A GUIDE TO SANRAL:
roads, bridges, design codes,
technology and more
What makes roads last?

Five factors influence the performance of a pavement (road surface):

- **TRAFFIC**: Traffic is the most important factor influencing pavement performance. The performance of pavements is mostly influenced by the loading magnitude, configuration and the number of load repetitions by heavy vehicles. The damage caused per pass to a pavement by an axle is defined relative to the damage per pass of a standard axle load, which is defined as an 80kN single axle load (E80). Thus a pavement is designed to withstand a certain number of standard axle load repetitions (E80s) that will result in a certain terminal condition of deterioration at the end of its design life, which typically has been 20 years in South Africa. Roads are not designed to last 20 calendar years, but for axle load repetitions estimated to occur over a 20-year period. If the estimates are correct, a road could reach end of its life after only five calendar years.

- **MOISTURE (WATER)**: Moisture can significantly weaken the support strength of natural gravel materials, especially the subgrade. Moisture can enter the pavement structure through cracks and holes in the surface, laterally through the subgrade, and from the underlying water table through capillary action. The result of moisture ingress is the lubrication of soil particles, loss of particle interlock and subsequent particle displacement resulting in pavement failure.

- **SUBGRADE**: The subgrade is the underlying soil that supports the applied wheel loads. If the subgrade is too weak to support the wheel loads, the pavement will flex excessively, which ultimately causes the pavement to fail. If natural variations in the composition of the subgrade are not adequately addressed by the pavement design, significant differences in pavement performance will be experienced.

- **CONSTRUCTION QUALITY**: Failure to obtain proper compaction, improper moisture conditions during construction, quality of materials, and accurate layer thickness (after compaction) all directly affect the performance of a pavement. These conditions stress performance of a pavement. These conditions stress the need for skilled staff and the importance of good inspection and quality control procedures during construction.

- **MAINTENANCE**: Pavement performance depends on what, when, and how maintenance is performed. No matter how well the pavement is built, it will deteriorate over time based upon the factors mentioned above. The timing of maintenance is very important.

### Code for durability

The Design Code covers the required blueprint when drawing plans of roads, bridges and culverts. These are always coded with the aim of safety, serviceability and durability.

#### LIMIT STATE

Limit state design has been evolved to achieve acceptable probabilities so that a structure remains fit for its required purpose. Different safety margins should be accepted for different safety classes. The consequences of failure may be considered from two viewpoints:

1. **Risk to life or concern for public reaction to possible failures.**
   - **a. Not serious**: risk to life negligible and economic consequences small.
   - **b. Serious**: risk to life exists and economic consequences considerable.
   - **c. Very serious**: risk to life great and/or economic consequences very great.

2. **Economic consequences due to:**
   - **i. Loss of use of the structure and all ancillary costs**
   - **ii. Need for replacement or repair.** In the design process, the consequences of failure are:
     - **i. Economic consequences**
       - **a. Not serious**: risk to life negligible and economic consequences small.
       - **b. Serious**: risk to life exists and economic consequences considerable.
       - **c. Very serious**: risk to life great and/or economic consequences very great.

A structure, or part of a structure, is considered unfit for use when it exceeds a particular state, called a limit state, beyond which it infringes one of the criteria governing its performance or use. The limit states can be placed in two categories:

- **1. Ultimate limit states**, which are those corresponding to the maximum load-carrying capacity
- **2. Serviceability limit states**, which are related to the criteria governing normal use and durability.

### Bridges looking good

The national road network, including its bridges and culverts, is in excellent condition because of routine road maintenance.

The almost 9 900 major bridges and culverts on the SANRAL road network undergo major safety inspections every five to six years. This is done by the Committee of Transport Officials – a team of inspectors with advanced experience in engineering, construction and safety standards.

The majority – including the 927 managed by SANRAL’s concessionaires – has been inspected since 2015. Where roads are upgraded or new bridges and culverts constructed, inspectors again ensure that standards are met.

At present, 93% of bridges are in good condition – a very high percentage considering that SANRAL has increasingly taken over the management of older provincial roads, where safety standards were lower.

When older roads are taken over, SANRAL immediately starts with comprehensive maintenance and rehabilitation programmes to ensure the roads also comply with its high safety requirements.

**STRICT RULES FOR BUILDING BRIDGES**

SANRAL applies strict conditions to the construction of bridges across its roads.

Before the construction of a bridge, a consulting engineering firm with an experienced bridge engineer is appointed during the design phase. The consulting firm undertakes internal reviews of bridge designs, while on medium- to large-span bridges a tender is put out by SANRAL for a peer review of the design.

The reviewing firm will also have experienced bridge engineers who will undertake the review of the bridge design and any construction issues. In addition, SANRAL has its own code of practice for the design of highways, bridges and culverts.

Particular emphasis is placed on the safe load capacity of the bridge. All bridges are built according to the Committee of Land Transportation Officials’ standard specifications for road and bridge works. A tender is also put out for an independent site laboratory, which will test construction materials.

In addition, SANRAL appoints a consulting firm to undertake construction supervision. And the agency interacts with all involved in design and construction of a bridge throughout the process.
Improving road safety between Hendrina and Hendrina Power Station

Road construction is one of the most challenging and demanding jobs. Every project brings new challenges which require civil engineers to think out of the box.

The upgrading of the N11 from Hendrina to the Hendrina Power Station undertaken by SANRAL is one such example.

The road is an important route for coal haulage and transportation of agricultural produce in Mpumalanga. On average, it carries 2 500 to 3 000 vehicles in one direction per day, mostly heavy trucks from the mines.

