



**KWAZULU-NATAL PROVINCE**

TRANSPORT  
REPUBLIC OF SOUTH AFRICA

**DIRECTORATE:**

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Ladysmith Region

**ADDENDUM NO.1**

**QUOTATION NO. ZNQ04953/00000/00/LAD/INF/22/T – SPECIAL SERVICES FOR GEOTECHNICAL INVESTIGATION FOR SLOPE STABILITY ASSESSMENT AND DESIGN OF CUT SLOPE PROTECTION ON THE MAIN ROAD P549(KM 16+600 TO KM 19+100) IN GREYTOWN. CLOSING DATE 22/08/2023**

Date Issued: -----

This Addendum No.1 comprise of a total of SIXTEEN (16) PAGES, including this page.

The amendments required to the contract document are as follows:

| Amendment No. | Amendment Required                                                                                                                                                                |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1             | In the Document, the details pertaining the description of works and the location of the project are incorrect.<br><br>Delete pages 33 to 38 and replace with new pages 33 to 38. |
|               |                                                                                                                                                                                   |

Non-acknowledgement of this addendum will lead to disqualification.

The acknowledgement of this addendum must only be submitted with the bid document.

Should you have any queries with regards to the above, please contact Mr. D Mvelase on the above telephone number.

Your Faithfully

-----

Mrs. B Nogwanya  
Ladysmith Regional Office Chief Director



## **KWAZULU-NATAL PROVINCE**

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I/We acknowledge receipt of this addendum No.1 and have made alterations to our tender document.

**BIDDER:.....**

**NAME OF SIGNATORY:.....**

**DATE:.....**



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**PAGE TO BE AMENDED IN THE DOCUMENT**

## PART2: SCOPE OF WORK

### 1. SITE LOCATION AND DESCRIPTION OF WORKS

The P340 Road, also known as R74, comprises a surfaced road, with all siting's of slip surfaces along the route south of the Sterkfontein Dam, KwaZulu-Natal. The study area is encompassed by a Northwest to Southeast aligned section of road from km 36+000 to km 40+000, approximately 30 km outside the town of Ladysmith (located at approximate latitude S 28° 52' 11.2" and longitude E 30° 09' 34.8").

The topography along the road section is characterised by a generally steeply sloping mudrock cut bank. An existing rock fall comprising sandstone blocks and slumped mudrock was also noted at km 39.95, where a portion of shotcrete had failed.

Within the southern section of the site, the slopes are dominated by steep (typically holding an angle of 35° - 55°), highly vegetated, weathered sandstone. The sandstone cliffs extend to approximately 30 m high, harbouring many loose boulders along their irregular surfaces. At the toe of the cliffs, the sandstone is draped by loose sand, forming shallower slopes with more uniform surfaces. The southern section is more irregular, with outcrops of rocks and some man-made gabion-retained terraces and rockfall protection.

#### 1.1. Personnel Requirements

The minimum qualifications and requirements for the service and sub-Service Provider's personnel shall be as indicated in the table below.

| Position                                                                           | Minimum Qualification/Registration      | Minimum Relevant Experience (years) <sup>2</sup> | Other Requirements |
|------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------|--------------------|
| Design Specialist (Geotechnical Engineer or Geotechnical Engineering Technologist) | Pr. Eng. or Pr. Tech. Eng. <sup>1</sup> | 10                                               | SAICE <sup>3</sup> |

- 1 Registered with the Engineering Council of South Africa (ECSA) or any other international body recognised by ECSA, i.e., Washington Accord, Dublin Accord and Sydney Accord.
- 2 Relevant experience is the actual number of years measured from the date of acquiring the base NQF qualification (either B.Eng / BSc.Eng / B.EngSci or BSc / B.Eng Tech (Hon) PGDip (Engineering) / M.Eng for Pr.Eng or National Higher Diploma / Masters Diploma / BTech / B.Eng Tech / Dip Eng / Adv Dip Eng / AdvCert (Engineering Practice) plus Adv Dip Eng for Pr.Tech Eng and National Diploma / Dip Eng / Dip Eng Tech / AdvCert (Engineering Practice) / Higher Certificate (Eng) / Adv Cert (Engineering) / Adv Cert (Engineering Practice) for Pr. Techni Eng), worked in the field of the specified position. For the road safety audit team leader, the field shall be road safety design and/or traffic and transportation engineering and/or geometric design.
- 3 South African Institute of Civil Engineers (SAICE)

### 2. SCOPE OF WORK

In summary, the scope of the works is as follows:

- Conducting a detailed assessment and geotechnical site investigation of rock slope stability and rehabilitation of deteriorating rockfall protection along the route (KM 36 to KM 40).
- Provide detailed design recommendations for the developing slip failure along the route (KM 36 to KM 40).

