support that can be expected from SANRAL. This is an issue that needs to be addressed as municipal authorities in developed areas may be antagonistic towards the project where they see it as creating additional burdens without any noticeable benefit. Municipalities in the rural underdeveloped areas are more likely to embrace the project concept, but may lack the institutional capacity to deal with the peripheral aspects of the proposed toll highway. This is discussed in more detail below:

Importantly, the mandate of SANRAL needs to be made explicitly clear at the outset. SANRAL's primary responsibility is to "strategically plan, design, construct, operate, rehabilitate and maintain South Africa's national roads". The forms of maintenance need to be set out clearly, so that there is no doubt as to who holds responsibility for the peripheral aspects of the proposed toll highway. The responsibility of, for instance, road fences along the length of the road, access points and crossovers, the upkeep of the road servitudes and development along the length of the road needs to be allocated before the project commences so that confusion does not arise once the project is operational.

Freeways by their nature are designed to maximise through-traffic. Efforts need to made and maintained to ensure that there is safe access to the road that does not slow traffic, and that the road does not get used by non-vehicular traffic. In the case of the proposed toll highway certain sections of the road where there is already an existing freeway, such as between Port Edward and Isipingo, would require little change in the management thereof. Large sections along the Wild Coast route though would require various means to control aspects such as illegal grazing on the servitudes, illegal ingress and egress onto the road, and pedestrian safety.

It needs to be borne in mind that the proposed toll highway would pass through a section of the country that is both impoverished and historically marginalised. Unlike toll roads that run through many parts of Gauteng, Western Cape, Free State and KwaZulu-Natal, large tracts of the surrounding lands, required for the proposed toll highway, are held communally rather than being secured under private tenure. Illegal ingress and egress to the road would therefore be difficult to control as land that runs parallel to the freeway is essentially communally owned and currently without fences.

A framework should thus be put in place by SANRAL, in collaboration with the Department of Transport and its various arms, Traditional Authorities and local municipalities in order to overcome institutional capacity issues. Essentially any aspect relating to the road that would fall under the auspices of a local municipality would have to be supported, both technically and financially, by either the province or the state. Alternatively, SANRAL would have to take sole responsibility for all aspects relating to the proposed toll highway. It would be important that a Memorandum of Understanding be signed between all controlling bodies to ensure adequate control of the route.

Table 14.2: Summary assessment of potential social impacts at a project scale and/or in relation to toll funding

ISSUE / IMPACT	EXTENT	DURATION	INTENSITY	PROBABILITY	SIGNIFICANCE	CONFIDENCE
Impacts associated with increased regional economic development						
Without mitigation	Local-Regional	Long term	Medium/High	Definite	***Medium+/High+***	High
With mitigation	Local-Regional	Long term	Medium/High	Definite	***MEDIUM+/HIGH+***	High
Impacts associated with increased cost of doing business and concomitant loss of income						
Without mitigation	Local-Regional	Long term	Medium	Definite	**Medium**	Medium
With mitigation	Local-Regional	Long term	Low	Definite	**LOW**	Medium
Increased cost of accessing services and employment for marginal communities						
Without mitigation	Local-Regional	Long term	Low/Medium	Definite	**Low/Medium**	Medium
With mitigation	Local-Regional	Long term	Low	Definite	**LOW**	Medium
Increased cost of accessing services and employment for advantaged communities						
Without mitigation	Local-Regional	Long term	Medium	Definite	**Medium**	Medium
With mitigation	Local-Regional	Long term	Low	Definite	**LOW**	Medium
Increased congestion on non toll roads and at critical access points						
Without mitigation	Local-Regional	Long term	Medium	Probable	**Medium**	Medium
With mitigation	Local-Regina	Long term	Low	Probable	**LOW**	Medium

14.4 TRAFFIC DIVERSION

The Scoping Study has indicated that the proposed toll highway would result in the diversion of traffic onto certain local and provincial alternative routes, where available, in order to avoid toll fees. It was also considered that such diversion could have a negative impact on the adjacent road network in terms of long-term road maintenance and upgrading requirements.

