

# The construction of the KwaMsane community access roads and pedestrian facilities – Phase 2



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THE South African National Roads Agency SOC Limited (SANRAL) recognised the need to reduce the potential for accidents on a section of the N2 near Mtubatuba which passes through the township of KwaMsane. Goba (Pty) Ltd were appointed by SANRAL as the consulting engineers for the design and construction supervision of the KwaMsane Community Access Roads and Pedestrian Facilities, Phase 2. The project lies within

the Mtubatuba Local Municipality and is situated adjacent to National Route 2, Section 30, near Mtubatuba in Northern KwaZulu-Natal.

This community project includes the upgrading of three community access roads, namely the Western Collector, the Eastern Collector and the N2 Underpass (which connects the Western and Eastern Collectors) from an existing heavily fatigued (potholed), surfaced road to a continuously reinforced concrete (CRC) pavement. The existing badly potholed roads within the township resulted in pedestrians and taxis using this portion of the N2 as a collection and drop-off area, as the roads were almost impassable, particularly during the wet season. The local municipality were unable to effectively maintain the roads due to the high recurrence of potholes caused by a weak pavement structure and weak in-situ subgrades.

In addition to the 2.8 km long upgrade of the roads, additional pedestrian facilities were constructed along the Eastern Collector and N2 Underpass to ensure safe passage for the local scholars from two nearby schools.

## CONCEPTUAL DESIGN AND CONSTRUCTION METHODS

The project was undertaken as a community upliftment project. SANRAL and Goba identified the need for a road system that was safe, provided pedestrian facilities and required minimal future maintenance.



Figure 1: KwaMsane access roads prior to construction



Figure 2: Western Collector construction utilising existing drains

Of the various pavement options considered, a CRC pavement was selected based on the high volumes of heavy vehicles from a nearby quarry and poor quality highly weathered basalt subgrades. By stipulating that construction had to be carried out by labour intensive means, the CRC pavement option provided an ideal opportunity to train and employ local labour.

In order to minimise future maintenance of the road, the concept of a perpetual pavement was introduced and a 150 mm thick CRC pavement, with an unsealed, tied and keyed longitudinal centre line joint was designed and constructed. The CRC pavement thickness was modelled using, amongst others, the design traffic loading obtained from data from the quarry located on the eastern side of the N2. The Cement and Concrete Institute's (C&CI) cncPave software was used to optimise the steel diameter and steel spacing required. The side drains were also tied to the concrete pavement to eliminate the need for a sealed joint there.

Upgrading of the Western Collector included the construction of the new pavement between the existing concrete-lined side drains, constructed under Phase 1 of the project. A survey of the existing road edge was carried out and a new



Figure 3: Hand placement of concrete



Figure 4: Course on concrete theory

longitudinal alignment was developed to take the existing varying cross fall and road crown into consideration.

Due to the nature of the topography and the alignment of the existing road infrastructure in the area, drainage on the Eastern Collector was identified as a crucial element in the design. Existing storm-water outlets were located on steep grades in certain areas and, due to the high concentration of stormwater, severe erosion and damage to properties occurred. This necessitated the design and construction of gabion storm water attenuating structures to curb existing erosion in these areas and to control future stormwater runoff into affected properties.

In order to maximise the benefits to the community on this project (local labour usage) it was a contractual requirement that the concrete be batched on site by means of mechanical mixers and hand placed.

Mazcon Civil and Building Contractors (Mazcon) were awarded the contract for the sum of R17 m and construction commenced in late June 2010. Mazcon is a black-owned construction company established in 2001 with a 7CEPE CIDB rating, and is a level 6 BEE contributor.

### COMMUNITY AND ENVIRONMENTAL INVOLVEMENT

To ensure maximisation of community participation in the project, two requirements were stipulated in the contract documentation. These were that a minimum of 8% of the total contract value should be spent on local labour and that at least 35% of the total project expenditure should be retained within the community and within the bounds of the Umkhanyakude District Municipality.

As part of the community upliftment programme, funds were allocated for

training within KwaMsane. The C&CI was approached by Goba to conduct an engineering training course for forty local labourers on the batching of concrete and the construction of a CRC pavement. The training course involved lectures on concrete theory and its applications, and a two-day practical workshop on the construction of a CRC pavement. The labourers who were trained were subsequently hired by the main contractor for the duration of the project and took immense pride in constructing their own roads.

To facilitate the training, Goba contacted a local school for the use of their premises during lectures presented by the C&CI. To increase the delegates' skills, Goba, together with Mazcon, facilitated training on steel fixing, formwork erection and concrete batching within the site camp before construction of a mandatory trial section to assess the skills knowledge gained.