## **2.1. Phase 1 - Preliminary Site Visit and Appraisal**

Drive / Walk-over of the affected rockfall protection, rock slope and slip areas to obtain initial information to facilitate the detailed geotechnical investigation and refine the geotechnical cost estimate (if necessary). Delineation of slope failure/slip extent laterally and in cross-section to validate existing data.

## **2.2. Phase 2 - Geotechnical Investigation**

The recommended geotechnical investigation is expected to comprise the following:

- Borehole drilling (min 3No.) to obtain the subsoil profile, soil samples and bedrock levels at depth.
- Test-pitting (4-6No.) by an excavator in accessible area on the embankment to obtain the subsoil profile, soil samples and bedrock levels at depth.
- DCP testing (+6-8No.) to provide the subsoil consistency and infill information, i.e., an indication of bedrock levels.
- The materials will be sampled for laboratory testing and tested at a SANAS-accredited laboratory. Undisturbed samples for Triaxial tests / Shear box / Atterberg Limits testing will be taken where possible to provide residual shear strength parameters of the failure zone materials.
- The fieldwork supervision/logging/sampling is to be performed by an experienced engineering geologist who is a registered Pr. Sci. Nat.

The geotechnical investigation shall be carried out in accordance with, but not limited to, the following Geotechnical engineering site investigation guidelines:

- The KwaZulu Natal Department of Transport Materials Investigation Specification.
- The South African Pavement Engineering Manual (SAPEM) Chapter 7: Geotechnical Investigations and Design Considerations,
- Dolomitic land Investigation Guidelines (SAICE),
- SAICE Lateral Support Guidelines.
- SAICE Site Investigation Code of Practice provide some guidance.
- SANS 3001: Civil Engineering Test Methods:

## **2.3. Phase 3 - Stability Analysis to Determine Suitable Rehabilitation Design Options**

- Geological Cross-sections are to be produced from the above and used to carry out two-dimensional geotechnical modelling and stability analyses to determine the failure mechanism/cause/geometry and subsequently allow the rehabilitation design.
- The stability analysis is to be performed using Geotechnical Engineering Design Software by an experienced geotechnical consultant who has specialised in slope stability analysis for some 10 years and rehabilitated numerous slopes. The materials' shear strength parameters are to be determined from a combination of Triaxial tests, shear box testing, back-analysis.
- The stability analysis of suitable rehabilitation design options must be performed to determine/optimize the most suitable solution. The results of the analyses and findings of the geotechnical investigation, in particular the Slip failure geology, including geotechnical cross sections and relevant geotechnical parameters, must be summarised in a brief report.
- The slope stability design optioneering and options analysis is to be performed by the Geotechnical engineering professional (professionally registered with ECSA, i.e., Pr. Eng. or Pr. Tech. Eng.).

## **2.4. Deliverables**

- Modus Operandi (i.e., a detailed report entailing the method of site investigation, type of tests to be conducted, their respective locations, etc.) for the proposed geotechnical site investigation.
- A detailed, comprehensive Geotechnical Investigation Report in PDF format presenting findings and observations from site investigation, laboratory testing, interpretation and design recommendation and possible geotechnical solutions (minimum 2) thereof. The report is to be reviewed and signed by the Geotechnical engineering professional (professionally registered with ECSA, i.e., Pr. Eng. or Pr. Tech. Eng.).
- The final factor of safety must be illustrated in the final design.