The traffic diversion specialist study identified the N2 Prospecton-Winklespruit, Winklespruit-Hibberdene and Hibberdene-Southbroom toll sections of the proposed toll highway (see Figure 14.1), on the KwaZulu-Natal South Coast, as sensitive to traffic diversion, with the Prospecton-Winklespruit section identified as the most sensitive in this regard. During the construction of the proposed additional lane in each direction on the N2 Prospecton-Winklespruit section (with an additional lane on each carriageway between Prospecton and Amanzimtoti), the closure of any existing lane during the peak period would increase the risk of serious traffic congestion significantly.

If the toll tariffs being charged during the operational phase were higher than the perceived road user benefits for a specific traffic movement, significant traffic diversion may occur with negative impacts on the alternative route. Also, since the Isipingo mainline toll plaza would have to process more traffic than any existing South African toll plaza, inadequate toll plaza capacity may lead to significant peak period traffic congestion.

Since the section of the proposed toll highway between Prospecton and Winklespruit is serving the highest traffic volume, a capacity analysis was performed for this section to determine the current levels of service.

The Highway Capacity Manual (2000, Transportation Research Board, Washington D.C.) is internationally recognised and used in capacity analyses. Two different methodologies from the manual were used to determine current service levels for the N2 and R102 between Prospecton and Winklespruit.

The estimated levels of service on the N2 during the 30th highest hourly volume of the year between Prospecton and Winklespruit are shown in Table 14.3.

Table 14.3: Current levels of service on the N2 between Prospecton and Winklespruit for the 30th highest hourly volume of the year

ROAD SECTION	LEVEL OF SERVICE
N2: Prospecton – Joyner	F
N2: Joyner – Dickens	D to F
N2: Dickens - Moss Kolnik	D to F
N2: Moss Kolnik – Adams	D
N2: Adams – Seadoone	D
N2: Seadoone – Winklespruit	C

The estimated levels of service on the R102 between Prospecton and Winklespruit are shown in Table 14.4.

Table 14.4: Current levels of service on the R102 between Prospecton and Winklespruit

ROAD SECTION	LEVEL OF SERVICE
R102: Prospecton – Joyner	C to D
R102: Joyner – Dickens	B to C
R102: Dickens - Moss Kolnik	C
R102: Moss Kolnik – Adams	B to C
R102: Adams – Seadoone	C to E
R102: Seadoone – Winklespruit	B to C

It is apparent from the capacity analysis that the N2 between Prospecton and Moss Kolnik is running close to or exceeding capacity in the so-called design hour (the 30th highest hourly volume of the year), while the R102 is currently still operating at acceptable levels of service.

If significant traffic diversion were to take place, it would affect the users of the R102 alternative route in that the route would become congested during peak periods. Along the Prospecton-Winklespruit and the Hibberdene-Southbroom sections the R102 is mostly a two-lane urban road with many traffic-controlled intersections and does, in many cases, not have capacity to accommodate significant traffic diversion. The Winklespruit-Hibberdene section of the R102 is mostly a two-lane rural road but with some urban sections. Analysis of the capacities of the N2 and the parallel R102 between Isipingo and Winklespruit has shown that the N2 is running close to or exceeding capacity during the 30th highest hourly volume of the year (the so-called design hour), while the R102 is currently still operating at acceptable levels of service.

The analysis of potential traffic diversion impacts is based on the "high" possible tariff indicated in the FSR (2006 prices, Class 1 vehicle) and an "open" toll strategy (which has the characteristic that many traffic movements are tolled at a single mainline toll plaza on a road section at the same toll tariff). If some of these traffic movements use only a very short distance of the tolled section but still pay the toll for the full section, many road users may perceive it to be not beneficial to use the toll road and would divert to an available alternative route. A summary of the assessment of the potential traffic diversion impacts is provided in Table 14.5.

Assessment

N2 Prospecton-Winklespruit section

It is predicted that the above phenomenon would occur in a very acute way on the N2 Prospecton-Winklespruit section because of the proposed location of the mainline toll plaza at the northern end of the section. It would especially be a problem in respect of traffic movements using only the Prospecton-Joyner Road (2.8 km) and Prospecton-Dickens Road (5.1 km) sections.

