

*Deek White → agreements
Gary Kimber*

UPGRADING OF GRAVEL ROADS

The purpose of this report is inform the Human Settlements and Infrastructure Committee of the current status pertaining to maintenance of the municipal gravel road network and of plans that are currently being formulated to progressively upgrade such network .

As part of the proposed upgrading process, an initial list of roads is submitted for consideration and approval

The report further seeks endorsement by the Committee of the extent of the municipal gravel road network for future maintenance, upgrading and planning purposes.

EXTENT OF THE GRAVEL ROAD NETWORK

The gravel road network that is currently maintained by the local authority is 1442 km in extent.

Portion of this road network is in proclaimed townships located in and on the periphery of urban areas but the large majority is located in rural and peri-urban areas.

None of the gravel roads that are located outside of proclaimed townships have been formalized in any way. A significant number of these roads were made by the Water and Sanitation department for operations purposes and the balance have come about through the need for access over time.

Interspersed amongst this informal road network is a formal provincial gravel road network of 1200km that is maintained by the KwaZulu Natal Department of Transport.

MAINTENANCE PROGRAMME AND IMPLEMENTATION

All municipal gravel roads are programmed to be re-graded twice a year and re-graveled every five years. Contractors are appointed in each of the three maintenance regions (North, South and West) to undertake these functions.

The current contracts are for a three year period and expire in January 2016. A number of problems were initially experienced when the contracts were handed over but these are being addressed and work is starting to get to a point where same should be on target early in 2014.

MAINTENANCE COST

The average annual cost for the upkeep of gravel roads per kilometer of roadway is R50 000.00. This equates to approximately R72m per annum for the entire network of 1442km.

SUSTAINABILITY OF CURRENT MAINTENANCE STRATEGY

Due to the effects of inclement weather coupled with steep terrain as well as the limited availability of suitable material for re-gravelling purposes, it is becoming increasingly difficult to sustain an acceptable minimum level of service on the unsurfaced road network at an acceptable cost.

The alternative to having to maintain a gravel road is to construct a surfaced road.

COST BENEFIT OF SURFACED VERSUS UNSURFACED ROADS

The initial cost of constructing a surfaced road is relatively high but maintenance costs are lower. The benefit to the road user is also considerable from both a vehicle operating as well as a safety and convenience perspective. In terms of TRH 20 (TECHNICAL RECOMMENDATIONS FOR HIGHWAYS 20) the fundamental theory of economic analysis applied to unsealed road construction and/or improvement is the comparison of the benefits and costs of providing the alternative facilities. The benefits are the expression in economic terms of the advantages of the particular action, e.g. fuel and time savings with reduced roughness, a reduction in dust and maintenance on paved roads compared with unsealed roads, reduced accidents, etc. The conventional cost analysis of a project should follow the "life-cycle costing" process and involves a combined function of the initial construction cost, the routine and periodic maintenance costs, road user costs and the salvage value of the facility over the design life or analysis period selected for the project.

The volume and type of traffic that the proposed road is intended for is obviously a key element in determining the design of the road and its associated cost

It has been shown that at relatively low traffic levels (< 100 vpd) it can be economically viable to surface unsealed roads using light pavement structures and thin bituminous seals (SADC, 2003). Software such as SuperSurf can be utilised to determine the break-even traffic for the economic justification of improving unsealed roads or upgrading them to sealed standard. TRH 20

A gravel road which carries more than 200 vehicles per day can be sealed with a bituminous surfacing at a cost less than maintaining the unsurfaced road over a period of six years. City of Tswane 2007 Sabita information series

CAPITAL UPGRADE PROGRAMME

An average of 15 km of gravel roads are currently upgraded on an annual basis. These are either roads in the urban areas (infill roads) or public transport routes in the rural areas. The estimated average cost of converting a gravel road to black top standard is in the region of R5.5m per km. Assuming that the extent of the gravel road network remains unchanged, the upgrading of gravel to black top standard at the current rate will take approximately ninety years.

