

ACCESS MANAGEMENT IN RURAL MPUMALANGA ON THE P17/6

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ABSTRACT: P17/6 (R538) between Hazyview and White River in the Ehlanzeni district of the Mpumalanga province was rehabilitated. Construction started in November 2013, and the completion date was set for 30 November 2015. The Clients' objective was to rehabilitate the road to extend the structural life of the road with 20 years. Part of the scope was to determine the current level of service at some of the junctions and provide options to increase capacity and general safety thereof. Furthermore, the client indicated that access control is a problem on this road. The vast extending rural villages along the route were changing the road from a vehicle only route (mobility road) to a mixed vehicle and pedestrian route (activity or access street) (TRH 26, 2012). Thus, changing the road classification from a primary distributor to a district distributor or local distributor at certain sections (Guidelines for Human Settlement Planning and Design Vol II, 2000). Part of the scope was to investigate the possibilities of closing some of these accesses, combine accesses to one access point on the main road and moving property entrances away from the main road. An access management plan was developed during design stage. However, during construction stage it was unfeasible. The community was opposed against the changes and disrupted the works to an extent where the walkway and kerbing construction action became the critical path of the project. The problem had to be addressed on site and the goal to reinstate the road to a primary distributor was not met. The end result was a compromise between reinstating the road to a primary distributor and keeping the local community happy. Although, the safety of the road user and pedestrians and local traffic was improved, the level of service of the road had not. Recommendations regarding future access management plans includes the setting out of informal rural areas, before development start or as soon as development start. It also includes extreme measures such as the reclaim of the road reserves and upgrades of the local streets.

Keywords: Access management; Mpumalanga; rural roads; community

INTRODUCTION AND BACKGROUND

Lidwala Consulting Engineers SA (Pty) Ltd. was appointed for the rehabilitation of the P17/6 (R538) from Hazyview to White River in the Ehlanzeni District of the Mpumalanga Province. The road is about 32 km in length. The client however, indicated that 16 km of the route was to be rehabilitated as the first phase. This 16 km is located within the buildup area. The design stage started in February 2013, the contractor was appointed in October 2013 and the site handover was in November 2013, with a completion date set for 30 November 2015.

This article discuss the problems encountered and solutions formulated during the implementation of formalising accesses on the P17/6. Furthermore, the impact of unstructured informal accesses on the classification of the P17/6 was also investigated.

According to the South African Road Classification and Access Management Manual (TRH 26, 2012) an access is defined as any public or private road, driveway, ramp, path or intersection that crosses or connect to a main road. An access street is defined as where the movement requirements of the main road is seconded to the access function and activities associated with access (TRH 26, 2012).

Background

This road was classified as a primary distributor (Guidelines for Human Settlement Planning and Design Vol II, 2000) when established. The main function of the road is to connect Hazyview and White River as an alternative main route to the R40. It served several small villages along the route which have experienced significant infrastructure growth since. The road has become a major collector road for the communities living in the eleven Wards along the route (the project location is indicated in Figure 1).

The area along the P17/6 has grown extensively without formal control or management of accesses from the road authorities. This resulted in unstructured informal accesses every 10 to 50 m, which in turn has a direct impact on traffic safety, level of service, operating speed and traffic flow (TRH 26, 2012).