The main aim of the project is to strengthen the existing pavement, which is past its structural design life and is generally in a poor condition, and introduce new features to make it safer for motorists.

Because it is an already existing road, the project presented contractors with some technical challenges.

According to Progress Hlahla, SANRAL’s Northern Region Manager, the project had to be split into 18 separate construction sections because of the various difficulties encountered, and complexity of dealing with construction of bridges, building of a temporary bypass for accommodating of passing traffic, high water table in the fills, various services in the way such as water mains, and fibre optic cables.

The new road will be much safer than the existing road with provision of three-metre paved shoulders, construction of a new bridge, provision of passing lanes and upgrading of the roadway through the town section.

“The first test was to build a bypass along the new road to accommodate passing traffic,” said Hlahla.

A major challenge was the relocation of services along the road such as the Telkom and Dark Fibre optic cables and dealing with two water main pipes that run parallel to the road. It was found that the water mains were in the way for the widening and reconstruction of major culverts and bridges, and had to be diverted in order to accommodate the road.

In the Mpumalanga section of the R573, two of the roundabouts will be four-legged, meaning they will have four exit points for traffic from three directions. All the roundabouts will have an 18m radius. The main roads will be 400m in length approaching the roundabouts, and 100m for secondary roads.

In Limpopo, the main intersection at Marble Hall will be configured from a simple T-junction into a four-legged roundabout with two-lane, 4.8m wide with a 50m outside diameter. This will help alleviate traffic and accommodate the heavy vehicles carrying mining equipment passing through the town.

Other engineering interventions include the construction of a butterfly intersection at Mathys Zyn Loop. The total width of the road will be 13.4m with 3.7m for each lane and 3m shoulders on both sides.

The deviation of these water mains (which service the town from the Optimum mine) was a major headache and impacted negatively on the contractor’s construction programme, explained Hlahla.

“We encountered a very high water table under the road in the town section, which required installation of a new subsoil drainage system to deal with the underground water. The municipality was called in to ensure that the high water table was not artificially created by leaking of municipal water mains. In general, SANRAL had a good working relationship with the local municipality,” he says.

“We are also going to be upgrading the intersection at the Hendrina Secondary School into a traffic circle, and will be installing new LED street lighting as well as implementing five new bus-stop shelters for convenience of non-motorists.”

Once completed, the N11, previously designed for a speed of 80km per hour, will now be much safer and wider to accommodate vehicles travelling at 100km per hour.

Project information:

Project title: Upgrading of the R573 Moloto Road (137km Gauteng – Mpumalanga – Limpopo).
Project value: SANRAL has invested R3.7bn for the whole project – over a period of five to six years. The budget is for Mpumalanga and Limpopo sections only. The Gauteng section of the R573 will be funded by the Gauteng provincial government. Thirty percent of the project value will be awarded to SMMEs.
Contractors for phase 1: Limpopo JV partners – KPMM (Main JV partner) and CBE (Targeted JV partner), Mpumalanga JV partners – Raubes (Main JV partner) and Khuluphala Trading, Themelo, BizAfrika (Targeted JV partners). More contractors will be appointed throughout the different phases of the project, SANRAL will issue notices on all relevant information about upcoming project phases on the website – www.nra.co.za
Project scope for phase 1: Construction of roundabouts (traffic circles) and a butterfly intersection; including widening of road lane to 3.7m with 3m shoulder on both sides.
Duration: 28 months – starting January 2017 to May 2019 (expected completion date).

Project title: Upgrading of the N11 from Hendrina to the Hendrina Power Station (20km).
Project value: R275m – 20% to be allocated to SMMEs including women-owned and youth-owned.
Contractors: Power Construction.
Project scope: Construction of layer works, widening of lanes – to 3.7m with 3m surfaced shoulders, construction of bridges, a traffic circle and reconstruction of kerbs.

Project title: Upgrading of the R573 from Hendrina to the Hendrina Power Station.
Project value: SANRAL’s Northern Region Manager, Regional Manager for SANRAL’s Northern Region, road safety is top of mind in the planning and design of infrastructure.

“SANRAL always prioritises the safety of road-users, both motorists and pedestrians, in the design of national roads. We strive to introduce balanced and safer engineering solutions based on the type of area as well as traffic and pedestrian activity on to the road,” says Hlahla.

One such example is the introduction of roundabouts - also known as traffic circles – as speed calming measures in the upgrading of the R573 Moloto Road project.

Previously dubbed “the road of death” due to the high number of crashes, Moloto Road is one of the country’s busiest routes, connecting Gauteng, Mpumalanga and Limpopo provinces.

On average it is used by approximately 150 000 commuters daily. Traffic consists of private vehicles, buses, taxis and heavy trucks.

“The objective is to make the road safer for pedestrians. Many lives have been lost due to dangerous crossing of the road. We will also provide safer access roads to private properties and farms in the area,” he said.

The roundabouts are a much safer design for this project compared to other intersections, such as T-junctions. They have the advantage of reducing conflict points, achieving traffic calming in that they compel traffic to reduce speed but not come to a complete stop, explained Hlahla.

There are four roundabouts planned for the first phase of the project, three in Mpumalanga – at Vlaaikraal 1 & 2 and Tweefontein – and one in Limpopo – at the intersection of the N11 and R573 in Marble Hall.

In the Mpumalanga section of the R573, two of the three roundabouts will be four-legged, meaning they will have four exit points to accommodate traffic from four directions; and one will be three-legged with three exit points for traffic from three directions. All the roundabouts will have an 18m radius. The main roads will be 400m in length approaching the roundabouts, and 100m for secondary roads.