## **2.5. Traffic Accommodation**

The persons responsible for undertaking the materials investigation shall provide, erect and maintain the necessary traffic-control devices, road signs, traffic cones, flagmen and speed controls (hereinafter referred to as traffic-control devices) in accordance with these special provisions and as appropriate in terms of the SARTSM and remove them when no longer required. It shall be incumbent upon the persons responsible for supervising traffic accommodation to see to it that the abovementioned traffic-control devices are present where required at all times and are in good condition.

The safety of the travelling public is of utmost importance, and every effort shall be made to ensure that all traffic control devices are maintained and effective and that courtesy is extended to the travelling public at all times. All workmen within the work area shall wear appropriate safety apparel and all vehicles shall be equipped with rotating beacons.

The type of construction, spacing and placement of traffic-control devices shall be in accordance with the appropriate short term closure layout, as shown in SARTSM. The recommended arrangements of the traffic control devices shall not be departed from without prior approval of the Engineer.

The details shown for spacing and placement of traffic-control facilities may, however, be revised at the discretion of the Engineer where deemed necessary to accommodate local site geometry and traffic conditions.

All temporary road signs shall be mounted on portable supports for the easy moving of signs to temporary positions. The only permitted method of ballasting the sign supports shall consist of durable sandbags filled with sand of adequate mass to prevent signs from being blown over by wind. The cost of the sandbags shall be included in the tendered rates.

Traffic cones manufactured in a fluorescent red-orange or red plastic material only may be used at short term lane deviations. Cones used on all deviations shall be 750 mm high.

Traffic will be assessed and approved by the Cost Centre Manager.

## **3. PRELIMINARY AND GENERAL**

Only SANAS accredited, commercial laboratories will be allowed to undertake this materials investigation. The laboratory shall supply all labour, materials, tools, machinery, equipment, lighting, as well as all that is necessary or may be necessary for the proper completion of the work and services in connection with the proposed testing.

The laboratory may employ sub-contractors, skilled and semi-skilled or unskilled labour to carry out the work according to the nature of requirements, but in conformity with the recognised current testing practice.

The laboratory must show proof of possession of drilling equipment by way of the lease agreement or ownership documents.

No excavation shall be undertaken before it is verified that the excavation will not damage any services.

Schedules of test pit locations will be made available to the laboratory. These may be subject to amendment on site.

The excavation of the test pit shall be 1 m x 1 m minimum in area, to the total depth of 1 m. The excavation shall be carried out with due care, so that each type of material encountered in the test pit can be sampled separately. The excavation shall be carried out neatly; the sides of the test pit shall be vertical.

The excavation should always be done as delicately as possible to ensure that only one layer at a time is removed and stockpiled separately without any contamination of material from other layers. The behaviour of the material in each layer during the breaking up process should be carefully observed as it gives vital information as to the consistency and "structure" of the layer e.g. a stabilised layer that remains in hard chunks during the excavation process may possibly be difficult to rework in-situ utilising conventional construction equipment. The excavation shall be completed in 1 day and shall not be carried out over 2 or more days.

If required, it is preferable to carry out any DCP testing prior to commencing with any excavations. If the pavement consists of relatively thick asphalt and/or strongly cemented layers, it may be necessary to drill through these layers or carefully removing them prior to commencing with the DCP test. The start position shall be measured relevant to the existing road surface.

The maximum depth of penetration of the DCP probe shall be 1000 mm. All asphalt surfacing / base and cemented layers shall be drilled prior to commencing the DCP. A refusal shall be recorded if the rate of penetration is less than 1 mm after 5 sets of 5 blows. If the refusal occurs within the top 400 mm of the pavement then drilling shall continue until the drill can penetrate easily into the pavement layers. If drilling is still difficult at 600 mm, it shall be stopped and a refusal recorded. If rock is encountered during drilling, then drilling shall be stopped and a refusal recorded with a note of rock being encountered.

All DCP holes shall be filled with river sand or similar, A3 quality, and plugged with asphalt.