Prospecton-Joyner Road alternative route

A 74 % increase of traffic volumes on the R102 Prospecton-Joyner Road alternative route is predicted, i.e. an increase in the 30th highest hourly volume of the year from 1 593 veh/h in one direction to 2 774 veh/h (2006 traffic volumes). Such an increased volume would have a significant negative impact on the level of service and quality of travel on the alternative route. Even though the R102 is a four-lane road between Prospecton and Joyner Roads, the practical situation is that one lane in each direction is being used for parking purposes by Toyota employees. This effectively reduces this section to a two-lane facility. Thus, the indicated predicted volume of 2 774 veh/h in the peak direction clearly exceeds the capacity of one lane which at best would be 1 800 veh/h.

Joyner Road-Dickens Road alternative route

A highly significant increase of the 30th highest hourly one-directional traffic volume of the year, from 307 veh/h to 1 147 veh/h (i.e. a 273 % increase), is predicted for the R102 Joyner Road-Dickens Road section if the full R 8.00 tariff were charged to all users at the Isipingo mainline toll plaza. Similar to the Prospecton-Joyner Road section, this increase would lead to a significantly worse volume/capacity ratio on the R102 Joyner Road-Dickens Road section and would, therefore, have a significant negative impact on the level of service and quality of travel on the alternative route. Provided that more lanes are provided at signalised intersections for R102 traffic, the R102 would, in spite of the predicted traffic diversion as a result of tolling at the Isipingo mainline toll plaza, not yet technically exceed its capacity in one direction of travel of 1 500 – 1 800 veh/h. It would, however, subsequently reach capacity many years earlier.

N2 Winklespruit-Hibberdene section

Consideration of the Park Rynie-Pennington section, one of the most sensitive sections (just south of the proposed Park Rynie Interchange where the mainline toll plaza is proposed), led to a predicted increase

of the 30th highest hourly volume in one direction from 459 veh/h to 742 veh/h, i.e. an increase of 62 %. It can be concluded that a 62 % increase in traffic volumes on the R102 Park Rynie-Pennington section every peak hour would lead to a significantly worse volume/capacity ratio on the R102 and would, therefore, have a negative impact on the level of service and quality of travel on the alternative route.

N2 Hibberdene-Southbroom section (the existing N2 South Coast Toll Road)

Analysis of this section indicated that, because the "high" possible toll tariff (i.e. R 24.00, 2006 prices, Class 1 vehicle) would exceed the perceived benefit, estimated at about R 20.00, a low attraction rate of 25 % is predicted to occur at the Oribi mainline plaza. This would lead to a significantly worse volume/capacity ratio on the parallel R102.

The highly probable impact of traffic diversion away from the N2 Prospecton-Southbroom section is assessed to be of **medium** and **high** intensity and significance on the adjacent road system during the construction and operational phases, respectively.

Mitigation

During the construction phase it should be ensured that the same number of lanes on multi-lane sections are available during peak periods as are currently available.

One approach to overcoming the tolling inequitability in the operational phase would involve the introduction of a system to allow local users on the N2 Prospecton-Southbroom sections to pay a toll tariff directly related to the distance of the toll section that is used (i.e. a local user discount linked to the use of electronic toll tags). A second approach would involve including visitors into the local user discount scheme as well (since frequent visitors may become toll road avoiders) by equipping toll lanes at the planned physical plazas with Electronic Toll Collection (ETC) readers and erection of Open Road Tolling gantries on appropriate interchange ramps in order to effectively create closed ETC systems on the N2 Prospecton-Winklespruit and Winklespruit-Hibberdene sections and, ideally, also on the Hibberdene-Southbroom section. The latter alternative can only be implemented if a decision were made, in future, that the upgraded freeways of the Durban metropolitan area would be tolled by means of Open Road Tolling (a process in terms of which vehicles are tolled electronically whilst travelling at normal highway speeds in a free flow traffic situation and where no stopping or speed reduction is required for toll payment purposes).