In Limpopo, the main intersection at Marble Hall will be configured from a simple T-junction into a four-legged roundabout with two-lane, 4.8m wide with a 50m outside diameter. This will help alleviate traffic and accommodate the heavy vehicles carrying mining equipment passing through the town.

Other engineering interventions include the construction of a butterfly intersection at Mathys Zyn Loop. The total width of the road will be 13.4m with 3.7m for each lane and 3m shoulders on both sides.

The roundabouts are much safer

Deciding on the best interventions to build quality and safer roads can be a challenge, but it is something that the engineers at SANRAL do well.

According to Progress Hlahla, Regional Manager for SANRAL’s Northern Region, road safety is top of mind in the planning and design of infrastructure.

“SANRAL always prioritises the safety of road-users, both motorists and pedestrians, in the design of national roads. We strive to introduce balanced and safer engineering solutions based on the type of area as well as traffic and pedestrian activity on to the road,” says Hlahla.

One such example is the introduction of roundabouts - also known as traffic circles – as speed calming measures in the upgrading of the R573 Moloto Road project.

Previously dubbed “the road of death” due to the high number of crashes, Moloto Road is one of the country’s busiest routes, connecting Gauteng, Mpumalanga and Limpopo provinces.

On average it is used by approximately 150 000 commuters daily. Traffic consists of private vehicles, buses, taxis and heavy trucks.

“The objective is to make the road safer for pedestrians. Many lives have been lost due to dangerous crossing of the road. We will also provide safer access roads to private properties and farms in the area,” he said.

The roundabouts are a much safer design for this project compared to other intersections, such as T-junctions. They have the advantage of reducing conflict points, achieving traffic calming in that they compel traffic to reduce speed but not come to a complete stop, explained Hlahla.

There are four roundabouts planned for the first phase of the project, three in Mpumalanga – at Vlaaikraal 1 & 2 and Tweefontein – and one in Limpopo – at the intersection of the N11 and R573 in Marble Hall.

In the Mpumalanga section of the R573, two of the three roundabouts will be four-legged, meaning they will have four exit points to accommodate traffic from four directions; and one will be three-legged with three
The upgrade of the N7 in Malmesbury goes way beyond construction and has social inclusion at its very core. With a budget of R505m, this project has since January 2015 created more than 500 work opportunities for local residents. As such, Project Liaison Officer, Michelle Phillips, made sure that more than 150 local residents benefit from SANRAL’s projects are engineered to not only create transport solutions, but to touch lives right to the core of our country.”

The existing single carriageway of the N7 Section 1 from km48 to km52 is being upgraded to a dual carriageway freeway. This has far-reaching consequences in terms of the economic development of this town. The total project cost is R66m, of which 23% was earmarked for SMME contractor development. Furthermore, 10% of the SMMEs were sourced from the surrounding communities and where needed, particular attention was given to capacity building and skills development.

The third phase of the overall upgrade of the N7 is concentrated at the Tierfontein intersection, where approximately 9km of the N7 is being constructed to produce a dual carriageway freeway. The first stage is the construction of the southern carriageway, which comprises two lanes of 3.7m in width. Once this is completed, traffic will be diverted onto this new section, followed by the construction of the northern carriageway to the same standards and measurements.

This project comes at a cost of R760m, of which R40m goes to funding local labour and a further R130m for the construction started in August 2017, and it is anticipated that work will be completed early 2019.

On a project of this magnitude challenges are par for the course, and according to Grant White, Site Agent of the Stefanutti Stocks Power Consortium, pedestrian and traffic accommodation during construction was one the major challenges, but lauds the community for the patience and cooperation during the construction period.

The intersections were considered unsafe for motorists, as those travelling from Olifantsheok on the N14 would have to come to a complete stop at the intersection, to either turn left towards Kathu or turn right onto the R325 towards Postmasburg. Very often motorists did not anticipate this complete halt on a national road, and proceeded straight across the intersection into the veld, sometimes resulting in tragic fatalities.

With industrial and residential expansion, the Kathu North and South intersections were experiencing significant increases in traffic volumes, which further compromised safety and road capacity.

The total project cost is R66m, of which 23% was earmarked for SMME contractor development. Furthermore, 10% of the SMMEs were sourced from the surrounding communities and where needed, particular attention was given to capacity building and skills development.

This project also incorporates a partnership with the Northern Cape Department of Roads and Public Works, which saw SANRAL take care of the repair, widening and re-seal of approximately 3.5km of the R380, which forms part of the Western leg of the Kathu South Intersection.

Construction started in August 2017, and it is anticipated that the project will be completed in January 2020.
About SANRAL

South Africa needs well-maintained national roads that promote the economy, social cohesion and a prosperous society. The entity charged with doing so is the South African National Roads Agency SOC Limited (SANRAL). Our mandate is to finance, improve, manage and maintain the national road network, the premier roads which connect South Africa's economic hubs, supporting economic growth and social development and contribute to job creation.

We are recognised as a global leader in engineering, technology and mobilising public-private sector partnerships to keep the network in excellent condition.

We are also committed to protect and preserve the environment through innovative solutions.

SANRAL adds value to all the developmental initiatives in the fields of transport, education, health and development of communities. We revel in our role as partners in the development of all South African communities and see this as closely aligned to our core function.

SANRAL makes a significant contribution towards road safety by maintaining and improving our road environment, and by identifying and addressing road safety concerns.