The DCP field measurements are to be analysed by the Service Provider using an approved DCP analysis computer program (WinDCP 51" or similar). As a minimum, the following information:

- Test position co-ordinates
- The DCP curve
- Layer strength diagram
- Normalised Emod curve
- Emod curve

Backfilling of the test pit excavations shall be carried out using the following as a minimum;

- Material of minimum G5 quality, compacted to minimum 95% MDD, to a level of 225 mm below the road surface.
- A base layer of G2 quality material, stabilised with 3% cement, compacted to minimum 97% MDD, to a level 25mm below the road surface.
- Tack coat of 0.5 l/m<sup>2</sup> using 30% spray grade emulsion.
- Surfacing consisting of continuously graded cold-mix from an approved source, well compacted, to match the level of the existing surfacing.

No work shall be undertaken if there is a possibility of it raining during the excavation and sampling. If for some reason it does rain during the excavation and sampling, the samples shall be discarded and the excavation shall be redone in the immediate vicinity at the laboratory's cost. No additional payment shall be made. Repairs to any subsidence of the excavation shall also be to the laboratory cost.

The laboratory will be responsible for the safe accommodation of traffic and shall clearly identify their proposed accommodation of traffic arrangements. All traffic accommodation measures shall conform to the requirements specified in the South African Road Traffic Signs Manual: Volume 2: Chapter 13,

The Occupational Health and Safety requirements as contained in Act No 85 of 1993 (as amended) shall apply for this works. This shall be read in conjunction with the Regulations as published in the Government Gazette No 7721 of 18 July as well as the General Safety Regulations published in the Government Notice No R1031 of 30 May 1986, as amended. It will be required of the laboratory to submit an Occupational Health and Safety Plan for the safe execution of the soils investigation.

The laboratory shall be required to submit to the Engineer the Risk Assessment Quality Control Document before any work commence.

#### **4. INSURANCE**

The service provider shall ensure that all necessary insurance policies have been provided which are adequate to cover all his insurable obligations under the contract and keep them in force for the duration of the contract. If called upon to do so, the service provider shall provide proof that adequate insurances are in force.

#### **5. PERIOD OF WORK**

Fieldwork is expected to commence as soon as possible and all test results are expected within 6 weeks of the start of the contract.

#### **6. COMMENCEMENT OF THE WORK**

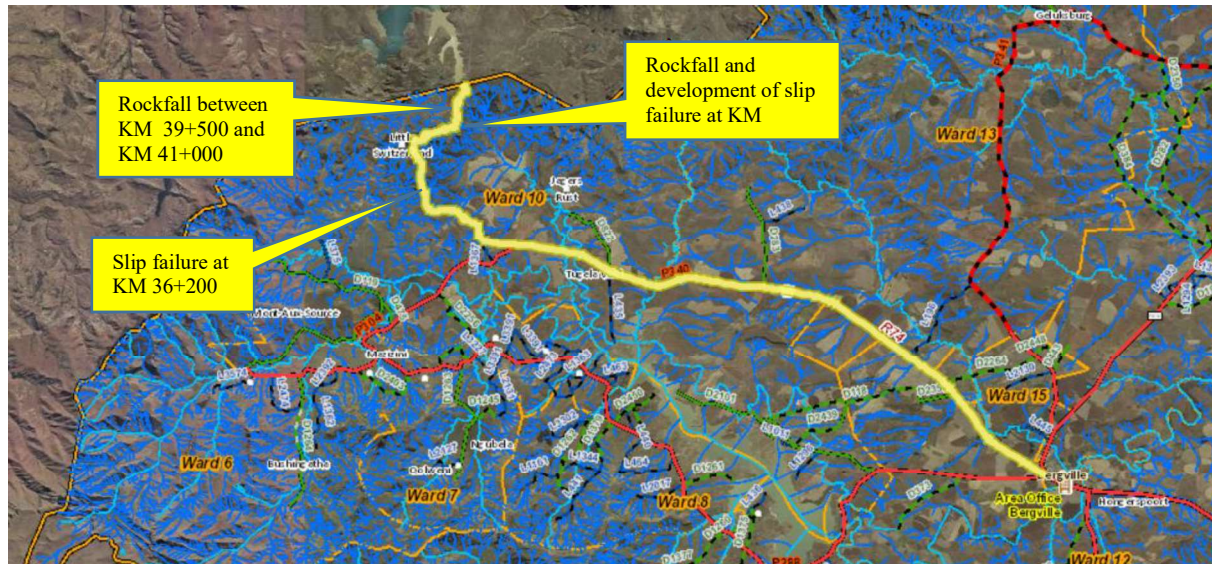
The selected service provider or providers shall accept and confirm by their submission of this quotation to commence the work within 14 (fourteen) days and to complete the work in its entirety within the stated and agreed period (as above) or any amendment to the period which shall be confirmed in writing.

