NEC3 Engineering & Construction Contract

Between **ESKOM HOLDINGS SOC Ltd**
(Reg No. 2002/015527/30)

and **[Insert at award stage]**
(Reg No. _____)

for **Buffelspoort-Ladismith 132kV Overhead Line Stay Wire Replacement**

Contents: **Pages**

CONTRACT No. **[Insert at award stage]**

Part C1: Agreements & Contract Data

Contents: **Pages**

C1.1 Form of Offer & Acceptance

Offer

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract for the procurement of:

Replacing the corroded strain tower stay foundations, approximately 23 strain towers each having 8 stays, with the associated stay wires on the Buffelspoort / Ladismith 132 kV line by:

1. **affecting the necessary repairs as per the micropile system.**
2. **The proposed micropile system design and methodology should be presented and approved at Dx WCOU DRT meeting for approval and acceptance by Eskom.**
3. **The proposed repairs should consider possible ways to coat parts extending into the soil as well as possible alternatives such as rust anodes, sacrificial anodes etc.**

Eskom reports also suggest that for the stayed structures it might be useful to earth the base of the structure, thereby assisting as a path for stray currents / sacrificial anode.

The tenderer, identified in the Offer signature block, has examined the documents listed in the Tender Data and addenda thereto and by submitting this Offer has accepted the Conditions of Tender.

By the representative of the tenderer, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance the tenderer offers to perform all of the obligations and liabilities of the *Contractor* under the contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the *conditions of contract* identified in the Contract Data.

Options B	The offered total of the Prices exclusive of VAT is	**R [●]**
	Sub total	**R [●]**
	Value Added Tax @ 14% is	**R [●]**
	The offered total of the amount due inclusive of VAT is[1]	**R [●]**
	(in words) **[●]**	

This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document including the Schedule of Deviations (if any) to the tenderer before the end of the period of validity stated in the Tender Data, or other period as agreed, whereupon the tenderer becomes the party named as the *Contractor* in the *conditions of contract* identified in the Contract Data.

Signature(s) .....

Name(s) .....

[1] This total is required by the *Employer* for budgeting purposes only. Actual amounts due will be assessed in terms of the *conditions of contract*.

Capacity .....

For the tenderer: .....

(Insert name and address of organisation)

Name & signature of witness ..... Date .....

Tenderer's CIDB registration number (if applicable) .....

Acceptance

By signing this part of this Form of Offer and Acceptance, the Employer identified below accepts the tenderer's Offer. In consideration thereof, the Employer shall pay the Contractor the amount due in accordance with the *conditions of contract* identified in the Contract Data. Acceptance of the tenderer's Offer shall form an agreement between the Employer and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract, are contained in:

Part C1	Agreements and Contract Data, (which includes this Form of Offer and Acceptance)
Part C2	Pricing Data
Part C3	Scope of Work: Works Information
Part C4	Site Information

and drawings and documents (or parts thereof), which may be incorporated by reference into the above listed Parts.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Returnable Schedules as well as any changes to the terms of the Offer agreed by the tenderer and the Employer during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Form of Offer and Acceptance. No amendments to or deviations from said documents are valid unless contained in this Schedule.

The tenderer shall within two weeks of receiving a completed copy of this agreement, including the Schedule of Deviations (if any), contact the Employer's agent (whose details are given in the Contract Data) to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the *conditions of contract* identified in the Contract Data at, or just after, the date this agreement comes into effect. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the tenderer receives one fully completed original copy signed between them of this document, including the Schedule of Deviations (if any).

Unless the tenderer (now *Contractor*) within five working days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the Parties.

Signature(s) .....

Name(s) .....

Capacity .....

for the Employer

.....
(Insert name and address of organisation)

Name & signature of witness .....

Date .....

Note: If a tenderer wishes to submit alternative tenders, use another copy of this Form of Offer and Acceptance.