SANRAL operated tolls

SANRAL manages the N1 South toll road between Gauteng and Bloemfontein, the N1 North toll road between Bela-Bela and Beitbridge, the N1 toll road at Huguenot Tunnel in the Western Cape, the N2 South and the N2 North toll roads along the KwaZulu-Natal east coast, the N2 Tsitsikamma toll road near Knysna, the N3 Marianhill toll road, the N4 toll road at Pelindaba west of Pretoria and the N17 toll road east of Johannesburg. Electronic Toll Collection (Pty) Ltd (ETC) manages the open road tolling or e-toll system on the inner-Gauteng highways. The company was incorporated in 2005 and is based in Centurion. It developed suitable technology which captures and processes traffic data. It also built IT systems which processes vast amounts of data on road users across Gauteng, including the Customer Service Centre and outlets, staff training, IT equipment and a fully functional website.

Ever wondered what our Blue Marker Boards are for?

If you need help

Blue marker boards are located every 200m or every 1 kilometre on all national roads. Use this to report your exact location. Numbers to call are listed per area under concessionaires and the i-Traffic section on this map.

Saving lives through technology

Accurate information about expected travel conditions and incidents that might have occurred on the way ahead is a key ingredient of SANRAL’s approach to utilise modern technology to save lives. Information about expected travel conditions is made available by way of strategically located Variable Message Signs (VMS) and also SANRAL’s i-Traffic website while real time information is conveyed to the three Twitter accounts. These services are already available on the major freeways in Gauteng, KwaZulu-Natal and the Western Cape.

In Gauteng, the system also offers emergency services to road users, which consists of towing vehicles to clear the scene of a crash, incident response teams to manage traffic and restore traffic flow, medical response vehicles with life support equipment and “medics on bikes” who can rush to provide assistance during peak hours.

Follow us on

facebook.com/sanralza
twitter @SANRAL.za
@sanral.za
www.sanral.co.za

SANRAL Corporate

www.sanral.co.za

SANRAL FRAUD HOTLINE: 0800 204 558
WEBSITE: www.nra.co.za / www.sanral.co.za

CAPE TOWN @CapeTownFreeway
GAUTENG @itrafficgp
KWAZULU-NATAL @i_trafficKZN

Report any incident on the Gauteng Freeway to:
0800 487 233
Report any incident on the Cape Town Freeway to:
0800 66 64 63
Report any incident on the KZN Freeway to:
033 846 2860

SANRAL operated tolls
SANRAL manages the N1 South toll road between Gauteng and Bloemfontein, the N1 North toll road between Bela-Bela and Beitbridge, the N1 toll road at Huguenot Tunnel in the Western Cape, the N2 South and the N2 North toll roads along the KwaZulu-Natal east coast, the N2 Tsitsikamma toll road near Knysna, the N3 Marianhill toll road, the N4 toll road at Pelindaba west of Pretoria and the N17 toll road east of Johannesburg. Electronic Toll Collection (Pty) Ltd (ETC) manages the open road tolling or e-toll system on the inner-Gauteng highways. The company was incorporated in 2005 and is based in Centurion. It developed suitable technology which captures and processes traffic data. It also built IT systems which processes vast amounts of data on road users across Gauteng, including the Customer Service Centre and outlets, staff training, IT equipment and a fully functional website.
Only 13% of SANRAL’s network is tolled. In addition, SANRAL has been the pioneer in pursuing and sustaining successful public-private partnerships (PPPs), which has rendered substantial dividends over the years for South Africa. SANRAL has three PPPs with its concessionaires – the N3 Toll Concession (BP) (Pty) Ltd (N3TC), the N1/N4 Bakwena Platinum Corridor Concession (Bakwena) and the Trans African Concession (TRAC) – which enable it to reduce the cost of transport, provide safer and more reliable road infrastructure, and build the economy of South Africa and its neighbours. The concessionaires are contracted to return the roads to the State free of debt and in a predetermined condition at the end of each respective concession. This will enable government to operate these roads without having to make major improvements for several years after the concessions end.

Concessionaires

<table>
<thead>
<tr>
<th>NATIONAL ROUTE</th>
<th>PLAZA</th>
<th>TEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1 Huguenot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huguenot</td>
<td>021 862 4400</td>
<td></td>
</tr>
<tr>
<td>N1 South</td>
<td>Verkeerdevlei</td>
<td>051 841 3000</td>
</tr>
<tr>
<td></td>
<td>Vaal</td>
<td>056 818 1199</td>
</tr>
<tr>
<td></td>
<td>Grasmere</td>
<td>011 855 1034</td>
</tr>
<tr>
<td></td>
<td>N1 North</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kranskop</td>
<td>014 717 5396</td>
</tr>
<tr>
<td></td>
<td>Nyl</td>
<td>015 491 4783</td>
</tr>
<tr>
<td></td>
<td>Sebetilela</td>
<td>015 491 4783</td>
</tr>
<tr>
<td></td>
<td>Capricorn</td>
<td>015 527 0160</td>
</tr>
<tr>
<td></td>
<td>Baobab</td>
<td>015 534 1322</td>
</tr>
<tr>
<td></td>
<td>R30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brandfort</td>
<td>051 821 0907</td>
</tr>
<tr>
<td></td>
<td>N2 Tltsikamma</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tltsikamma</td>
<td>044 531 6767</td>
</tr>
<tr>
<td></td>
<td>N2 South Coast</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Izoatsa</td>
<td>039 682 4076</td>
</tr>
<tr>
<td></td>
<td>Oribi</td>
<td>039 682 4076</td>
</tr>
<tr>
<td></td>
<td>Umtentweni</td>
<td>039 682 4076</td>
</tr>
<tr>
<td></td>
<td>N2 North Coast</td>
<td></td>
</tr>
<tr>
<td></td>
<td>KSA</td>
<td>032 945 5006</td>
</tr>
<tr>
<td></td>
<td>oThongathi</td>
<td>032 945 1237</td>
</tr>
<tr>
<td></td>
<td>Mvoti</td>
<td>032 945 3794</td>
</tr>
<tr>
<td></td>
<td>Mandini</td>
<td>032 945 3794</td>
</tr>
<tr>
<td></td>
<td>Dokodweni</td>
<td>032 945 3794</td>
</tr>
<tr>
<td></td>
<td>Mnunzini</td>
<td>032 945 3794</td>
</tr>
<tr>
<td></td>
<td>N3 Marrianhill</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marianhill</td>
<td>031 700 3616</td>
</tr>
<tr>
<td></td>
<td>N4 Magalies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pelindaba</td>
<td>012 386 0278</td>
</tr>
<tr>
<td></td>
<td>Quaggga</td>
<td>012 386 0278/010 060 2687</td>
</tr>
<tr>
<td></td>
<td>N17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gosforth</td>
<td>011 902 1575</td>
</tr>
<tr>
<td></td>
<td>Dalpark</td>
<td>011 915 8620</td>
</tr>
</tbody>
</table>