Figure 5: Training on steel fixing

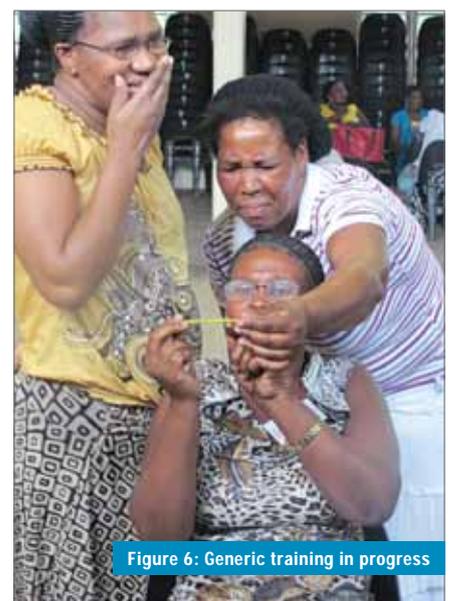


Figure 6: Generic training in progress



Figure 7: Refuse bins and bus bay shelters

Thirty local community members were also trained in home-based care as part of a generic training programme. Goba contracted Tholowethu Trading Enterprise to conduct a three-day training course in international home-based care, held at the Mtubatuba Town Hall.

The delegates were taught various methods of communication, community empowerment, community mobilisation and basic nursing care with specific reference to rural, elderly and HIV positive people. The knowledge gained was then taken out and used within the community.

As part of the entrepreneurial training, Goba recommended that Mazcon be assisted in attaining a recognised quality management system. Wynleigh International (Pty) Limited was contracted to assist Mazcon in compiling an in-house quality assurance plan. This would enable Mazcon to become more competitive in the market place and secure its position as an emerging contractor. Furthermore, a local construction company, Amajika General Trading 2, established under Phase 1 of the project, was appointed as a subcon-



Figure 8: Planting fruit trees within the community

tractor for the project. This company was utilised throughout the project for concrete batching, v-drain construction and pothole repairs amounting to nearly R600 000, and is envisaged to carry out maintenance on other surfaced roads in the township.

Two students received in-service training under Goba and Mascon's su-

pervision during the construction phase. A total of nearly R400 000 was spent on training as part of this contract.

Within the project, SANRAL had allocated funds for the construction of community facilities. Four projects were thus identified within the KwaMsane community.

The first project was to procure and install eight refuse bins around the KwaMsane community to reduce the amount of visible litter. This project was undertaken with the assistance of the Mtubatuba Municipality to ensure that refuse was removed and correctly disposed of.

The second project was to design and construct three bus shelters for the bus lay-bys along the new roadway. Two bus lay-bys and shelters were constructed at

identified locations along the Western Collector and one was constructed along the Eastern Collector.

The third project involved the re-grading of an internal access road within the community. The existing road had insufficient drainage, which was compounded by inconsistent town planning resulting in stormwater outlets at critical areas being blocked by local residents as the runoff was damaging their properties. Various alternate drainage options were

considered, with the selected option to regrade the existing road and construct proper drainage facilities along the road being implemented.

The fourth project involved the planting of fruit trees within the properties of local residents. Various local fruit-bearing trees were planted in selected areas to enhance the aesthetics of KwaMsane and provide a means of an alternative food source for local inhabitants. The expenditure for these community projects amounted to R780 000.

#### PROJECT TEAM

**Client** South African National Roads Agency SOC Limited

**Engineering Consultant** Goba (Pty) Ltd

**Main Contractor** Mazcon Civil and Building Contractors

#### CONCLUSION

The project, which will be completed within the allocated budget, is in the final stages of completion, with only minor auxiliary works requiring attention. The aim of reducing the number of pedestrians and vehicles on the N2 has largely been achieved, as there is a significant increase in commuter traffic, in particular taxis, along the upgraded local routes. Future planned phases will reduce the N2 traffic even further.

A total of nearly R5.3 million has been spent within the Umkhanyakude District, of which R2.1 million was spent on local labour, and a further R1.4 million within the local community. Based on the requirements stipulated, the project was a tremendous success, with all aspects regarding the community facilities, expenditure and training being met. In addition to the benefits for the community, the final product is aesthetically pleasing and was constructed to a high standard by the community themselves. □



Figure 9: Western Collector completed



Figure 10: Eastern Collector completed

Source:

[http://www.saice.org.za/downloads/monthly\\_publications/2012/2012-Civil-Engineering-September/#/0](http://www.saice.org.za/downloads/monthly_publications/2012/2012-Civil-Engineering-September/#/0)