Traffic analyses using the above-mentioned operational phase mitigation measures indicate significantly improved toll road attraction rates of 99 % in the case of the N2 Prospecton-Joyner Road section and 95 % in the case of the Joyner Road-Dickens Road section. From these attraction rates it may be concluded that, in the case of the Prospecton-Winklespruit section, problems resulting from traffic diversion without mitigation measures would be eliminated by the introduction of the mitigation measures. In the case of the Winklespruit-Hibberdene section mitigation measures would reduce the predicted increase in traffic volumes on the R102 Park Rynie-Pennington section down from a 62 % increase to a 33 % increase. This is considered still reasonably significant, and would have an impact on the level of service and the quality of travel on the alternative route, but would not introduce capacity problems since the increase would be off a low base volume.

As far as the Hibberdene-Southbroom section is concerned, it should be ensured that the tariff is determined on the basis of a revenue-maximising tariff (i.e. 76.7 % of the perceived benefit) since this approach would ensure traffic attraction of the order of 80-85 % of toll eligible traffic and would also be in the interests of the concessionaire. The introduction of similar measures to those proposed for the other two sections, i.e. the ability to pay for the distance of the toll road section used, should also ideally be

considered for this section as well in order to improve tolling equitability and attraction to this toll road section.

Implementation of the mitigation measures would reduce the traffic diversion impact to **LOW** significance during the construction and operational phases.

Table 14.5: Summary assessment of potential traffic diversion impacts

ISSUE / IMPACT	EXTENT	DURATION	INTENSITY	PROBABILITY	SIGNIFICANCE	CONFIDENCE
Impacts associated with traffic diversion						
Without mitigation	Local	Short/Long term	Medium/High	Highly probable	**Medium/High**	High
With mitigation	Local	Short/Long term	Low	Highly probable	**LOW**	High

14.5 NOISE

The noise specialist study included consideration of road traffic noise on the alternative R102 route between Isipingo and Pennington since this road represents the primary alternative route, with the highest volumes of traffic on a two lane, single carriageway through Umbogintwini flanked by residential properties with boundaries within 6 m of the nearest road edge.

Existing and predicted future Average Daily Traffic (ADT) figures made available by the traffic specialist were used to calculate the day-time noise rating level at the nearest property boundaries flanking Kingsway in Umbogintwini. Table 14.6 below records the calculated day-time noise rating level to the nearest dB at the property boundary for conventional smooth asphalt, porous asphalt and two-layer low-noise porous asphalt. An average mean speed of 70 km/h and 5.2 % heavy-duty traffic was assumed. It should be noted that the day-time noise rating levels recorded in Table 14.6 would only be due to noise emanating from traffic on Kingsway. The day-time noise rating level on the residential properties, due to the combined noise from the N2 plus Kingsway, would be somewhat higher.

Table 14.6: Existing and future noise rating level along Kingsway, Umbogintwini [$L_{Req,d}$ – day-time equivalent continuous rating level for noise]

YEAR	2007	2017		2022	
Situation	**Existing**	**Without tolling**	**With tolling**	**Without tolling**	**With tolling**
ADT	22 735	33 654	40 160	40 945	48 861
Smooth asphalt $L_{Req,d}$ dBA	74	75	76	76	77
Porous asphalt $L_{Req,d}$ dBA	70	72	73	73	73
2-layer low-noise $L_{Req,d}$ dBA	68	69	70	70	71

Assessment

Table 14.6 indicates that the existing day-time noise rating level of 74 dBA on residential land flanking Kingsway is exceptionally high - exceeding the acceptable outdoor day-time noise rating level in a suburban district (with little road traffic) by 24 dB and in an urban residential district by 19 dB. Based on the ADT values the predicted increase in the day-time noise rating level over the subsequent 10 and 15 years would be barely significant, with or without tolling of the existing N2 (refer to Table 14.6). However, any increase would exacerbate an already unacceptably high exposure to road traffic noise on residential land in this suburb. The existing, and potential future noise impact along on the alternative R102 at Umbogintwini (without and with tolling of the existing N2) is assessed to be of **VERY HIGH** intensity and significance (see Table 14.7).