Toll plazas managed by BAKWENA Customer Care line for all enquiries: 0800 225 9362

Mainline Plazas

- N1 - Pumulani
- N1 - Carousel
- N4 - Swartruuggens
- N4 - Doornpoort

Ramp Plazas

- N1 - Maubane
- N1 - Storomydi
- N1 - Zambesi
- N1 - Wallmanshal
- N1 - Hampmanskraal

Toll plazas managed by N3TC Customer Care line for all enquiries: 0800 63 4357 (0800 N3 HELP)

Mainline Plazas

- Mooi
- Tugela
- Wilge
- De Hoek

Ramp Plazas

- Mooi
- Trevertont
- Bergville
- Tugela East

Toll plazas managed by TRAC Customer Care line for all enquiries: 0800 872 264

Mainline Plazas

- Diamond Hill
- Middelburg
- Machado
- Nkomazi
- Moamba
- Maputo

Ramp Plazas

- Donkerhoek
- Cullinan
- Valtaki
- Ekandustria

Provincial departments

Provinces are responsible for regional roads and enforcement activities on the national and provincial roads in their provinces.

Gauteng
Department of Roads and Transport
Tel: 011 355 7000
www.ggp.gov.za
Department of Community Safety
Tel: 011 689 3600
www.gautsafety.ggp.gov.za

Mpumalanga
Department of Public Works, Roads and Transport
Tel: 013 766 6696/6979
Department of Safety, Security and Liaison
Tel: 013 766 4059
www.mpumulanga.gov.za

KwaZulu-Natal
Department of Transport
Tel: 033 341 2621
www.kzntransport.gov.za

North West
Department of Public Works and Roads
Tel: 018 388 1435
Department of Community Safety and Transport Management
Tel: 018 361 9100
www.nwpg.gov.za

Eastern Cape
Department of Roads and Public Works
Tel: 043 604 7400
www.easterncape.gov.za
Department of Safety and Liaison
Tel: 040 639 4487
www.esn.gov.za

Limpopo
Department of Public Works and Roads
Tel: 015 295 1000
Department of Safety, Security and Liaison
Tel: 015 290 2972
www.limpopo.gov.za

Northern Cape
Department of Roads and Public Works
Tel: 053 839 2100
Department of Transport, Safety and Liaison
Tel: 053 839 2100
www.northerncape.gov.za

Western Cape
Department of Transport and Public Works
Tel: 021 483 2078
Department of Community Safety
Tel: 021 483 6481/6829
www.capecateway.gov.za

Contact Information

Head Office
48 Tonnamie Avenue, Val de Grace, Pretoria
P.O.Box 415, Pretoria, 0001
www.nra.co.za
012 844 8000

Northern Region
36 Jeppe Street, Menlo Park, Pretoria
Private Bag x 17, Lynnwood Ridge, 0040
www.nra.co.za
012 346 1512

Western Region
13 Havenbok Street, Oakdale, Bellville
Private Bag X 19, Bellville, 7530
www.nra.co.za
021 957 4600

Eastern Region
68 Van Ekeren Place, Miekendini, Pietermaritzburg
P.O. Box 100410, Scottsville, 3029
www.nra.co.za
033 352 8100

Southern Region
Southern Life Gardens, Block C, 70 Second Avenue, Newton Park, Port Elizabeth
P.O. Box 27230, Greenacres, 6057
www.nra.co.za
041 398 3200

Department of Transport and Public Works
Western Cape
www.westerncape.gov.za
Tel: 021 957 4600

Department of Roads and Public Works
Northern Cape
www.northerncape.gov.za
Tel: 053 839 2100

Department of Public Works,
Mpumalanga
www.mpumulanga.gov.za
Tel: 013 766 4059

Department of Safety, Security and Liaison
KwaZulu-Natal
www.kzntransport.gov.za
Tel: 033 341 2621

Department of Public Works, Roads, and Transport
North West
www.nwpg.gov.za
Tel: 018 361 9100

Department of Community Safety and Transport Management
Eastern Cape
www.easterncape.gov.za
Tel: 043 604 7400

Department of Safety and Liaison
Limpopo
www.limpopo.gov.za
Tel: 015 295 1000

Department of Safety, Security and Liaison
Northern Cape
www.northerncape.gov.za
Tel: 053 839 2100