Failure to commence the work within the stated 14 (fourteen) days period may result in the cancellation of the service providers order to supply the service or services as quoted without reimbursement for any costs that they may have incurred up to and including the date of cancellation.

#### **7. LATE SUBMISSION**

Any costs irrespective as to reason or cause that are or may be incurred, either by the client or their representatives due to the late completion of the work and the proper and or acceptable submission of the documentation, shall be borne by the service provider/s. Such costs shall be deducted from any monies that are or may be due to the service provider.

## ANNEXURE 1



**Figure 1** Locality Map of Main Road 340



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## **AMENDMENT PAGES**

## PART 2: SCOPE OF WORK

### 1. SITE LOCATION AND DESCRIPTION OF WORKS

P549 is currently a blacktop road located within the uMvoti District Municipality which begins at a 3-way junction with Main Roads P16-1 (R74) & P305, proceeding in a general Northwesterly direction with multiple farm portions. The terrain encountered along the existing alignment of Main Road 549 can be considered mountainous, with mostly erodible soils and hard rock in sections further west from KM 15 of the route. Due to the mountainous terrain, several tributaries and non-perennial and perennial streams cross the road at various points.

The topography along the road section is characterised by a generally steeply sloping mudrock cut bank. An existing cut slope comprising siltstone blocks and slumped sandstone was also noted along the route.

The cut slopes are dominated by steep (typically holding an angle of 60°-75°), no vegetated, weathered sandstone and siltstone. The cut slopes extend to approximately 20m high, harbouring many erodible materials along their irregular surfaces. At the toe of the cut slope, the loose material forming shallower slopes with more uniform surfaces, which blocks the road surface drainage system. This section is more irregular, with material landslides falling from the cut slope.

#### 1.1. Personnel Requirements

The minimum qualifications and requirements for the service and sub-Service Provider's personnel shall be as indicated in the table below.

| Position                                                                           | Minimum Qualification/Registration      | Minimum Relevant Experience (years) <sup>2</sup> | Other Requirements |
|------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------|--------------------|
| Design Specialist (Geotechnical Engineer or Geotechnical Engineering Technologist) | Pr. Eng. or Pr. Tech. Eng. <sup>1</sup> | 10                                               | SAICE <sup>3</sup> |

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<sup>2</sup> Relevant experience is the actual number of years measured from the date of acquiring the base NQF qualification (either B.Eng / BSc.Eng / B.EngSci or BSc / B.Eng Tech (Hon) PGDip (Engineering) / M.Eng for Pr.Eng or National Higher Diploma / Masters Diploma / BTech / B.Eng Tech / Dip Eng / Adv Dip Eng / AdvCert (Engineering Practice) plus Adv Dip Eng for Pr.Tech Eng and National Diploma / Dip Eng / Dip Eng Tech / AdvCert (Engineering Practice) / Higher Certificate (Eng) / Adv Cert (Engineering) / Adv Cert (Engineering Practice) for Pr. Techni Eng), worked in the field of the specified position. For the road safety audit team leader, the field shall be road safety design and/or traffic and transportation engineering and/or geometric design.

<sup>3</sup> South African Institute of Civil Engineers (SAICE)

### 2. SCOPE OF WORK

In summary, the scope of the works is as follows:

- Conducting a detailed slope stability assessment and geotechnical site investigation of cut slope stability and rehabilitation of a washed-away material due to soil erosion along the route.
- Provide detailed design recommendations for the developing slip failure along the route.

#### 2.1. Phase 1 - Preliminary Site Visit and Appraisal

Drive / Walk-over of the affected cut slope, slip and eroded areas to obtain initial information to facilitate the detailed geotechnical investigation and refine the geotechnical cost estimate (if necessary)—delineation of slope failure/slip extent laterally and in cross-section to validate existing data.