Mitigation

Due to the close proximity of residential land to the R102, the use of low-noise road surfaces, as demonstrated in Table 14.5, would reduce the levels of noise but not sufficiently to even nearly approach the acceptable noise rating level. In considering the erection of noise barriers their effectiveness is seriously compromised, if not nullified, where apertures are required for cross roads and driveway access. Noise barriers would only be effective if these could be erected between the R102 and, where space is available, parallel service roads providing access to the residences. In this instance, inadequate planning has resulted in a situation whereby technical noise mitigation alternatives cannot be practically implemented.

Within the physical constraints imposed on noise mitigation alternatives in Umbogintwini and similar land further south along the R102 it is recommended that serious consideration be given to attracting through-traffic away from the R102 onto the N2. This would imply that the section of the proposed toll highway skirting the residential suburbs south of Durban not be tolled, or that the mitigation measures recommended in Section 14.2 above, be implemented effectively. It should be noted, however, that future noise rating levels along the R102 would be unacceptable both without and with tolling of the existing N2.

Table 14.7: Summary assessment of existing and potential noise impacts on the R102 (Umbogintwini)

ISSUE / IMPACT	EXTENT	DURATION	INTENSITY	PROBABILITY	SIGNIFICANCE	CONFIDENCE
Impacts associated with noise impacts on the R102 (Umbogintwini) as a result of traffic diversion						
Without mitigation	Local	Long term	Very high	Highly probable	**Very high**	High
With mitigation	Local	Long term	Very high	Highly probable	**VERY HIGH**	High

14.6 AIR QUALITY

As in the case of the noise specialist study, the air quality specialist study considered potential air quality impacts on available alternative routes under the “do nothing” and “with tolling” scenarios. The study identified the R102 and R620 between Southbroom and the Isipingo Interchange as the most sensitive alternative route, in particular the section of the R102 at Kingsway .

A summary of the assessment of the potential air quality impacts along the R102 and R620 between Southbroom and the Isipingo Interchange is provided in Table 14.8.

Assessment

The average daily vehicle numbers at Kingsway of 21 020 (in 2005 – the “base case”) is estimated to increase to about 57 533 (“do nothing” scenario) and 68 657 (with implementation of the proposed toll highway) in 2035.

The expected increase in traffic volumes would result in ambient concentrations of all modelled pollutants (carbon monoxide, oxides of nitrogen, selected Volatile Organic Compounds, etc.) to increase over the baseline case. In 2035 exceedances of the Air Quality Act standard for oxides of nitrogen are predicted up to 50 m from the roadside at Kingsway (and Southbroom). Predicted concentrations for carbon monoxide and particulate matter would remain within compliance in 2035.

Potential health risks due to nitrogen dioxide exposure are predicted at certain locations for 2015 and subsequent years (up to 2035), as follows:

- 2015 – Kingsway (up to about 100 m from the roadside); Southbroom (up to about 50 m);
- 2025 – Kingsway (up to about 100 m – "do nothing" scenario – and up to 250 m – "with tolling"); Southbroom (up to about 100 m); Umtentweni-north (up to about 50 m – "do nothing" scenario – and up to 100 m – "with tolling"); Scottburgh and Port Shepstone (up to 50 m); and
- 2035 – Kingsway (up to about 250 m); Scottburgh, Umtentweni-north, Port Shepstone and Southbroom (up to about 100 m).

It is predicted that potential localised air quality impacts on the R102 and R620 alternative routes would be of **LOW-MEDIUM** intensity and significance without and with mitigation. It is considered unlikely that the significance of the potential impact could be reduced However, it is recommended that discussions be held with the local municipalities, in particular the eThekwini Municipality, to address the long-term plans for air quality management in the relevant areas.