Department of Community Safety
Western Cape
www.capecateway.gov.za
Tel: 021 483 2078

Department of Community Safety and Transport
KwaZulu-Natal
www.kzntransport.gov.za
Tel: 033 355 8600

Department of Community Safety and Liaison
Mpumalanga
www.mpumulanga.gov.za
Tel: 013 766 4059

Department of Community Safety
Gauteng
www.ggp.gov.za
Tel: 011 355 7000

Department of Community Safety
Western Cape
www.westerncape.gov.za
Tel: 021 957 4600

Department of Transportation
Northern Cape
www.northerncape.gov.za
Tel: 053 839 2100

Department of Community Safety and Transport
Eastern Cape
www.easterncape.gov.za
Tel: 043 604 7400

Department of Community Safety and Liaison
Positive response to proposed N3 corridor upgrades

There has generally been positive response to the proposed N3 capacity improvements between Durban and Pietermaritzburg, following three days of public hearings held in 2018.

The widening - and realignment in sections - of the 84km N3 Corridor between EB Cloete interchange in Durban and Twickenham Road in Pietermaritzburg is being undertaken by the agency because the N3 is presently operating near full capacity.

Ravi Ronny, SANRAL Eastern Region Design and Construction Manager, said the road improvements are subject to the provisions of the National Environmental Management Act, and require environmental authorisation from the National Department of Environmental Affairs.

He said an integral component of environmental assessment is public participation where interested and affected parties are encouraged to participate actively in road related developments in which they have an interest or which may affect them.

The hearings at Cato Ridge, Camperdown and Pietermaritzburg afforded the public the opportunity to learn about SANRAL’s proposals, to view graphic representations of what is proposed, to obtain further information and to engage directly with officials from SANRAL, as well as the design engineers and the environmental assessment practitioner.

Ronny said according to information gathered by environmental consultants Ace Africa, it is estimated that 150 interested and affected parties attended the information-sharing sessions over three days.

*In general, the members of the public who attended are positive about the proposed improvements.

*Where people are directly affected in terms of their properties, they are obviously concerned.

*There are some properties that are seriously affected by the land acquisition that will be required and these will need to be dealt with on a case-by-case basis by SANRAL’s property division,* said Ronny.

Other common complaints/concerns/objections related to noise during construction and from the increased traffic after improvements and construction disruptions.

The N3 Durban-Pietermaritzburg upgrade over the next six to eight years will provide for an additional two to three lanes per direction and substantial interchange reconfigurations to accommodate future traffic growth and improve safety.

Widening will be accommodated as far as possible within the existing median and road reserve, but additional land will need to be acquired in some areas.

The project will involve modification of existing bridges, crossroads and drainage, construction of some new infrastructure and demolition of redundant structures.

Realignment/relocation of services in the existing road reserve will also be undertaken.

Ronny said the N3 Corridor is essential if one of government’s strategic integrated projects linking the Port of Durban with Gauteng, South Africa’s economic heartland, is to succeed.

If the upgrades do not go ahead, it is estimated that users of the N3 will continue to suffer losses of nearly R800 million per annum - due to accidents and time delays. R175m can be attributed to time delays and between R250 000 and R295 000 per hour to crashes and road closures due to crashes. These estimates are already five years old.

Ronny said the N3 carries in excess of 40 000 vehicles per day around Pietermaritzburg and consists of a mix of urban commuter traffic, long distance traffic and substantial heavy vehicles, with some sections in excess of 25% heavy vehicles.

“More that 75 million tons of freight per annum are carried on the N3 corridor, with approximately 9 000 heavy vehicles using the national road per day.

“Durban is by far South Africa’s busiest port with over 80% of goods moving along this corridor by road.

“Therefore, the need to consider the best economic solutions to ensure the seamless flow of freight is very important to this corridor,” said Ronny, adding any blockage on the N3 causing its closure was tantamount to a national crisis.

**Project information:**

Project start date: Phase 1 to commence by mid 2020

How much is budgeted for the project: R13bn

What measures does SANRAL have in place to minimise disruptions during the construction period?

We will be embarking on an enterprise-development programme in line with SANRAL’s 14 Point Plan prior to construction to ensure we have buy in from all the affected stakeholders.

**Recycling of old asphalt reduces costs**

A single carriageway between Kroonstad to Hoffontein in the Free State is being upgraded to a four-lane dual carriageway, thus reducing accidents and drastically easing congestion.

The project commenced in 2015 and was completed in 2018.

Louw Venter, construction manager at Hilary Construction said: “There was increasing congestion on this road just before Kroonstad going towards Ventersburg, which necessitated the widening of the road. There were also many serious crashes.”

Some innovations were made during the construction of this road. At least 40% of the old road surface was recycled to be used in producing asphalt for the new road. This not only reduces the cost of the road but is also environmentally friendly.

Boet Raath, Plant and Surfacing Manager on the project said: “We recycled the old road and mixed it into the new asphalt and surfaced it onto the new road.”

The labour complement on the project was a mix of experienced staff and local labourers from Kroonstad. The locals had to be trained before the project started and that has given them valuable skills which will help them secure jobs in the future.

A local company, Godfrey Mmuso, was subcontracted to the main contractor, Hilary Construction. They did concrete work, v-drains and stone pitching.

Palesa Pete, director at the company, said: “We joined the project in August 2017 and have learnt so much since. I would have never received the opportunity to work on a national road had it not been for SANRAL.”