## **2.2. Phase 2 - Geotechnical Investigation**

The recommended geotechnical investigation is expected to comprise the following:

- Borehole drilling (min 4No.) to obtain the subsoil profile, soil samples and bedrock levels at depth.
- Test-pitting (4-6No.) by an excavator in accessible area on the embankment to obtain the subsoil profile, soil samples and bedrock levels at depth.
- DCP testing (+2-4No.) to provide the subsoil consistency and infill information, i.e., an indication of bedrock levels.
- The materials will be sampled for laboratory testing and tested at a SANAS-accredited laboratory. Undisturbed samples for Triaxial tests / Shear box / Atterberg Limits testing will be taken where possible to provide residual shear strength parameters of the failure zone materials.
- The fieldwork supervision/logging/sampling is to be performed by an experienced engineering geologist who is a registered Pr. Sci. Nat.

The geotechnical investigation shall be carried out in accordance with, but not limited to, the following Geotechnical engineering site investigation guidelines:

- The KwaZulu Natal Department of Transport Materials Investigation Specification.
- The South African Pavement Engineering Manual (SAPEM) Chapter 7: Geotechnical Investigations and Design Considerations,
- Dolomitic land Investigation Guidelines (SAICE),
- SAICE Lateral Support Guidelines.
- SAICE Site Investigation Code of Practice provide some guidance.
- SANS 3001: Civil Engineering Test Methods:

## **2.3. Phase 3 - Stability Analysis to Determine Suitable Rehabilitation Design Options**

- Geological Cross-sections are to be produced from the above and used to carry out two-dimensional geotechnical modelling and stability analyses to determine the failure mechanism/cause/geometry and subsequently allow the rehabilitation design.
- The stability analysis is to be performed using Geotechnical Engineering Design Software by an experienced geotechnical consultant who has specialised in slope stability analysis for some 10 years and rehabilitated numerous slopes. The materials' shear strength parameters are to be determined from a combination of Triaxial tests, shear box testing, back-analysis.
- The stability analysis of suitable rehabilitation design options will be performed to determine/optimize the most suitable solution. The results of the analyses and findings of the geotechnical investigation; in particular the Slip failure geology including geotechnical cross sections and relevant geotechnical parameters; will be summarised in a brief report.
- The slope stability design optioneering and options analysis is to be performed by the Geotechnical engineering professional (professionally registered with ECSA, i.e., Pr. Eng. or Pr. Tech. Eng.).

## **2.4. Deliverables**

- Modus Operandi (i.e., a detailed report entailing the method of site investigation, type of tests to be conducted, their respective locations, etc.) for the proposed geotechnical site investigation.
- A detailed, comprehensive Geotechnical Investigation Report in PDF format presenting findings and observations from site investigation, laboratory testing, interpretation and design recommendation and possible geotechnical solutions (minimum 2) thereof. The report is to be reviewed and signed by the Geotechnical engineering professional (professionally registered with ECSA, i.e., Pr. Eng. or Pr. Tech. Eng.).
- The final factor of safety must be illustrated in the final design.

## **2.5. Traffic Accommodation**

The persons responsible for undertaking the materials investigation shall provide, erect and maintain the necessary traffic-control devices, road signs, traffic cones, flagmen and speed controls (hereinafter referred to as traffic-control devices) in accordance with these special provisions and as appropriate in terms of the SARTSM and remove them when no longer required. It shall be incumbent upon the persons responsible for supervising traffic accommodation to see to it that the abovementioned traffic-control devices are present where required at all times and are in good condition.

The safety of the travelling public is of utmost importance and every effort shall be made to ensure that all traffic control devices are maintained and effective and that courtesy is extended to the travelling public at all times. All workmen within the work area shall wear appropriate safety apparel and all vehicles shall be equipped with rotating beacons.

The type of construction, spacing and placement of traffic-control devices shall be in accordance with the appropriate short term closure layout, as shown in SARTSM. The recommended arrangements of the traffic control devices shall not be departed from without prior approval of the Engineer.

The details shown for spacing and placement of traffic-control facilities may, however, be revised at the discretion of the Engineer where deemed necessary to accommodate local site geometry and traffic conditions.

