



13 November 2019  
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### Aurecon South Africa (Pty) Ltd

264 Main Street

Paarl

7646

Attention: Chris Van Pletzen

### Leliefontein to Conmarine Water Pipeline – Geotechnical Investigation Quotation

#### 1. Introduction and Scope of Investigation

SRK Consulting South Africa (Pty) Ltd (SRK) was invited by Aurecon South Africa (Pty) Ltd to provide a quotation to undertake a geotechnical investigation for the proposed new 900/800 mm water pipeline from the Leliefontein Reservoir (Paarl) to the Conmarine reservoir (Wellington), a distance of approximately 11 km.

A geotechnical service provider is required to oversee the entire geotechnical investigation, including, the geotechnical investigation, laboratory testing, analysis of results and the preparation of a geotechnical report.

The terms of reference for the geotechnical investigation are summarised as follows:

The work includes, but is not necessarily limited to, the following:

- The Service Provider to carry out a desk-top study of the area with a view to refine and finalise the proposed trial hole positions.
- Appointing sub-contractors to undertake the excavation of trial holes and laboratory testing.
- Coordinating the overall geotechnical investigation (i.e. liaison with Drakenstein Municipality, the Engineering Consultant (Aurecon), affected landowners, sub-contractors, laboratories, etc.).
- Obtaining wayleaves from the relevant service authorities for the excavation of trial holes.

Partners R Armstrong, S Bartels, N Brien, JM Brown, CD Dalgliesh, BM Engelsman, R Gardiner, M Hinsch, W Jordaan, WC Joughlin, DA Kilian, S Kirsten, F Lake, JA Lake, V Maharaj, I Mahomed, HAC Meintjes, MJ Morris, DH Mossop, GP Nel, VS Reddy, T Shepherd, PJ Shephard, MJ Sim, VM Simposya, JS Stiff, M van Huyssteen, AT van Zyl, MD Wanless, ML Wertz, A Wood

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Associate Partners PJ Aucamp, CM Bauman, LSE Coetser, SA de Villiers, M du Toit, SG Jones, I Linzei, JI Mainama, NG McFai lane, RD O'Brien, S Reuther, D Visser, C Wessels

Consultants JR Dixon, Pi Eng, GC Howell, Pi Eng, PhD, PR Labrum, Pi Eng, RRW McNeill, Pi Tech Eng, PN Rosewarne, Pi Sci Nat, MSc, AA Smithen, Pi Eng, TR Stacey, Pi Eng, DSc, PJ Terbrugge, Pi Sci Nat, MSc, HFJ Theart, Pi Sci Nat, PhD, DJ Venter, Pi Tech Eng

SRK Consulting (South Africa) (Pty) Ltd Reg No 1995 012890 07

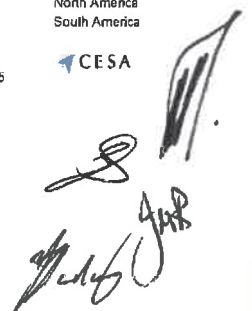
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- Liaison with land owners regarding the work to be undertaken on their properties and to request them to identify their existing services and agree upon the best suitable position for e.g. excavation of trial holes.
- Overseeing all fieldwork, including profiling, sampling, taking of water levels, etc. Trial holes shall be profiled by suitably qualified and experienced persons.
- Taking of representative samples and transporting these samples to the laboratory for testing.
- Testing of the samples in the laboratory, to recognised and accepted standards, and presentation of the results.
- Data Analysis and Reporting on results.

## 2. Site Investigation Procedure

Google images of the proposed pipeline route have been carefully studied and it is evident that it will be very difficult to excavate test pits at many positions due to limited space adjacent to agricultural lands, and the abundance of fences which will result in access problems. SRK has conducted numerous pipeline investigations in the past and the most challenging aspect relates to access. In particular, fences and proximity of agricultural land.

The tender document indicates that trial holes should be excavated with a track excavator to achieve an excavation depth of about 3.5 m (probable excavation depth required at valve chamber locations, however, the pipeline is only expected to be placed at a depth of about 2 m below surface).

The pipeline is approximately 11 km in length, and it is SRK's opinion that the use of a track excavator will prove problematic to move from one trial hole location to another. It will not be possible to drive the track excavator along the whole route without disturbance/damage to the municipal and farm roads. The abundance of fence lines will also make it very difficult to gain access to specific locations. Fences may either need to be cut (not recommended) or the excavator will have to be "walked" long distances to access gates etc. For these reasons, use of a track mounted excavator will significantly increase time in the field and costs.

SRK's proposal is for the trial holes to be excavated using a backhoe excavator which is capable of excavating to a depth of at least 3.5 m below surface. A rock bucket can be used to improve excavation within harder materials. The advantage of using a backhoe excavator is that the machine can be rapidly driven to locations and to access gates into fields which may be some distance from the trial hole position (even if this requires quite a long detour). An added advantage of using a backhoe excavator is that the machine can excavate in a more restricted space, causing less damage to farm tracks and adjacent agricultural lands. The test pits can also be more easily backfilled.

The trial holes will first be excavated using a backhoe excavator and if a particular hard area is located, provision has been made for the hiring of a track excavator for one day. The track excavator will be delivered to the particular location using a lowbed. Should it be found that the track excavator is not required there will be a cost saving.

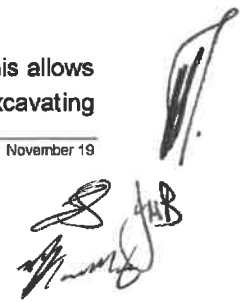
Using a backhoe excavator will be much more efficient and less costly, and will cause far less damage and disturbance than using a track excavator.

## 3. Geotechnical Costs

The priced bill of quantities and Annexure A is included

## 4. Timing

It is understood that the successful tenderer will be notified on the 20<sup>th</sup> November 2019. This allows approximately three weeks before the annual end of year contractor shutdown. Prior to excavating




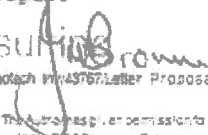
any trial holes, SRK will have to go through the process of obtaining wayleaves and liaison with farmers in terms of suitable locations for trial holes, access arrangements etc. It is envisaged that this can be completed before the annual shutdown. It is envisaged that SRK will be able to commence with the test pitting as soon as the plant hire companies are available in the new year. The site pitting will take one week to complete, allow another week for the resistivity survey and approximately two weeks for laboratory testing and reporting.

Please contact the undersigned should you have any queries.

Yours faithfully,



**SRK Consulting (South Africa) (Pty) Ltd**

SRK Consulting - Certified Electronic Signature

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**John Brown Pr. Sci. Nat**  
Principal Engineering Geologist, Partner

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 **srk consulting**   
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**Bruce Engelsman Pr Eng Pr CPM**

Principal Engineer, Partner

**Enclosures:**

- Annexure A: Agreement
- Priced Bill of Quantities
- SRK General Conditions of Agreement
- CV's (John Brown, Daniell Du Preez, Lewis Prince, Ashley Nanton)
- Public Liability Insurance
- Professional Indemnity Insurance
- Black Economic Empowerment (BEE) Verification