SANRAL insists on quality products and work so our standard of work has improved tremendously. Participating in the project will also help improve our CIDB grading level.

The project included a bridge which serves as an interchange between Hoffontein and Ventersburg. Bridge 322 connects two former gravel roads, one travelling east and the other west to Ventersburg.

The road was dropped so that the the N1 travels under the bridge.

Bridge 322 is the biggest bridge in the project. It is a post-stanchion bridge, as opposed to the traditional in-situ cast bridge.

Assistant Resident Engineer on the bridge project, Hans Stemperman, said: “The older bridges used a lot of steel for reinforcement. But this bridge has cables to hold up the weight.”

One of the major challenges for the project was the heavy rainfall. The place where the bridge is taking place is a low-lying area. Culverts are being built to direct and control the flow of the water.
Completion of access roads connects communities

The completion of community access roads and haul routes are creating a safer route for pedestrians and motorists travelling between two villages in Lusikisiki.

The completed roads are also connecting two municipal wards and traditional areas managed by two chiefs.

SANRAL's 24-month project provided training for 11 SMMEs and 11 supervisors of which 73% were youth-owned SMMEs and 36% were women-owned SMMEs.

In addition, there were 165 jobs created, and training was given to165 employees who were subsequently awarded NQF Level 2 certificates.

Mbulelo Peterson, SANRAL's Southern Region Manager said: “The new road network (three separate but connected roads) will allow the community to travel safely from the rural areas to the interchange of the future N2 Wild Coast Road.”

Old gravel roads and earth track were upgraded. The scope of work included the construction of 4.5km of cape seal surfaced road with concrete at sections with steep gradient through the communities; building v-drains; manufacturing kerbs and bollards; construction of box culverts and sidewalks; manufacturing kerbs and bollards; construction of box culverts and sidewalks; and upgrading access and parking area at two schools and a TVET college.

The road passes two fairly large well-established schools. Access by vehicle as well as safer pedestrian traffic will be offered by the new road and sidewalks.

SMMEs with catering businesses also benefited from the project and the structure that was built for training is now being used by the community and schools.

Gcobani Socenywa, SANRAL Southern Region Project Manager said: “The group of trainee contractors are all keen and should develop into future potential contractors.”

The kerbs and bollards were manufactured on site. The kerbs were tested at Controlab in East London and passed the requirements for the SABS 927-1969. “Passing the SABS requirements is an indication of the training and quality control on site,” Peterson said.

“Despite the community’s initial scepticism about the project now that it is completed, they are happy about the roads.”

Further to SANRAL’s community development initiatives, former Umkhonto Wesizwe Military Veterans were also employed as security guards on the project.

Siphelele Msindwana and Lindiwe Nokhele formed Gandundu Nkungu JV on the project and worked on 700m section of the road.

Msindwana and Nokhele manufactured more than 3000 kerbs and more than 400 bollards which were used on the project. They also built v-drains and two box culverts (small bridges) that connects Mcobotini and Gosco villages.

“The culverts are built in areas where the river overflows and overtops the road thus making it difficult for people to cross, especially the students who have to attend school. We supplied the entire programme with kerbs,” said Msindwana.

Msindwana and Nokhele look forward to growing their business. “We complement each other, and our experience will carry us forward. We hope we will upgrade to CIDB level 4 CEPE or CIDB level 5 CEPE.”

“We have been tendering for work. The town is busy developing and we hope to be established business owners by then. The main challenge is competing with large developed manufacturers,” Msindwana said.

Andiswa Joyi and Siyanda Medlana formed Khubeja JV.

“Before working on this project I was unemployed. I am happy that I got an opportunity to work on this project. My goal is to work on the N2 Wild Coast project,” said Joyi.

Mthobeli Biyela was appointed as a public liaison officer (PLO) on 18 July 2016. He completed his N6 in Management Assistant at the Ingwe TVET College.

“Before working on this project I was unemployed and today I own a car. We used to depend on my mother’s pension and child grant, today I am able to provide for my family. As the PLO I was appointed to work with chiefs, councillors, SMMEs and communities to talk about the project and the work being done on the community access road being built in Lusikisiki,” Biyela said.

ADDITIONAL TRAINING

It was not easy to find a local qualified safety officer in Lusikisiki. SANRAL eventually found someone who ran her own safety officer business although the qualification was not registered.

“We assisted her in completing the application to be a registered health and safety officer to the South African Council for Project and Construction Management Professions (SACPMP). We also registered her with the South African Institute of Occupational Safety and Health (SAIOSH) as a technical member, which gives her access to further training, information and other opportunities. During the project she worked on site as the safety officer under the guidance of the Safety Manager (Construction Manager on site). Four other residents also received training for health and safety.

“The additional aim of the project was to deliver the outcomes in such a way that as much as possible of the total economic spend on the project remained within the community and to provide as many skills as possible onto the community,” Peterson said.
A glimpse of SANRAL’s major road upgrades

SANRAL’s road building and rehabilitation activities are so spread out over South Africa that much of it goes unnoticed. The reasons for the various road upgrades differ. In some cases, it is because there is increasing traffic; in others it is to enhance access to boost tourism, basic services and economic activity. Here is a glimpse of some of these projects.

In Kathu in the Northern Cape, there has been an increase in industrial and residential expansion. An increase in traffic meant that intersections at Olifantshoek, Kathu South and Kathu North were upgraded. Particular attention was given to capacity building and skills development for contracting SMMEs from surrounding communities.

In the Free State is the stretch of the N1 between the Winburg interchange and Winburg Station on the way to Bloemfontein, which was upgraded to a four-lane highway.