Schedule of Deviations to be completed by the *Employer* prior to contract award

Note:

1. This part of the Offer & Acceptance would not be required if the contract has been developed by negotiation between the Parties and is not the result of a process of competitive tendering.
2. The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permitted in terms of the Conditions of Tender.
3. A tenderer's covering letter must not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid be the subject of agreement reached during the process of Offer and Acceptance, the outcome of such agreement shall be recorded here and the final draft of the contract documents shall be revised to incorporate the effect of it.

No.	Subject	Details
1	**[●]**	**[●]**
2	**[●]**	**[●]**
3	**[●]**	**[●]**
4	**[●]**	**[●]**
5	**[●]**	**[●]**
6	**[●]**	**[●]**
7	**[●]**	**[●]**

By the duly authorised representatives signing this Schedule of Deviations below, the Employer and the tenderer agree to and accept this Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules, as well as any confirmation, clarification or changes to the terms of the Offer agreed by the tenderer and the Employer during this process of Offer and Acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the tenderer of a completed signed copy of this Form shall have any meaning or effect in the contract between the parties arising from this Agreement.

	For the tenderer:	**For the Employer**
Signature	.....	.....
Name	.....	.....
Capacity	.....	.....
On behalf of	..... *(Insert name and address of organisation)*	..... *(Insert name and address of organisation)*
Name & signature of witness	.....	.....
Date	.....	.....

C1.2 ECC3 Contract Data

Part one - Data provided by the *Employer*

Completion of the data in full, according to the Options chosen, is essential to create a complete contract.

Clause	Statement	Data
1	**General**	
	The *conditions of contract* are the core clauses and the clauses for main Option	
		B: Priced contract with bill of quantities
	dispute resolution Option	**W1: Dispute resolution procedure**
	and secondary Options	
		X2 Changes in the law
		X7: Delay damages
		X16: Retention
		X18: Limitation of liability
		Z: *Additional conditions of contract*
	of the NEC3 Engineering and Construction Contract, April 2013 (ECC3)	
10.1	The *Employer* is (Name):	**Eskom Holdings SOC Ltd (reg no: 2002/015527/30), a state owned company incorporated in terms of the company laws of the Republic of South Africa**
	Address	**Registered office at Megawatt Park, Maxwell Drive, Sandton, Johannesburg**
10.1	The *Project Manager* is: (Name)	**Angus Mouton**
	Address	**Eskom Distribution PO Box 222 Brackenfell 7560**
	Tel	**021 980 3818**
	Fax	**086 668 3294**
	e-mail	**angus.mouton@eskom.co.za**
10.1	The *Supervisor* is: (Name)	**Leo Simpson**
	Address	**Eskom Distribution PO Box 222 Brackenfell 7560**

	Tel No.	**021 980 3730**
	Fax No.	**-**
	e-mail	**SimpsoG@eskom.co.za**
11.2(13)	The *works* are	**Buffelspoort-Ladismith 132kV Overhead Line Stay Wire Replacement**
11.2(14)	The following matters will be included in the Risk Register	**See Typical Risks on pages 40**
11.2(15)	The *boundaries of the site* are	**The boundaries of the various servitudes of the line stretches from Buffelspoort Substation to Ladismith Substation. The majority of the circuit being located close to, or near the Ladismith area (Western Cape, Little Karoo)**
11.2(16)	The Site Information is in	**Part 4: Site Information**
11.2(19)	The Works Information is in	**Part 3: Scope of Work and all documents and drawings to which it makes reference.**
12.2	The *law of the contract* is the law of	**the Republic of South Africa**
13.1	The *language of this contract* is	**English**
13.3	The *period for reply* is	**1 week**
2	**The *Contractor's* main responsibilities**	**Data required by this section of the core clauses is provided by the *Contractor* in Part 2 and terms in italics used in this section are identified elsewhere in this Contract Data.**
3	**Time**	
11.2(3)	The *completion date* for the whole of the *works* is	**31 05 2023**