All temporary road signs shall be mounted on portable supports for the easy moving of signs to temporary positions. The only permitted method of ballasting the sign supports shall consist of durable sandbags filled with sand of adequate mass to prevent signs from being blown over by wind. The cost of the sandbags shall be included in the tendered rates.

Traffic cones manufactured in a fluorescent red-orange or red plastic material only may be used at short term lane deviations. Cones used on all deviations shall be 750 mm high.

Traffic will be assessed and approved by the Cost Centre Manager.

## **3. PRELIMINARY AND GENERAL**

Only SANAS accredited, commercial laboratories will be allowed to undertake this materials investigation. The laboratory shall supply all labour, materials, tools, machinery, equipment, lighting, as well as all that is necessary or may be necessary for the proper completion of the work and services in connection with the proposed testing.

The laboratory may employ sub-contractors, skilled and semi-skilled or unskilled labour to carry out the work according to the nature of requirements, but in conformity with the recognised current testing practice.

The laboratory must show proof of possession of drilling equipment by way of the lease agreement or ownership documents.

No excavation shall be undertaken before it is verified that the excavation will not damage any services.

Schedules of test pit locations will be made available to the laboratory. These may be subject to amendment on site.

The excavation of the test pit shall be 1 m x 1 m minimum in area, to the total depth of 1 m. The excavation shall be carried out with due care, so that each type of material encountered in the test pit can be sampled separately. The excavation shall be carried out neatly; the sides of the test pit shall be vertical.

The excavation should always be done as delicately as possible to ensure that only one layer at a time is removed and stockpiled separately without any contamination of material from other layers. The behaviour of the material in each layer during the breaking up process should be carefully observed as it gives vital information as to the consistency and "structure" of the layer e.g. a stabilised layer that remains in hard chunks during the excavation process may possibly be difficult to rework in-situ utilising conventional construction equipment. The excavation shall be completed in 1 day and shall not be carried out over 2 or more days.

If required, it is preferable to carry out any DCP testing prior to commencing with any excavations. If the pavement consists of relatively thick asphalt and/or strongly cemented layers, it may be necessary to drill through these layers or carefully removing them prior to commencing with the DCP test. The start position shall be measured relevant to the existing road surface.

The maximum depth of penetration of the DCP probe shall be 1000 mm. All asphalt surfacing / base and cemented layers shall be drilled prior to commencing the DCP. A refusal shall be recorded if the rate of penetration is less than 1 mm after 5 sets of 5 blows. If the refusal occurs within the top 400 mm of the pavement, then drilling shall continue until the drill can penetrate easily into the pavement layers. If drilling is still difficult at 600 mm, it shall be stopped, and a refusal recorded. If rock is encountered during drilling, then drilling shall be stopped, and a refusal recorded with a note of rock being encountered.

All DCP holes shall be filled with river sand or similar, A3 quality, and plugged with asphalt.

The DCP field measurements are to be analysed by the Service Provider using an approved DCP analysis computer program (WinDCP 51" or similar). As a minimum, the following information:

- Test position co-ordinates
- The DCP curve
- Layer strength diagram
- Normalised Emod curve
- Emod curve

Backfilling of the test pit excavations shall be carried out using the following as a minimum;

- Material of minimum G5 quality, compacted to minimum 95% MDD, to a level of 225 mm below the road surface.
- A base layer of G2 quality material, stabilised with 3% cement, compacted to minimum 97% MDD, to a level 25mm below the road surface.
- Tack coat of 0.5 l/m<sup>2</sup> using 30% spray grade emulsion.
- Surfacing consisting of continuously graded cold-mix from an approved source, well compacted, to match the level of the existing surfacing.

No work shall be undertaken if there is a possibility of it raining during the excavation and sampling. If for some reason it does rain during the excavation and sampling, the samples shall be discarded and the excavation shall be redone in the immediate vicinity at the laboratory's cost. No additional payment shall be made. Repairs to any subsidence of the excavation shall also be to the laboratory cost.