Another highway that divides communities is the N2 near George, but SANRAL is linking them by building a pedestrian bridge across the road, giving access to schools, shops and businesses. On the other side of the Western Cape, an 11-span bridge across the Olifants River is a major part of the upgrade of the N7, the major connector with Namibia.

In Mpumalanga, tourism was boosted when the R570 to Jeppes Reef on the Swaziland border was improved, as well as the N11 between Middelburg and the Loskop Dam. Increased coal and agricultural transport needs led to the upgrade of the same N11 between Hendrina and Hendrina Power Station.

In Limpopo, the N1 divides the town of Botlokwa. SANRAL lowered the road, fenced it off and built a road bridge on the existing ground level, along with two pedestrian bridges. The community is no longer inconvenienced when crossing the road and it is safe to do so, as the highway is inaccessible.

In Nelspruit, the N11 between Harrismith and Industriepad was upgraded, again due to the high volume of traffic. The work included a new interchange, widening the road to four lanes, taxi-laybys and pedestrian facilities.

In the Eastern Cape, the major improvement of the N1 included the section between Mthatha to Ngceleni. The project forms part of a bigger master plan for tourism and other long-term mega projects in the Eastern Cape.

Inland the R510, which runs from Rustenburg in the North West to the border of Limpopo, has been upgraded and is expected to increase road safety and ease traffic. The road is now much more comfortable for drivers and safer for pedestrians. It has brought considerable economic benefits to emerging contractors and suppliers in the area.

SANRAL plans well in advance: SANRAL plans its CAPEX projects decades in advance, submits those plans to Treasury to allocate funds, or alternatively designates them as toll roads, which are then funded through public-private partnerships. These CAPEX projects are multi-year, multimillion-rand development projects.
Driving conditions are essentially how a motorist experiences the condition of a road, or how smooth the ride is. This has to do with the way the road was built, but significantly the effectiveness and frequency with which it has been maintained.

The effectiveness of the agency’s maintenance programme is measured against internationally used standards:

- Road roughness, for which the desired standard is less than 4.2m/km
- Rut depth, where the standard is less than 20mm. Depressions deeper than this can hold water and cause vehicles to aquaplane
- Macro-texture, where the desired texture is higher than 0.4mm. The coarseness of the road surface affects friction and safety at speeds exceeding 60km/h in wet conditions.

South Africa’s roads scored very high in 2017/18, as the graph illustrates:

- Road roughness 97%
- Rut depth 99%
- Macro-texture 99%

SANRAL measures surface deflections on the national road network using custom-developed road survey vehicles. The information collected by the survey vehicle is of great value in identifying strategies for developing and maintaining the road network.

The survey vehicle enables SANRAL to complete a deflection survey of the whole national road network at 1m intervals in less than six months – a process which previously would have taken 46 years at 6m intervals using old stationary measurements.

It allows for profile measurements at 100km/h for roughness, rut depth, macro texture, vertical alignment, cross fall, 2D right of way video and 3D surface crack video.

The surveillance truck provides a continuous picture of the roads, ensuring that roadside activities are fully integrated with the centralised asset and work management systems, providing real-time visibility of the conditions of the road assets.

The older technology had to be stationary, thus the new truck improves the safety of operators and road users.

Measuring surface deflections

SANRAL measures surface deflections on the national road network using custom-developed road survey vehicles. The information collected by the survey vehicle is of great value in identifying strategies for developing and maintaining the road network.

The survey vehicle enables SANRAL to complete a deflection survey of the whole national road network at 1m intervals in less than six months – a process which previously would have taken 46 years at 6m intervals using old stationary measurements.

It allows for profile measurements at 100km/h for roughness, rut depth, macro texture, vertical alignment, cross fall, 2D right of way video and 3D surface crack video.

The surveillance truck provides a continuous picture of the roads, ensuring that roadside activities are fully integrated with the centralised asset and work management systems, providing real-time visibility of the conditions of the road assets.

The older technology had to be stationary, thus the new truck improves the safety of operators and road users.

A smooth ride

SANRAL measures surface deflections on the national road network using custom-developed road survey vehicles. The information collected by the survey vehicle is of great value in identifying strategies for developing and maintaining the road network.

The survey vehicle enables SANRAL to complete a deflection survey of the whole national road network at 1m intervals in less than six months – a process which previously would have taken 46 years at 6m intervals using old stationary measurements.

It allows for profile measurements at 100km/h for roughness, rut depth, macro texture, vertical alignment, cross fall, 2D right of way video and 3D surface crack video.

The surveillance truck provides a continuous picture of the roads, ensuring that roadside activities are fully integrated with the centralised asset and work management systems, providing real-time visibility of the conditions of the road assets.

The older technology had to be stationary, thus the new truck improves the safety of operators and road users.

A smooth ride

Driving conditions are essentially how a motorist experiences the condition of a road, or how smooth the ride is. This has to do with the way the road was built, but significantly the effectiveness and frequency with which it has been maintained.

The effectiveness of the agency’s maintenance programme is measured against internationally used standards:

- Road roughness, for which the desired standard is less than 4.2m/km
- Rut depth, where the standard is less than 20mm. Depressions deeper than this can hold water and cause vehicles to aquaplane
- Macro-texture, where the desired texture is higher than 0.4mm. The coarseness of the road surface affects friction and safety at speeds exceeding 60km/h in wet conditions.

South Africa’s roads scored very high in 2017/18, as the graph illustrates:

- Road roughness 97%
- Rut depth 99%
- Macro-texture 99%