30.1	The *access dates* are:	**Part of the Site**		**Date**
		1	**Whole line servitude**	**From 1 February 2023 to 30 September 2023**

31.1	The *Contractor* is to submit a first programme for acceptance within	**2 weeks of the Contract Date.**
31.2	The *starting date* is	**1 February 2023**
32.2	The *Contractor* submits revised programmes at intervals no longer than	**4 weeks.**
35.1	The *Employer* is not willing to take over the *works* before the Completion Date.	
4	**Testing and Defects**	
42.2	The *defects date* is	**52 weeks after Completion of the whole of the *works*.**

43.2	The *defect correction period* is	**2 weeks**
5	**Payment**	
50.1	The *assessment interval* is	**between the 25th day of each successive month.**
51.1	The *currency of this contract* is the	**South African Rand.**
51.2	The period within which payments are made is	**3 weeks plus the payment term as listed against the vendor on the Eskom database. Will be confirmed at tender award stage.**
51.4	The *interest rate* is	**the publicly quoted prime rate of interest (calculated on a 365 day year) charged from time to time by the Standard Bank of South Africa Limited (as certified, in the event of any dispute, by any manager of such bank, whose appointment it shall not be necessary to prove) for amounts due in Rands and** **(ii) the LIBOR rate applicable at the time for amounts due in other currencies. LIBOR is the 6 month London Interbank Offered Rate quoted under the caption "Money Rates" in The Wall Street Journal for the applicable currency or if no rate is quoted for the currency in question then the rate for United States Dollars, and if no such rate appears in The Wall Street Journal then the rate as quoted by the Reuters Monitor Money Rates Service (or such service as may replace the Reuters Monitor Money Rates Service) on the due date for the payment in question, adjusted *mutatis mutandis* every 6 months thereafter and as certified, in the event of any dispute, by any manager employed in the foreign exchange department of The Standard Bank of South Africa Limited, whose appointment it shall not be necessary to prove.**
6	**Compensation events**	
60.1(13)	The place where weather is to be recorded is:	**Ladismith Area**
	The *weather measurements* to be recorded for each calendar month are,	**The line is located in an arid to semi-arid desert area, the area is prone to wide variations in temperature and little to no rainfall.** **The contractor should be aware and make provision for possible delays due to weather events.**
	The *weather measurements* are supplied by	**N/A**

	The *weather data* are the records of past *weather measurements* for each calendar month which were recorded at: and which are available from:	**N/A**
7	**Title**	**Buffelspoort-Ladismith 132kV Overhead Line Stay Wire Replacement**
8	**Risks and insurance**	
80.1	These are additional *Employer*'s risks	**1. See Typical Risks on pages 40**
84.1	The *Employer* provides these insurances from the Insurance Table	**as stated for "Format Dx" available on** *http://www.eskom.co.za/Tenders/InsurancePoliciesProcedures/Pages/EIMS_Policies_From_1_April_2014_To_31_March_2015.aspx* **(See Annexure B for basic guidance)**
84.1	The *Employer* provides these additional insurances	**as stated for "Format Dx" available on** *http://www.eskom.co.za/Tenders/InsurancePoliciesProcedures/Pages/EIMS_Policies_From_1_April_2014_To_31_March_2015.aspx* **(See Annexure B for basic guidance)**
84.2	The minimum limit of indemnity for insurance in respect of loss of or damage to property (except the *works*, Plant, Materials and Equipment) and liability for bodily injury to or death of a person (not an employee of the *Contractor*) caused by activity in connection with this contract for any one event is	**whatever the *Contractor* deems necessary in addition to that provided by the *Employer*.**
84.2	The minimum limit of indemnity for insurance in respect of death of or bodily injury to employees of the *Contractor* arising out of and in the course of their employment in connection with this contract for any one event is	**As prescribed by the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993 and the *Contractor's* common law liability for people falling outside the scope of the Act with a limit of Indemnity of not less than R500 000 (Five hundred thousand Rands).**
9	**Termination**	**There is no reference to Contract Data in this section of the core clauses and terms in italics used in this section are identified elsewhere in this Contract Data.**
10	**Data for main Option clause**	
B	**Priced contract with bill of quantities**	
60.6	The *method of measurement* is	**Standard System of Measuring Builders Work (Sixth Edition Amended), Civil Engineering Standard Method of Measurement (Third Edition) and SANS, amended as stated in Part C2.1, Pricing Assumptions.**
11	**Data for Option W1**	
W1.1	The *Adjudicator* is	**the person selected from the ICE-SA Division (or its successor body) of the South African Institution of Civil Engineering Panel of Adjudicators by the Party intending to refer a**