The laboratory will be responsible for the safe accommodation of traffic and shall clearly identify their proposed accommodation of traffic arrangements. All traffic accommodation measures shall conform to the requirements specified in the South African Road Traffic Signs Manual: Volume 2: Chapter 13,

The Occupational Health and Safety requirements as contained in Act No 85 of 1993 (as amended) shall apply for this works. This shall be read in conjunction with the Regulations as published in the Government Gazette No 7721 of 18 July as well as the General Safety Regulations published in the Government Notice No R1031 of 30 May 1986, as amended. It will be required of the laboratory to submit an Occupational Health and Safety Plan for the safe execution of the soils investigation.

The laboratory shall be required to submit to the Engineer the Risk Assessment Quality Control Document before any work commence.

#### **4. INSURANCE**

The service provider shall ensure that all necessary insurance policies have been provided which are adequate to cover all his insurable obligations under the contract and keep them in force for the duration of the contract. If called upon to do so, the service provider shall provide proof that adequate insurances are in force.

#### **5. PERIOD OF WORK**

Fieldwork is expected to commence as soon as possible, and all test results are expected within 6 weeks of the start of the contract.

#### **6. COMMENCEMENT OF THE WORK**

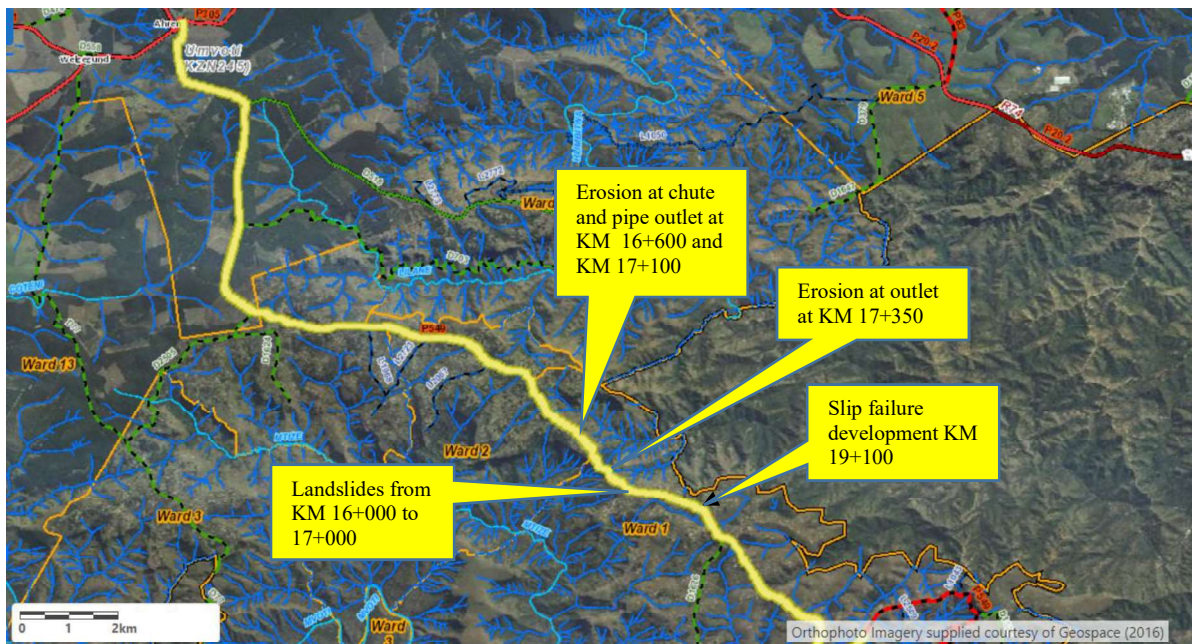
The selected service provider or providers shall accept and confirm by their submission of this quotation to commence the work within 14 (fourteen) days and to complete the work in its entirety within the stated and agreed period (as above) or any amendment to the period which shall be confirmed in writing.

Failure to commence the work within the stated 14 (fourteen) days period may result in the cancellation of the service providers order to supply the service or services as quoted without reimbursement for any costs that they may have incurred up to and including the date of cancellation.

#### **7. LATE SUBMISSION**

Any costs irrespective as to reason or cause that are or may be incurred, either by the client or their representatives due to the late completion of the work and the proper and or acceptable submission of the documentation, shall be borne by the service provider/s. Such costs shall be deducted from any monies that are or may be due to the service provider.

## ANNEXURE 1



**Figure 1** Locality Map of Main Road 549