Table 14.8: Summary assessment of key potential air quality impacts on the R102 and R620 alternative routes

ISSUE / IMPACT	EXTENT	DURATION	INTENSITY	PROBABILITY	SIGNIFICANCE	CONFIDENCE
Impacts on air quality associated with anticipated increased traffic volumes on the R102 and R620 alternative routes						
Without mitigation	Local	Long term	Low-medium	Probable	**Low-medium**	Medium
With mitigation	Local	Long term	Low-medium	Probable	**LOW-MEDIUM**	Medium

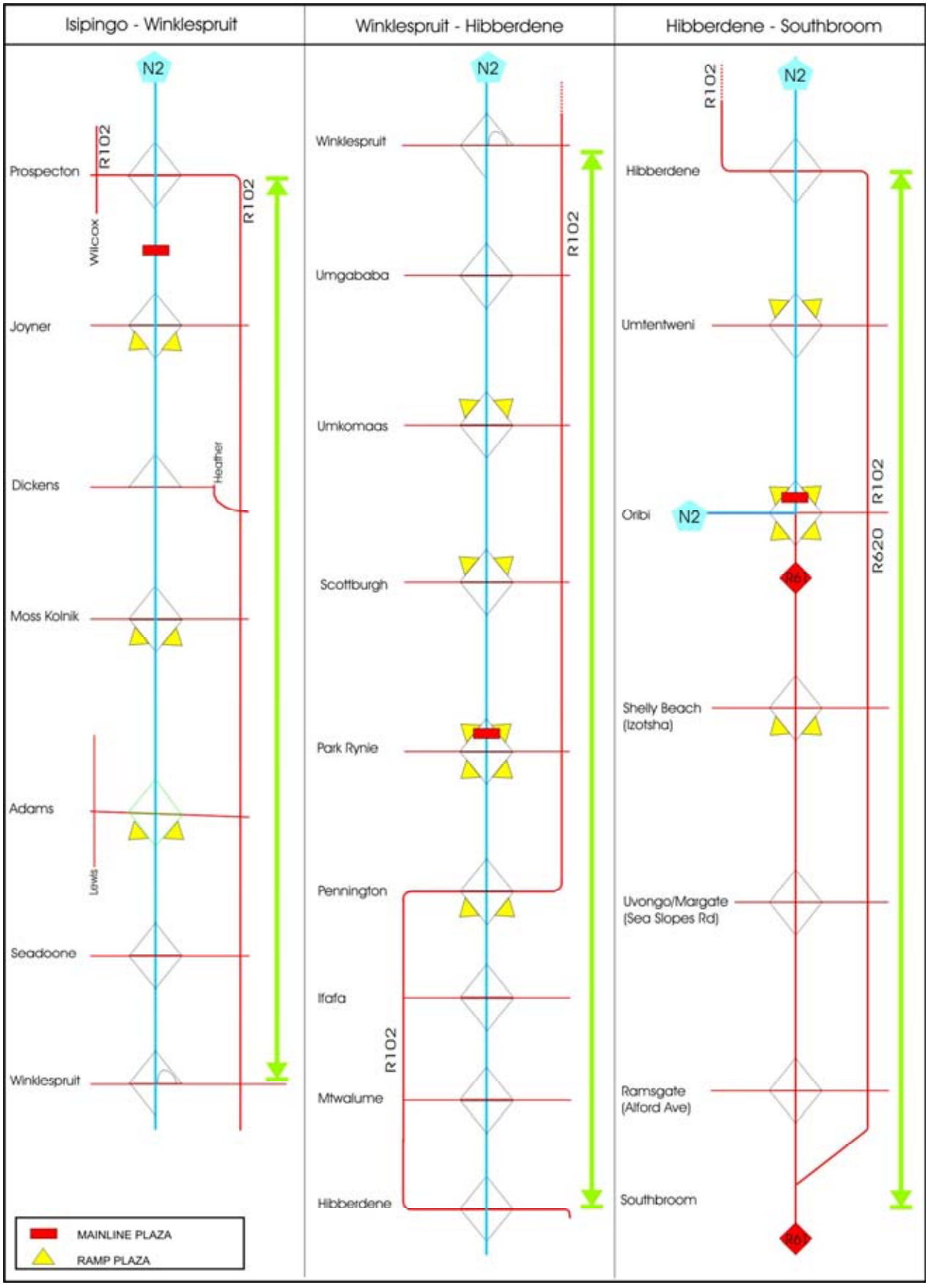

Figure 14.1: N2 Prospecton–Southbroom section - position of proposed mainline and ramp toll plazas