		dispute to him. (see www.ice-sa.org.za). If the Parties do not agree on an Adjudicator the Adjudicator will be appointed by the Arbitration Foundation of Southern Africa (AFSA).
	Address	**[●]**
	Tel No.	**[●]**
	Fax No.	**[●]**
	e-mail	**[●]**
W1.2(3)	The *Adjudicator nominating body* is:	**the Chairman of ICE-SA a joint Division of the South African Institution of Civil Engineering and the London Institution of Civil Engineers. (See www.ice-sa.org.za) or its successor body.**
W1.4(2)	The *tribunal* is:	**Arbitration**
W1.4(5)	The *arbitration procedure* is	**the latest edition of Rules for the Conduct of Arbitrations published by The Association of Arbitrators (Southern Africa) or its successor body.**
	The place where arbitration is to be held is	**South Africa**
	The person or organisation who will choose an arbitrator - if the Parties cannot agree a choice or - if the arbitration procedure does not state who selects an arbitrator, is	**the Chairman for the time being or his nominee of the Association of Arbitrators (Southern Africa) or its successor body.**
12	**Data for secondary Option clauses**	
X2	**Changes in the law**	**There is no reference to Contract Data in this Option and terms in italics are identified elsewhere in this Contract Data.**
X7	**Delay damages (but not if Option X5 is also used)**	
X7.1	Delay damages for Completion of the whole of the *works* are	**R 10,000.00 per day up to a limit of 20% of the total contract value.**
X16	**Retention (not used with Option F)**	
X16.1	The *retention free amount* is	**R 0.00**
	The *retention percentage* is	**10%**
X18	**Limitation of liability**	
X18.1	The *Contractor*'s liability to the *Employer* for indirect or consequential loss is limited to:	**R0.0 (zero Rand)**
X18.2	For any one event, the *Contractor*'s liability to the *Employer* for loss of or damage to the *Employer*'s property is	**the amount of the deductibles relevant to the event described in the insurance policy format selected in the data for clause 84.1 above,**

	limited to:	**which policy is available on** *http://www.eskom.co.za/Tenders/InsurancePoliciesProcedures/Pages/EIMS_Policies_From_1_April_2014_To_31_March_2015.aspx*
X18.3	The *Contractor*'s liability for Defects due to his design which are not listed on the Defects Certificate is limited to	**The greater of** • **the total of the Prices at the Contract Date and** • **the amounts excluded and unrecoverable from the *Employer*'s assets policy for correcting the Defect (other than the resulting physical damage which is not excluded) plus R15M first amount payable in terms of the *Employer*'s assets policy.**

X18.4	The *Contractor*'s total liability to the *Employer* for all matters arising under or in connection with this contract, other than excluded matters, is limited to:	**the total of the Prices other than for the additional excluded matters.**
		
		The *Contractor's* total liability for the additional excluded matters is not limited.
		