CHANGE IN MAINTENANCE STRATEGY ON LOW VOLUME TRAFFIC GRAVEL ROADS

Taking the current estimated cost of upgrading a gravel road into account there is obviously no financial case for upgrading low volume gravel roads to black top standard. If however a lesser pavement design is used then the upgrading of such roads makes economic sense. The life cycle of the road will obviously be a lot lower than that of the roads being constructed at present but if the use of such designs are restricted to low volume roads in the rural and peri-urban areas then they will provide an improved level of service over that life cycle. Taking due cognizance of the current influencing factors and constraints, it is intended to implement a programme whereby 60 km of low volume roads in rural areas are upgraded on an annual basis.. It is intended to commence this programme in January 2014 utilising the current maintenance contracts for such purpose.

The design model is as such that the cost of this exercise will be in the region of R1m per km. Roads to be chosen for upgrading each year will be from within the rural context and as per the gravel road prioritization programme held by the Unit's Pavement Management Section. Careful consideration will be given to roads linking existing surfaced roads and those serving public facilities and such roads will be included in a three year rolling programme. Once roads have been selected from the prioritization model a report will be submitted to the Human Settlements and Infrastructure Committee and once endorsed, the necessary consultation with ward councilors will be undertaken, prior to the any work being implemented.

The table below sets out the various aspects that have been presented in the report so far:

CATEGORIES	LEVEL OF SERVICE	ROAD LENGTH	UPGRADE COST	PROGRAMMED UPGRADE P.A.	LIFECYCLE
Rural/peri-urban (low volume)	Regrading 2X pa Regrav 1X5yrs Upgrade- single stabilized layer plus wearing course (TRH 20)	1100 km	R1m/km	60 km	6 to 8 yrs
Rural/peri-urban (public transport)	Regrading 2X pa Regrav 1X5yrs Upgrade – TRH 4	60 km	R6m/km	10 km	20 yrs
Urban/urban periphery	Regrading 2X pa Regrav 1X5yrs Upgrade – TRH 4	240 km	R6m/km	5 km	30 yrs

CONFIRMATION OF THE GRAVEL ROAD NETWORK WITHIN THE MUNICIPAL BOUNDARY

The network, deemed to be Municipal owned for maintenance purpose currently stands at 1442km, which is made up of urban periphery (established township areas), periurban and rural roads. The percentage split between urban periphery vs periurban and rural combined is 20/80. Peri urban and rural roads are generally roads that carry a daily volume of under 200 vehicles of which 20% could be heavy vehicles. The Municipal gravel network is spread over 50 of the 103 Municipal wards.

In addition to the above, the provincial government is responsible for approximately 1200km of unpaved gravel road situated within the Municipal Boundary in various wards and inbetween the

Municipal owned gravel road network. Both networks have to date not been clearly marked in the field for correct identification purposes. Consultation is currently taking place with provincial authorities to get this process underway. The Municipality has however installed road number plates on some of its gravel roads for identification purposes, with continuity of this process also being explored.

Over and above the Municipal and Province owned unpaved network, every possibility exists that further gravel roads serving communities may be in existence which are currently not on either Authority's maintenance programme. A process needs to unfold to investigate this portion of the network.

With respect to actual land ownership on which the 1442 km of Municipal network rests, a small percentage of roadways are registered in the name of the Municipality with the balance either on Ingonyama trust land or simply deemed to be Municipal owned.

PROCUREMENT STRATEGY FOR 2014 AND 2015 PROGRAMME

The intention is to utilize the 3 existing gravel road contractors, under a variation order arrangement to undertake the upgrade work for year 2014 and 2015. The necessary reports as required by SCM policy will be submitted to the relevant committees for approval.

FUNDING

Funding is being sourced from the USDG allocation.

LIST OF ROADS TO BE UPGRADED DURING 2014

The following roads are being earmarked for upgrading as the initial first year target: