



# **THULAMELA LOCAL MUNICIPALITY ROADS AND STORM WATER MAINTENANCE POLICY**

**2024/2025**

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## 1. PREAMBLE

Whereas s152(1)(b) of the Constitution of the Republic of South Africa Act 108 of 1996 ('the Constitution') provides that one of the objects of local government is to ensure that the provision of services to communities occurs in a sustainable manner. And whereas s153(a) of the Constitution provides that a municipality must structure its administration, budgeting and planning process to give priority to the basic needs of the community, and to promote the social and economic development of the community.

And whereas s195(1) of the Constitution provides that the public administration must be governed by the democratic values and principles enshrined in the Constitution, including:

- The promotion of the efficient, economic and effective use of resources.
- The provision of services impartially, fairly, equitably and without bias; and
- The fact that people's needs must be responded to

## 2. INTRODUCTION

Roads network that is properly looked after provides the foundations of a good economy that sustains community's livelihoods. This is in the broadest terms and includes meeting domestic and social critical needs of the populace, supporting local economic activities required to reach economic growth objectives and maintain the environment. All this is intended to improve overall traffic ability of Municipal roads in accessing essential basic amenities and critical services for the population in all weather conditions.

To achieve these goals and objectives a framework of roads network infrastructure assets and resources is required that will support the growth path and development within the municipality. There is a need to anticipate and plan for future population growth and effectively manage the increased traffic volumes that comes with it, without compromising the various aspects of ecological sustainability such as Borrow pits and water sources in meeting social and/or economical needs.

Considering the above introduction, this policy guides the roads and stormwater maintenance within the Thulamela Local Municipality area. It provides a framework for:

- a) Appreciating the various aspects of road management, priorities, safety, environmental issues, materials and equipment

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- b) Identifying various problems that need attention
- c) Understanding the reasons for problems
- d) Prioritising actions required
- e) Selecting suitable actions and repair methods
- f) Having a systematic approach to maintenance work

The primary objective of this policy is to address the safe performance of the actions required to maintain and protect the roads and pavements. The policy guides the following broad categories:

- a) Road Management
- b) Priorities
- c) Safety
- d) Environmental
- e) Materials
- f) Equipment
- g) Maintenance Actions

### **3. LEGISLATIVE REQUIREMENTS**

The Roads Management Act 2004 requires the Council of a Municipality (the Roads Authority as per section 37 (1), ii-iv) to inspect, repair and maintain public roads (section 40) for which it is a Roads Authority. This applies to any part of a public road which is:

- A roadway
- A pathway
- A road shoulder, or
- Road infrastructure, for which Council is the Road Authority

The Municipality as a Road Authority in terms of:

- Section 42 (1) determines the standard to which it will construct, inspect, maintain and repair its roads infrastructure. In relation to inspections, it may also determine the inspection intervals.

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- Section 41 (2) © in relation to maintenance determine the programs the maintenance work to be performed during regular maintenance and the standard to which the maintenance is to be performed.
  - (i) Section 41 (2) (d) determines in relation to the repair of defects reported or found on inspection.
  - (ii) The matters which are to be treated as defects which require repairs or warning.
  - (iii) The circumstances in which intervention action is to be taken.
  - (iv) The type of intervention to be taken iv. The period within which the intervention is to be taken.
- The priority to be given to the intervention action.
- Section 41 (3) may during the undertaking of the above action conduct repairs, erect warning signs or reduce or remove risk.

#### 4. DETERMINATION OF SCOPE

Maintenance within the municipality has been categorised according to why and when it happens as:

- a) **Backlog Maintenance:** *Maintenance that is necessary to prevent deterioration of the asset or its function, but which has not been carried out.*
- b) **Planned Maintenance:** *Maintenance work to prevent failure of the asset during its cycle.*
- c) **Corrective Maintenance:** *Performed because of failure, to restore an item or asset to its original state or condition, as far as practicable. Corrective maintenance may or may not be programmed.*
- d) **Preventative Maintenance:** *Performed to retain an item or asset to its original condition as far as practicable by providing systematic inspection, detection prevention of incipient failure.*
- e) **Emergency Corrective Maintenance:** *Outside of routine maintenance and works programs that must be initiated immediately for health, safety, security, hazard reasons or that may result in the rapid deterioration of the plant or equipment if undertaken.*
- f) **Deferred Maintenance:** *Maintenance planned to be carried out in the current financial year, but due to shortage of funds and or unforeseen circumstances is not carried out and added to the Backlog Maintenance awaiting attention.*

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## 5. CONDITION CHECKS OR ASSESSMENT

Condition monitoring is critical in the road maintenance program within Thulamela municipality. While obvious problems should be noted as soon as they become evident, and serious problems should be reacted to and reported immediately, it is recommended that a checklist be developed as part of the maintenance plan. The following guidelines should be adhered to when developing a checklist:

Component	Frequency
Road Signs	Yearly
Road Markings	Yearly
Guardrails	Monthly
Structures	Yearly
Flexible Road Condition	Yearly
Rigid Road Condition	Yearly
Drainage	Monthly
Instabilities	Dependant on the degree of the problem
Informal Settlements	Weekly
Illegal Access	Monthly
Fencing	Monthly
Illegal Signage	Monthly

Considering that the roads maintenance program will always be faced with tight budgetary constraints, it is critical that the maintenance is cost-effective and in situations of limited funding, the work is prioritised. The two major objectives of road maintenance are to:

- a) Provide a safe and acceptable level of service for the travelling public
- b) Maintain the condition of the road such that the maximum life is obtained from the road

The priority shall be to always keep the road safe. Safe will considered as any situations, which may result in accidents, should be handled first.

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## **6. SAFETY AND ENVIRONMENT**

### **6.1 Safety**

On most roads, there are large volumes of traffic that travel at high speed. As a result, it can be very dangerous when working on or close to a road surface. All staff need to develop a safety culture and attitude which should include the following:

- Always be aware that working on or near a road is a potentially dangerous situation
- Always wear a safety jacket when working on or close to the road
- Do not step onto the travelled surface without first checking for oncoming traffic
- When not in a delineated work area, as far as possible, face oncoming traffic and always be watching for traffic
- All vehicles must be equipped with yellow flashing lights and be clearly marked with "Maintenance Vehicle" signs
- Remove all loose or foreign objects such as tools, materials, temporary signs and equipment from the road surface
- Maintain appropriate temporary signs – when not in use or required, remove or cover the signs
- Do not work simultaneously on both sides of the road at one location

### **6.2 Environment**

The National Environment Management Act (Act 107 of 1998) recognises the right of all South Africans to live in an environment that is not harmful to their health or wellbeing and must have the environment protected for the benefit of present and future generations. Accordingly, the Act expressly states that any person undertaking any activities with the potential to damage the environment has a duty to take all reasonable measures to prevent such damage occurring. It follows that all activities undertaken during road maintenance operations should be approached in an environmentally sound and sustainable manner.

## **7. MATERIALS CONSIDERATION SURFACED ROADS MAINTENANCE**

There are numerous materials used in road maintenance. The following materials are approved for use in routine maintenance:

### **7.1 Base Material**

Although a range of base materials is available and may be used, the use of untested, unsuitable material is the primary cause of early failure of base patches. Because it can be difficult during patching to be certain of the quality of in situ base materials, it is suggested that on heavily trafficked roads, the base material should be an imported non plasticity crushed stone. Other base material should only be used where there is good confidence that it will meet the desired requirements.

### **7.2 Emulsion Treated Base**

Emulsion treated base (ETB) is preferred as the material to be used in granular road repairs. The ETB should consider of a crushed stone base material treated with 3% ammoniac stable mix emulsion and 1% cement (by mass). The treated material should be mixed with water to achieve an optimum fluid content (emulsion plus water) to enable maximum compaction.

### **7.3 Asphalt Base**

Hot asphalt base should be obtained from commercial sources to a mix design approved by SANRAL. Use depends on the proximity of the asphalt plant. "Cold mix" should only be used as a temporary emergency repair to maintain road serviceability.

### **7.4 Emulsions**

Because of ease of handling and low application temperatures, the use of emulsion is favoured for maintenance work particularly where small quantities are required. The use of LATEX (3% - 5%) is recommended due to its improvement of the emulsion properties. Where the emulsion is stored in drums any residue can be dealt with by rolling the drum (say 20m) before use. Where bulk storage is used, the static tank should be fitted with a pump and the emulsion should be circulated at least weekly.

### **7.5 Hand Sprayed Seals**

Typically using a 13mm surface chip with split application of emulsion and a grit choke layer of a 19mm and 6,7mm double seal with a final fog spray.

### **7.6 Modified Cape Seal**

A tack coat of emulsion (preferably modified) with a chip size dependant on the layer thickness required (minimum 19mm recommended), and a slurry. A light penetration coat will be necessary to hold the chip during slurring.

### **7.7 Preformed Road Patch**

Preformed road patches should be obtained from commercial sources and consist of a range of chip sizes on bitumen rubber on a backing strip.

### **7.8 Geo-fabric Bandage**

A geo-fabric bandage consists of a rectangular piece of geo-fabric tacked to the road surface using a latex modified emulsion. The bandage should be "armoured" by covering with a further application of latex modified emulsion and a nominal 4,75mm grit. All binder applications and materials should be used as per the suppliers' specifications and instructions.

### **7.9 Slurry Bound Macadam**

A single size stone aggregate vibrated in place and in filled with a fine slurry.

### **7.10 Asphalt Surfacing**

Hot asphalt would be normally obtained from commercial sources to an approved design. Use depends on the proximity of an asphalt plant as well as the quantity required. On site mixing of small amounts of "hot" asphalt using a concrete mixer and a gas burner. Using this method, quantities adequate for local potholes, edge-break and pothole repairs can be produced at a temperature above 120 degrees Celsius. With care, good mixing and adequate rolling, a dense asphalt can be achieved.

Cold asphalts either premixed (with cutbacks) or made on site with emulsion have a poor performance record. Either the cold asphalt shoves during hot weather (high binder content) or if stable, is porous and allows the ingress of water which causes base failure or the asphalt ravels in wet weather (low binder content).

### **7.11 Mixes and Mixing**

- a) **On Site Hot Asphalt:** Using 9,5mm and 6,7mm surfacing stone and a crusher sand (suitable for slurry) make up samples to achieve a smooth continuous grading.
- b) **Mixing:** Work out the quantity of asphalt needed and decide on the size of the batch or number of batches needed. Using clearly marked standard calibrated containers, charge the concrete mixer as follows:
  - (i) Add and heat the stone fraction of the aggregate to at least 110 degrees Celsius.
  - (ii) Add to the mixer the required quantity of stable mix emulsion.

(iii) Add to the mixer the required quantity of the crusher sand.

Mix the whole mix (while still heating the mix) until all the particles are all well coated.

As a guide, directly after mixing the asphalt should be at a temperature of between 120 degrees Celsius and 125 degrees Celsius and have a uniform appearance. Before placing the asphalt, the road surface should be tacked with a dilute application of the emulsion.

## **8. EQUIPMENT**

The equipment normally needed on routine road maintenance is conventional small plant used on civil engineering works. However, either special equipment or modifications to equipment have been found to work on crack sealing, binder application, weed killers and hot asphalt.

### **8.1 Back Sprayer**

A back sprayer tank may be modified, by attaching a special lance to the hose. The pack hand pump delivers a pressure of 2 Bar and can be used for spraying bituminous emulsions (including polymer modifiers) with a special spray nozzle. By changing the nozzle to a single jet (3mm), the equipment can be used for crack sealing of individual cracks.

### **8.2 Equipment Modifications for Small Hot Asphalt Mixes**

A standard concrete mixer can be modified, by setting up an industrial gas burner and bottle to feed hot air into the mouth of the mixer. This set up can be used to produce small amounts of "hot" asphalt on site suitable for local patch repairs. For mix and mixing procedures, refer to the section on **Materials**. The material can be either, mixed in the yard, and hauled to site by bakkie, or the mixer, burners and aggregate can be set up on a flatbed truck. Measuring containers can be either buckets or boxes, but should be of standard size, marked and have handles.

### **8.3 Equipment for Heating Small Quantities of Binder or Sealant**

Binders and sealants are highly flammable and must NOT be heated by a direct flame. It is strongly recommended that binders be heated using a double boiler principle.

### **8.4 Screed Box / Rails**

To get a smooth ride over a patch repair and to control volumes and compaction of material placed, the use of rebars or wooden battens (of set thickness) is strongly recommended. The bars should be placed parallel to the road centre line on either side of the patch. The uncompacted surface can be screeded off by pulling a board along the top of the rails. The thickness of the bar / batten depends on the type of material being placed and the thickness of the layer.

A rough guide to lose material should be about 140% to 150% of the final required compacted thickness. Once the material has been spread and the bars removed, and the material is compacted down to the level of the surrounding road surface. During the final rolling, the newly placed material should be "ironed out" to match the surrounding surface.

## 9. MAINTENANCE ACTIONS

This section of the policy deals with practical day to day issues of routine road maintenance. Where possible, descriptions of problems are given with possible solutions, suggesting possible cause, considering the problem and recommending repair methods.

### 9.1 Surfacing Failure

Causes	Extent	Repair Methods
Old, dry, brittle surfacing which has cracked in a diamond like patten and under traffic is deboning from the base in circular patches.	Isolated: Localised failures occurring at one or two places. These can be treated as isolated repairs.	Depending on the thickness of the layer, localised failures can be made good either with a coarse slurry or a fine asphalt. Deboned material adjacent to the hole(s) should be lifted off with a flat spade.
Surface layer deboning from the base or old surface (in the case of a reseal or over layer) because of the poor preparation of the layer before surfacing.	Intermittent: Where there are number of failures at close spacing. These should be treated as a surface patch repair.	Grouped or closely spaced failures should be marked out in rectangular shapes and the surface layer should be removed over the entire area of the rectangle. The layer may be replaced with a coarse slurry or a fine asphalt.
Mechanical damage caused during an accident or where vehicles have burnt out.	Extensive: Where failure is because of brittle failure of old surfacing, the area is extensively cracked and showing widespread deboning.	No routine maintenance other than emergency holding measures in localised areas using a coarse slurry or fine asphalt should be carried out where the underlying area is breaking up and causing a traffic hazard.

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## 9.2 Potholes

Potholes are surface failures, which extend to the base layer forming a hole. Normally, these failures should be less than 0,5 square meters in area, are isolated and are not associated with displacement. If left for any period, potholes could develop into major structural failures.

Causes	Extent	Repair Methods
Potholes are caused by traffic which breaks up the surface and underlying base in areas of localised weakness or where the surfacing is damaged or structurally cracked. Water accelerates the formation and deterioration of potholes.	Isolated: Localised failures should be treated as isolated repairs.	All potholes should be cleared of loose material, trimmed to a rectangular shape and primed with a diluted emulsion. Shallow potholes (less than 25mm deep) can be filled with a coarse slurry. Deeper potholes should be excavated to a minimum depth of 40mm, and the base of the hole should have sound material. Where cold asphalt is used, it may be necessary to seal the surface with a petroleum-based seal. Larger potholes or clusters may be treated as for patch repairs.
	Intermittent: Where there are several potholes closely spaced, failures should be treated as a patch repair.	
	Extensive: Provided that the pothole failures are not accompanied by sideways movement (displacement), their repair can still be carried out as routine maintenance.	

## 10. MAINTENANCE OF GRAVEL ROADS AND CULVERT

Appropriate, timely and high-quality maintenance of unsealed or gravel roads is necessary to ensure that unsealed roads continue to provide the required level of service to the road user. Any deficiency in the maintenance activities will result in deterioration in the road quality with consequent increased road user costs and significant future difficulties in restoring the correct shape and quality to the surface.

### 10.1 Condition Assessment

*Gravel roads react to the traffic and environment (usually negatively) far more than surfaced roads in both rate and degree. They thus perform differently and are prone to the development of characteristic problems in the short term, differing from those affecting sealed roads. These problems include dustiness, potholes, stoniness, corrugation, rutting, cracking,*

ravelling erosion, loss of shape/profile, slipperiness, impassability, loss of gravel and excessive loose material and have a major influence on the performance, maintenance requirements and costs of operating gravel roads.

### **10.1 Material Location**

One of the increasingly difficult problems faced by the municipality with gravel roads is the location of suitable wearing course materials. Many sources of the good wearing course gravels used in the past have become worked out or are no longer accessible. The successful location of new sources of wearing course materials is a specific science and the basic procedure that follows is suggested as a routine process. Many existing sources regarding local materials exist, however they are not within the municipal authority and prior to maintenance the Ward Councillors will assist technical officials to establish material location in which the maintenance works should be done, these will follow the costing of work and may differ from one Ward to the other. These include:

- Local sources and quarries
- Experienced staff and residents within the project location
- Existing source records • Construction documentation

### **10.2 Maintenance Description and Scope Determination**

The maintenance description forms the first stage of project planning and is undertaken at the office prior to any fieldwork necessary for material location and scope determination. The activities covered include:

#### **a) Project or programme briefing**

- This establishes the purpose for which the materials will be used, and the quantities required for the maintenance of identified streets.

#### **b) Interpretation of background information**

- This phase entails the collection and analysis of information about the project area. Information is often available from the Ward Councillor and other structures within the project location.

#### **c) Collection of information**

During the desk study, the following procedure (in check list form) should be followed:

- Verification of road owners, its classification and functions or purpose or beneficiaries to align with powers and function of municipality.

- *Confirm the quality and quantity of material required for the project.*
- *Establish land use, land ownership and potential environmental constraints within the gravel road corridor.*
- *Obtain relevant materials investigation reports from previous projects.*
- *Discuss material types and existing and potential sources with municipality maintenance supervisors and other people with experience of the area.*
- *Establish whether there is sufficient gravel at existing and known sources and if not, discuss or negotiate the alternative solutions considering the cost associated with proposed solution.*
- *Identify possible sources of material*
- *Assessment of both human and capital resource not limited to plant, equipment and machinery.*

## **11. MAINTENANCE APPROACH ON GRAVEL ROADS**

### **11.1 Blading**

Blading should preferably be carried out during periods of average moisture when the material is most easily cut, moved and compacted. Experience has, in fact, shown that during the dry season, the hard upper crust or "blade" should not be cut. If blading is deemed to be essential during the dry season, it is best to blade the loose material to window at the side of the road and wait until rain moistens it before re-spreading it. It is essential that drains are cut through the windows to allow any rain that falls to flow away from the road. A significantly improved performance will be obtained if the material is graded in a moist condition and then compacted before opening to traffic.

*Different forms of grader blading are applied in southern Africa depending on:*

- a) *Condition of the road and in particular the shape, occurrence and depth of distress*  
*Material quality and oversize*
- b) *Availability of maintenance material in general,*

*Blading can be classified as either light or heavy during wet or dry conditions. For purposes of communication the following definitions apply regarding "Wet" and "Dry" blading:*

- a) *Dry blading comprises of two different opinions are held, namely:*
  - *Blading (light or heavy) without any form of additional moisture and applied in areas where there is no water available and/ or extremely low rainfall areas.*

- *Blading (light or heavy) without a water bowser, generally during or after rainy periods.*
- b) *Wet blading is generally referred to as any form of blading making use of a water bowser to moisten the surface material.*
- c) *Light blading Light blading refers to blading with a motor grader without disturbance to the existing hard crust. Light blading (smoothing) could consist of a light trimming of the road surface on a routine basis. Light blading is also considered to be the appropriate routine maintenance activity during early life after regravelling operations when defects are less than 25 mm in depth and suitable "maintenance material" is still available.*

## **11.2 Regravelling**

Regravelling generally refers to the addition of a suitable wearing course layer, typically 100 mm to 150 mm in thickness over the entire length or substantial lengths of the road. Regravelling is the most expensive single maintenance procedure for unsealed roads. It is carried out when the imported gravel on the road has been almost totally lost through erosion by rain and wind or abrasion by traffic or when inappropriate material exists on the road. Regravelling should take place before the subgrade is exposed to avoid deformation which will necessitate reconstruction, and loss of the strength which has been built up in the subgrade by traffic clinging over time. Improvements to any drainage deficiencies should be made prior to regravelling.

The regravelling process should follow the same procedure as the construction process with respect to the winning, hauling, spreading and compaction of the material. Due to the cost of regravelling and the availability of construction equipment, a special effort is made to:

- Improve drainage through forming and/or installation of culverts,
- Reduce accident risks through small changes in the alignment and camber, and
- Obtain sufficient pavement strength through proper roadbed preparation, suitable materials and

sufficient thickness.

## **11.3 Culverts**

The maintenance of culverts is necessarily a labour-intensive operation and should be carried out regularly to avoid damage to the culvert and surroundings, should they become blocked,

and flooding occur. It is important once again that the material removed from the culverts is not used to maintain the road and is disposed of as far as practically possible from the culvert. Cleaning of the outlet of culverts to ensure free-flow conditions on the downstream side should not be neglected.

## **12. LABOUR INTENSIVE MAINTENANCE**

The maintenance of conventional unsealed roads is essentially a machine intensive operation. The volumes of material required, and their spreading and compaction requirements make the use of labour for many operations neither time nor cost-effective.

Despite this and particularly in line with the Expanded Public Works Programme (EPWP) being implemented in South Africa (GDPtrw, 2008), the potential for labour intensive construction, particularly in remote areas should not be ignored. Many rural access roads have been successfully constructed using labour primarily, but the need to obtain conventional quality standards should not be neglected to avoid excessively rapid deterioration of the road. It is essential that trial sections are initially constructed to ensure that the required standards can be cost-effectively achieved.

Labour intensive methods, particularly on relatively narrow roads (less than about 6 m) can generate significant employment opportunities in rural communities, increase the income in these areas and establish contractors for various maintenance operations. It may, however, be necessary to use conventional compaction plants to achieve the specified densities.

## **13. COMPANION DOCUMENTS**

For effective management of both surfaced and unsurfaced roads, the TRH document should be considered in conjunction with several other documents which include:

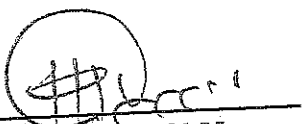
- TMH 1 Standard methods for testing road construction materials (1st edition) (NITRR, 1979)
- TMH 1 Standard methods for testing road construction materials (2nd Edition) (NITRR, 1986)
- TRH 5 Statistical concepts of quality assurance and their application in road construction (NITRR, 1977)
- TRH 14 Guidelines for road construction materials (NITRR, 1985)
- TMH 5 Sampling methods for road construction materials (NITRR, 1981)

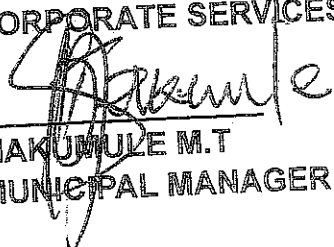
- TMH 12 Pavement Management Systems: Standard visual assessment manual for unsealed roads (Jones and Paige-Green, 2000)
- Standard Specifications for Road and Bridge Works for State Road Authorities (COLTO, 1998).

#### 14. ADOPTION AND REVIEWAL OF THE POLICY

Technical Services as the custodian of roads and stormwater management within Thulamela municipality will begin the implementation of roads and stormwater maintenance policy to ensure that the objectives of this policy are accomplished, and the adoption will follow the process below:

- This policy has been reviewed and adopted by Council on 31 May 2024 and to be reviewed annually.
- This policy will be effective from 01 July 2024.

  
 SIKHWIVHILU N.M  
 ACTING SENIOR MANAGER:  
 CORPORATE SERVICES

  
 MAKUMULE M.T  
 MUNICIPAL MANAGER

31/05/2024  
 DATE

31/05/2024  
 DATE