		The additional excluded matters are amounts for which the *Contractor* is liable under this contract for
		
		• **Defects due to his design which arise before the Defects Certificate is issued,**
		• **Defects due to manufacture and fabrication outside the Site,**
		• **loss of or damage to property (other than the *works*, Plant and Materials),**
		  • **death of or injury to a person and**
		  • **infringement of an intellectual property right.**

X18.5	The *end of liability date* is	**(i) 7 (seven) years after the *defects date* for latent Defects and** **(ii) the date on which the liability in question prescribes in accordance with the Prescription Act No. 68 of 1969 (as amended or in terms of any replacement legislation) for any other matter.** **A latent Defect is a Defect which would not have been discovered on reasonable inspection by the *Employer* or the *Supervisor* before the *defects date*, without requiring any inspection not ordinarily carried out by the *Employer* or the *Supervisor* during that period. If the *Employer* or the *Supervisor* do undertake any inspection over and above the reasonable inspection, this does not place a greater responsibility on the *Employer* or the *Supervisor* to have discovered the Defect.**
Z	**The *Additional conditions of contract* are**	**Z1 to Z12 always apply.**

Z1	**Cession delegation and assignment**
Z1.1	The *Contractor* does not cede, delegate or assign any of its rights or obligations to any person without the written consent of the *Employer.*
Z1.2	Notwithstanding the above, the *Employer* may on written notice to the *Contractor* cede and delegate its rights and obligations under this contract to any of its subsidiaries or any of its present divisions or operations which may be converted into separate legal entities as a result of the restructuring of the Electricity Supply Industry.

Z2	**Joint ventures**
Z2.1	If the *Contractor* constitutes a joint venture, consortium or other unincorporated grouping of two or more persons or organisations then these persons or organisations are deemed to be jointly and severally liable to the *Employer* for the performance of this contract.
Z2.2	Unless already notified to the *Employer*, the persons or organisations notify the *Project Manager* within two weeks of the Contract Date of the key person who has the authority to bind the *Contractor* on their behalf.
Z2.3	The *Contractor* does not alter the composition of the joint venture, consortium or other unincorporated grouping of two or more persons without the consent of the *Employer* having been given to the *Contractor* in writing.

Z3	**Change of Broad Based Black Economic Empowerment (B-BBEE) status**
Z3.1	Where a change in the *Contractor's* legal status, ownership or any other change to his business composition or business dealings results in a change to the *Contractor*'s B-BBEE status, the *Contractor* notifies the *Employer* within seven days of the change.
Z3.2	The *Contractor* is required to submit an updated verification certificate and necessary supporting documentation confirming the change in his B-BBEE status to the *Project Manager* within thirty days of the notification or as otherwise instructed by the *Project Manager*.
Z3.3	Where, as a result, the *Contractor's* B-BBEE status has decreased since the Contract Date the *Employer* may either re-negotiate this contract or alternatively, terminate the *Contractor*'s obligation to Provide the Works.
Z3.4	Failure by the *Contractor* to notify the *Employer* of a change in its B-BBEE status may constitute a reason for termination. If the *Employer* terminates in terms of this clause, the procedures on termination are P1, P2 and P3 as stated in clause 92, and the amount due is A1 and A3 as stated in clause 93.

Z4	**Ethics**
Z4.1	Any offer, payment, consideration, or benefit of any kind made by the *Contractor*, which constitutes or could be construed either directly or indirectly as an illegal or corrupt practice, as an inducement or reward for the award or in execution of this contract constitutes grounds for terminating the *Contractor*'s obligation to Provide the Works or taking any other action as appropriate against the *Contractor* (including civil or criminal action).
Z4.2	The *Employer* may terminate the *Contractor*'s obligation to Provide the Works if the *Contractor* (or any member of the *Contractor* where the *Contractor* constitutes a joint venture, consortium or other unincorporated grouping of two or more persons or organisations) is found guilty by a competent court, administrative or regulatory body of participating in illegal or corrupt practices. Such practices include making of offers, payments, considerations, or benefits of any kind or

otherwise, whether in connection with any procurement process or contract with the *Employer* or other people or organisations and including in circumstances where the *Contractor* or any such member is removed from the an approved vendor data base of the *Employer* as a consequence of such practice.