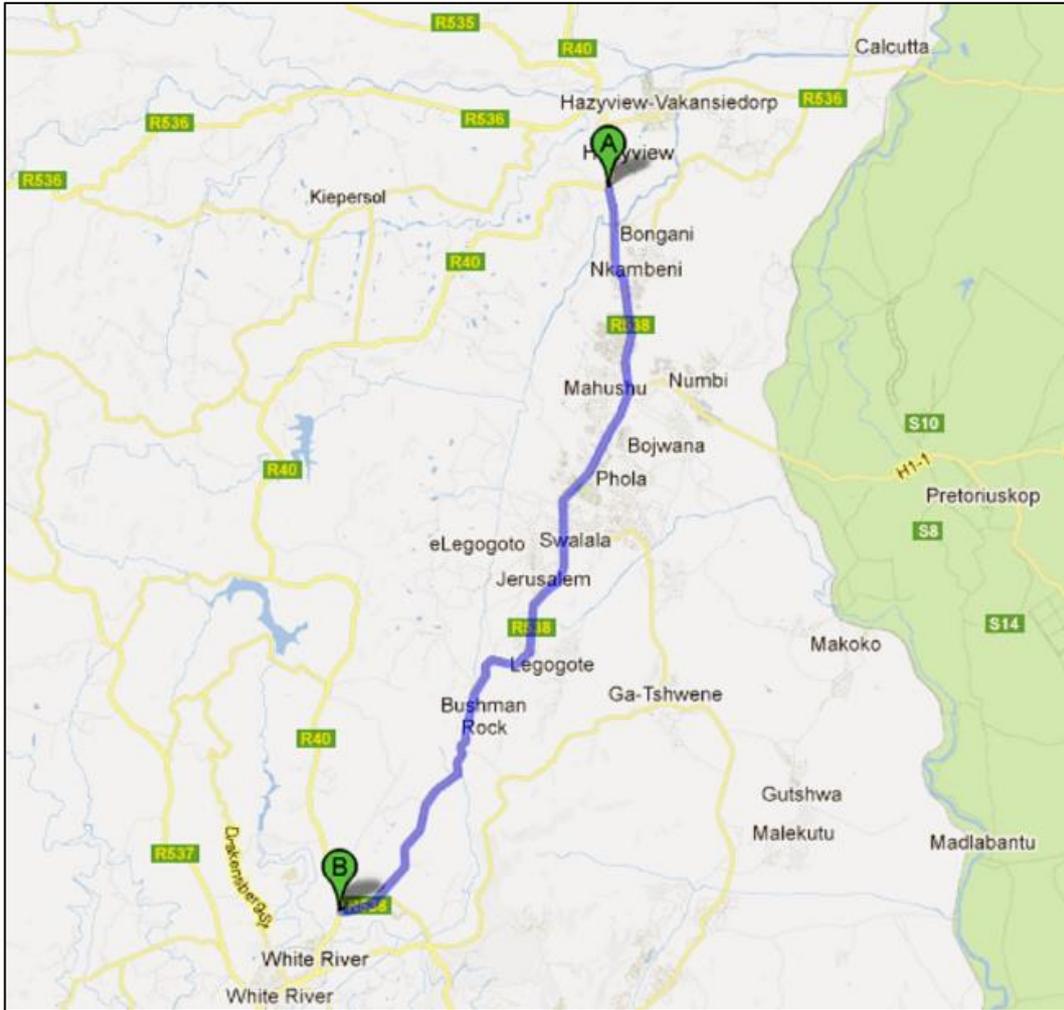


Figure 1: Locality Image (Google Maps, 2013)

The traffic on this road is high and therefore classify the road as a primary distributor and vehicle-only route. An electronic traffic count was conducted (24 hours over 7 days) at two positions along the road. Position A was located just south of the R40 to the south of Hazyview and position B was located just east of the R40 to the north of White River (see Figure 1). The traffic volumes on this road are high, as indicated in Table 1. These positions were chosen to determine the main traffic flow from and towards White River in relation to traffic flow from and towards Hazyview.

Table 1: Traffic Count April / May 2013

Station	ADT	Heavy Vehicles	% Heavy Vehicles
A – Hazyview	7849	555	7.1%
B – White River	7352	881	12.0%

Scope of work

The Clients' objective was to rehabilitate the road in order to extend the structural life of the road by 20 years. Part of the scope was to determine the current level of service at some of the junctions which exhibited insufficient capacity at current traffic flows and provide options to increase capacity and general safety thereof. Additionally the scope was to investigate the possibilities of limiting access points by closing accesses, combining accesses to one access point on the main road, and moving driveways away from the main road towards the internal road network.

ACCESS MANAGEMENT

According to the Guidelines for Human Settlement Planning and Design Vol I (2000) a primary distributor is a vehicle only route in the movement network. The vast rural villages extending along the route were however changing the road from vehicle only route to a mixed pedestrian and vehicle route, thus changing the road classification from a primary distributor to a district distributor or local distributor at certain sections.

The Guidelines for Human Settlement Planning and Design Vol I (2000) recommends 500 m spacing between successive intersections for a vehicle-only route. The increased number of junctions and informal accesses along the route have reached the spacing similar to a local street (10 to 50m). The road section under investigation has a total of approximately 214 access points along the route (estimated in 2012 during design stage). Thirteen of these accesses were access streets (as defined by TRH 26, 2012). Four of these accesses were upgraded to major junctions with speed control in the form of speed humps and pedestrian crossings. Two of the junctions were roundabouts and two were T-junctions.

According to the South African Road Classification and Access Management Manual (TRH 26, 2012) the function of a road is either a mobility road or an activity or access street. Vehicle movements have priority on mobility roads, whereas activity or access streets give priority to access, turning movements, buses, taxis and pedestrians. These two functions are completely different and cannot be merged.

Part of the objective of the rehabilitation of the P17/6 was to improve the access management and to reinstate the road to a primary distributor. However, with the successive formal and informal intersections and access roads already on the road, a combination of mobility road and activity or access streets had to be reached.

Access management on P17/6

The options investigated for successful access management on the P17/6 were as follows:

- Close unstructured informal accesses;
- Reclaim the road reserve, and
- Declassify the road.

By closing unsafe and unnecessary unstructured informal accesses and improving the safe and alternative accesses to access streets, road safety, level of service, operating speed and traffic flow will be improved. It was however not possible to close all the accesses, due to the limited space available and layout of the informal settlement. The sight distances, amount of vehicular traffic of each access and the option of an alternative access to the properties determined whether it should be closed or not.

Pedestrian Access

The high volume of pedestrian movements along the route are a result of the high density of settlements and the vast amount of schools along the route. It was not possible to separate pedestrian movements from the road to reinstate the road to a vehicle-only route.

In order to accommodate the pedestrian traffic, a continuous walkway along the road was proposed to the client. A figure 3 (barrier kerb, indicated in Figure 2) was used to divide the pedestrian traffic from the vehicle traffic and to ensure pedestrian safety. The barrier kerb was also used to control the access roads and entrances to property accesses.

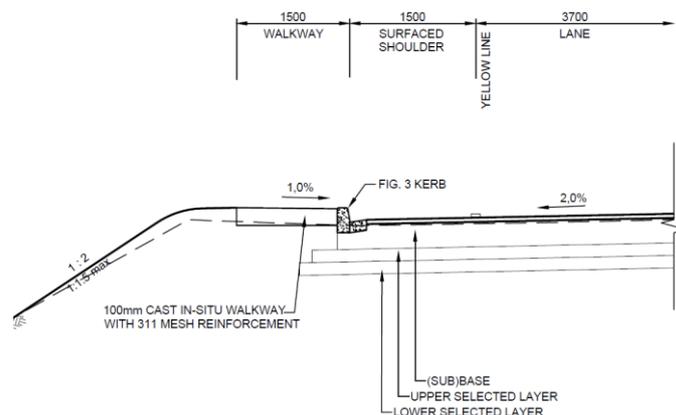


Figure 2: Typical cross section with walkway

Control of unstructured accesses

During design stage, an access management plan was created indicating which unstructured accesses should be closed and which were to remain, in addition to the type of junction to be constructed.

With the assistance of the aerial images those accesses that could be closed and driveways that could be rerouted were investigated.

The following criteria were followed to determine which access should be closed:

- Sight distance of the access;
- The size of the access (a bigger access caters for more traffic);

- The width of the access road (a wider road accommodates higher traffic volumes);
- The possibility of a gravel service road;
- The location of the access, and
- The amount of alternative accesses to the area.

The sight distances of all the retained accesses were determined and the investigations were indicated on a drawing with the plan layout and aerial images to provide background, see Figure 3.

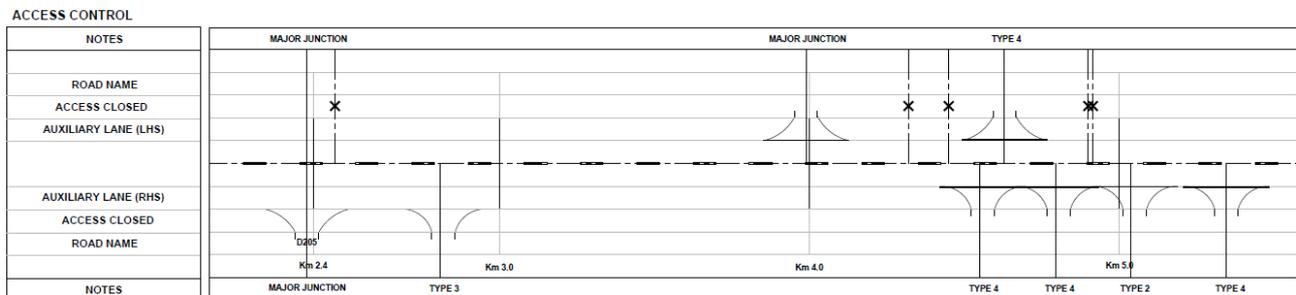


Figure 3: Part of drawing issued for construction

Three different types of accesses were identified. The first type was the major intersections (two T-junctions and two roundabouts). The second type of intersection (Figure 4) were constructed at the thirteen formal access streets.

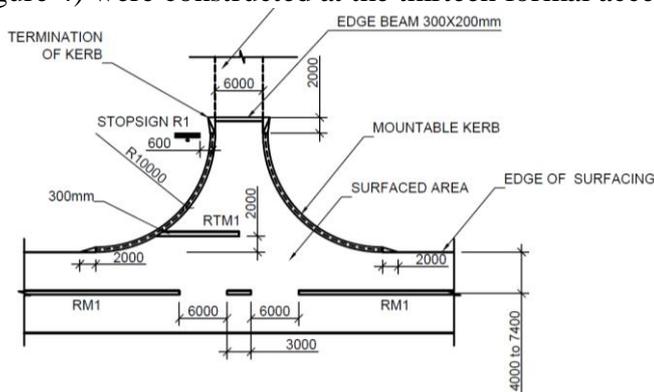


Figure 4: Surfaced formalised access (Type 2)

The type 3 (Figure 5) intersections were constructed to formalise an unstructured informal access. The Type 3 intersections mainly formalised the gravel road junctions and the driveways with an edge beam. Sixty of these accesses were constructed as indicated in Figure 6.

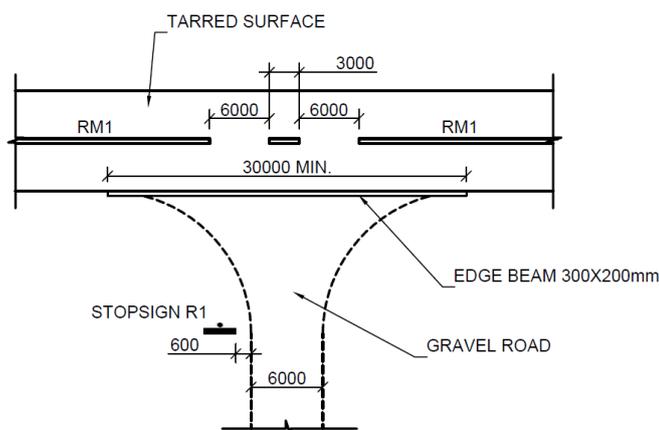


Figure 5: Formalised access to gravel road (Type 4)



Figure 6: Example of a Type 4 access

CONSTRUCTION

Construction started in November 2013. The programmed activities were scheduled to start with the major pavement rehabilitation works. Thereafter the kerbing and walkway works would start, simultaneously with the access management. Local subcontractors with local labourers were appointed to construct the kerbing and walkways.

Communication

The access management plan was further developed during construction stage to clearly indicate the appropriate action to the Contractor. A list was compiled of each access to be retained with reference points, photos and GPS (Geographic Positioning System) coordinates, as indicated in Table 2. This method worked well, and even though the community were involved in the decision of closing the accesses, the community did not accept the proposed closures and/or relocations of the accesses.

Table 2: List of accesses

Access no	Location	Description	Action	Latitude:	Longitude:	Photo
1	km 6.9	House connection over V-drain	Construct a concrete drift at the access, as indicated on P17-TD-02	S 25d 6m 9.98s	E 31d 8m 8.88s	
2	km 7.24	Access to Royal High School	30m kerb access on LHS and Type 3 Access on RHS	S 25d 6m 23.14s	E 31d 8m 11.28s	
		Access to House nr 40444	Edge beam, kerb to start next to house entrance	S 25d 6m 24.85s	E 31d 8m 11.43s	
3		Access at Pink house	4m kerb access	S 25d 6m 24.81s	E 31d 8m 11.36s	

Problems encountered

The local community was perceived as uncooperative, and intolerant regarding the construction. As soon as the first access were closed, the community demolished the closures (see Figure 7). Furthermore accounts of intimidation and violence towards the main contractor and the subcontractors were documented.



Figure 7: Kerbs broken by community

This caused problems as the walkway production was on the critical path at that stage and the community stopped the work. With the help of a social facilitator, Community Development Workers (CDW) of the area (including the respective Ward Councillor in the area) some of the community members were persuaded to agree to a gravel service road that leads to an access which is safe to enter the main road. However, a few community members were adamant and were provided direct access to the main road.

Furthermore, the existing layout of the villages along the road were as such that there were only a few accesses possible to be closed. Most of the property entrances had no other alternative than to access the main road. Some accesses didn't have a through road that linked to another access.

Ideally the accesses that were retained had to be upgraded, but due to budget constraints only gravel upgrades were possible, resulting in severe drainage problems. Even though the intervals of accesses could be increased from 50 to 100m, it is still not adequate for a primary distributor road. The level of service was slightly increased, but the traffic safety is still a concern.

CONCLUSION AND RECOMMENDATIONS

In conclusion, the access management on the P17/6 was a challenge. The community and the existing layout of the villages made retrofitting a successful access management impossible. As a result the P17/6 had to be declassified as a

district distributor and the operating speed in the build-up area was reduced to 60 km/h.

The following could have made the access management a success:

- Further involvement of the local municipality to improve the surrounding roads;
- Further involvement of the community, and educating the community in safety awareness regarding unsafe accesses.
- Access management should be a project on its own;
- Upgrade the local streets as part of an access management plan;
- Reclaim the road reserve;
- More attention for the road authorities to access management is required, and
- The setting out of informal rural areas before development start or as soon as development start.

The following recommendations could be made:

- Further study on the economic impact of successive accesses on a provincial road;
- Further study of the safety for the road user and pedestrians of successive accesses on a provincial road;
- Including the occurrences of accidents along a road with access management compared to a road with successive intersections;
- Impact of the successive accesses on traffic flow, and
- Further study regarding the classification of a road.

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