Z4.3 Notwithstanding the provisions of core clause 90.2, the procedures on termination in terms of this clause are P1, P2 and P3 as stated in the core clause 92 and the amount due is A1 and A3 as stated in core clause 93.

Z5 Confidentiality

Z5.1 The *Contractor* does not disclose or make any information arising from or in connection with this contract available to Others. This undertaking does not, however, apply to information which at the time of disclosure or thereafter, without default on the part of the *Contractor*, enters the public domain or to information which was already in the possession of the *Contractor* at the time of disclosure (evidenced by written records in existence at that time). Should the *Contractor* disclose information to Others in terms of clause 25.1, the *Contractor* ensures that the provisions of this clause are complied with by the recipient.

Z5.2 If the *Contractor* is uncertain about whether any such information is confidential, it is to be regarded as such until notified otherwise by the *Project Manager*.

Z5.3 In the event that the *Contractor* is, at any time, required by law to disclose any such information which is required to be kept confidential, the *Contractor*, to the extent permitted by law prior to disclosure, notifies the *Employer* so that an appropriate protection order and/or any other action can be taken if possible, prior to any disclosure. In the event that such protective order is not, or cannot, be obtained, then the *Contractor* may disclose that portion of the information which it is required to be disclosed by law and uses reasonable efforts to obtain assurances that confidential treatment will be afforded to the information so disclosed.

Z5.4 The taking of images (whether photographs, video footage or otherwise) of the *works* or any portion thereof, in the course of Providing the Works and after Completion, requires the prior written consent of the *Project Manager*. All rights in and to all such images vests exclusively in the *Employer*.

Z5.5 The *Contractor* ensures that all his subcontractors abide by the undertakings in this clause.

Z6 Waiver and estoppel: Add to core clause 12.3:

Z6.1 Any extension, concession, waiver or relaxation of any action stated in this contract by the Parties, the *Project Manager*, the *Supervisor*, or the *Adjudicator* does not constitute a waiver of rights, and does not give rise to an estoppel unless the Parties agree otherwise and confirm such agreement in writing.

Z7 Health, safety and the environment: Add to core clause 27.4

Z7.1 The *Contractor* undertakes to take all reasonable precautions to maintain the health and safety of persons in and about the execution of the *works*. Without limitation the *Contractor*:

- accepts that the *Employer* may appoint him as the “Principal Contractor” (as defined and provided for under the Construction Regulations 2014 (promulgated under the Occupational Health & Safety Act 85 of 1993) (“the Construction Regulations”) for the Site;
- warrants that the total of the Prices as at the Contract Date includes a sufficient amount for proper compliance with the Construction Regulations, all applicable health & safety laws and regulations and the health and safety rules, guidelines and procedures provided for in this contract and generally for the proper maintenance of health & safety in and about the execution of *works*; and

- undertakes, in and about the execution of the *works*, to comply with the Construction Regulations and with all applicable health & safety laws and regulations and rules, guidelines and procedures otherwise provided for under this contract and ensures that his Subcontractors, employees and others under the *Contractor's* direction and control, likewise observe and comply with the foregoing.

Z7.2 The *Contractor*, in and about the execution of the *works*, complies with all applicable environmental laws and regulations and rules, guidelines and procedures otherwise provided for under this contract and ensures that his Subcontractors, employees and others under the *Contractor's* direction and control, likewise observe and comply with the foregoing.

Z8 Provision of a Tax Invoice and interest. Add to core clause 51

Z8.1 Within one week of receiving a payment certificate from the *Project Manager* in terms of core clause 51.1, the *Contractor* provides the *Employer* with a tax invoice in accordance with the *Employer*'s procedures stated in the Works Information, showing the amount due for payment equal to that stated in the payment certificate.

Z8.2 If the *Contractor* does not provide a tax invoice in the form and by the time required by this contract, the time by when the *Employer* is to make a payment is extended by a period equal in time to the delayed submission of the correct tax invoice. Interest due by the *Employer* in terms of core clause 51.2 is then calculated from the delayed date by when payment is to be made.

Z8.3 The *Contractor* (if registered in South Africa in terms of the companies Act) is required to comply with the requirements of the Value Added Tax Act, no 89 of 1991 (as amended) and to include the *Employer*'s VAT number 4740101508 on each invoice he submits for payment.

Z9 Notifying compensation events

Z9.1 Delete from the last sentence in core clause 61.3, "unless the *Project Manager* should have notified the event to the *Contractor* but did not".

Z10 *Employer's* limitation of liability

Z10.1 The *Employer's* liability to the *Contractor* for the *Contractor's* indirect or consequential loss is limited to R0.00 (zero Rand)

Z10.2 The *Contractor*'s entitlement under the indemnity in 83.1 is provided for in 60.1(14) and the *Employer*'s liability under the indemnity is limited.

Z11 Termination: Add to core clause 91.1, at the second main bullet point, fourth sub-bullet point, after the words "against it":

Z11.1 or had a business rescue order granted against it.

Z12 Addition to secondary Option X7 Delay damages (if applicable in this contract)

Z12.1 If the amount due for the *Contractor*'s payment of delay damages reaches the limits stated in this Contract Data for Option X7 or Options X5 and X7 used together, the *Employer* may terminate the *Contractor*'s obligation to Provide the Works using the same procedures and payment on termination as those applied for reasons R1 to R15 or R18 stated in the

Annexure A: Insurance provided by the Employer

These notes are provided as guidance to tendering contractors and the Contractor about the insurance provided by the Employer. The Contractor must obtain its own advice. Details of the insurance itself are available from the internet web link given below.

1. For the purpose of works contracts, insurance provided by Eskom (the *Employer*) has been arranged on the basis of "project" or "contract" value, where the value is the total of the Prices at Completion of the whole of the works including VAT.

   A "project" is a collection of contracts or work packages to be undertaken as part of a single identified capital expansion or refurbishment of a particular asset or facility.

   A "contract" is a single contract not linked to or being part of a "project".

2. For ECC3 there are three main "formats" of cover and deductible structure; Format A, Format B and Format Dx.

   Format A is for a project or contract value less than or equal to R350M (three hundred and fifty million Rand) inclusive of VAT.

   Format B is for a project or contract value greater than R350M .(three hundred and fifty million Rand) inclusive of VAT.

   In the case of contracts / packages within a project:

   - For a contract / package of R50M which is part of a R400M project, Format B will apply
   - For a contract / package of R250M which is part of a R6 billion project, Format B will apply;
   - For a contract / package of R120M which is part of a R350M project Format A will apply;

   For a contract which is not part of a project the same limits apply:

   - For a contract of R50M, Format A will apply
   - For a contract of R355M, Format B will apply.

   Format Dx applies only to Distribution Division projects and contracts. If a Distribution Division project or contract exceeds the Format A limit, the Eskom Insurance Management Services [EIMS] need to be contacted for advice on how to formulate the insurance cover. Cover and deductibles for Distribution Division are per the relevant policy available on the internet web link given below.

   Format A generally applies to Transmission Division projects and contracts. If a Transmission Division project or contract exceeds the Format A limit, the Eskom Insurance Management Services [EIMS] need to be contacted for advice on how to formulate the insurance cover.

3. Tendering contractors should note that cover provided by the *Employer* is only per the policies available on the internet web link listed below and may not be the cover required by the tendering contractor or as intended by each of the listed insurances in the left hand column of the Insurance Table in clause 84.2. In terms of clause 84.1 "the *Contractor* provides the insurances stated in the Insurance Table except any insurance which the *Employer* is to provide". Hence the *Contractor* provides insurance which the *Employer* does not provide and in cases where the *Employer* does provide insurance the *Contractor* insures for the difference between what the Insurance Table requires and what the *Employer* provides.

4. When the Marine Insurance is required the *Contractor* needs to obtain a copy of the latest edition of Eskom's Marine Policies Procedures found at internet website given below.

5. **Further information and full details of all Eskom provided policies and procedures may be obtained from:**

http://www.eskom.co.za/live/content.php?Item_ID=9248

C1.2 Contract Data

Part two - Data provided by the *Contractor*

Notes to a tendering contractor:

1. Please read both the NEC3 Engineering and Construction Contract (April 2013) and the relevant parts of its Guidance Notes (ECC3-GN)[2] in order to understand the implications of this Data which the tenderer is required to complete. An example of the completed Data is provided on pages 156 to 158 of the ECC3 (April 2013) Guidance Notes.
2. The number of the clause which requires the data is shown in the left hand column for each statement however other clauses may also use the same data
3. Where a form field like this [ ] appears, data is required to be inserted relevant to the option selected. Click on the form field ***once*** and type in the data. Otherwise complete by hand and in ink.

Completion of the data in full, according to Options chosen, is essential to create a complete contract.

Clause	Statement	Data
10.1	The *Contractor* is (Name): Address Tel No. Fax No.	
11.2(8)	The *direct fee percentage* is The *subcontracted fee percentage* is	**%** **%**
11.2(18)	The *working areas* are the Site and	
24.1	The *Contractor's* key persons are: 1 Name: Job: Responsibilities: Qualifications: Experience: 2 Name: Job Responsibilities: Qualifications: Experience:	**CV's (and further key persons data including CVs) are appended to Tender Schedule entitled .**

[2] Available from Engineering Contract Strategies Tel 011 803 3008, Fax 011 803 3009 or see www.ecs.co.za

11.2(3)	The *completion date* for the whole of the *works* is	**30 September 2023**		
11.2(14)	The following matters will be included in the Risk Register	**See Typical Risks on pages 40**		
11.2(19)	The Works Information for the *Contractor*'s design is in:	**Part 3: Scope of Work and all documents and drawings to which it makes reference.**		
31.1	The programme identified in the Contract Data is	**Submitted within 2 weeks of the Contract Date.**		
B	**Priced contract with bill of quantities**			
11.2(21)	The *bill of quantities* is in	**Part 2: C2.2**		
11.2(31)	The tendered total of the Prices is	**(in figures)**		
		(in words), excluding VAT		
	Data for Schedules of Cost Components	*Note "SCC" means Schedule of Cost Components starting on page 60, and "SSCC" means Shorter Schedule of Cost Components starting on page 63 of ECC3 (April 2013).*		
B	**Priced contract with bill of quantities**	**Data for the Shorter Schedule of Cost Components**		
41 in SSCC	The percentage for people overheads is:	**%**		
21 in SSCC	The published list of Equipment is the last edition of the list published by			
	The percentage for adjustment for Equipment in the published list is	**Minus %**		
22 in SSCC	The rates of other Equipment are:	**Equipment**	**Size or capacity**	**Rate**
61 in SSCC	The hourly rates for Defined Cost of design outside the Working Areas are **Note: Hourly rates are estimated 'cost to company of the employee' and not selling rates.** **Please insert another schedule if foreign resources may also be used**	**Category of employee**	**Hourly rate**	
62 in SSCC	The percentage for design overheads is	**%**		
63 in SSCC	The categories of design employees whose travelling expenses to and from the Working Areas are included in Defined Cost are:			

PART 2: PRICING DATA
ECC3 Option B

C2.1 Pricing assumptions

How work is priced and assessed for payment

Clause 11 in NEC3 Engineering and Construction Contract (ECC3) Option B states:

Identified and defined terms 11 11.2

(21) The Bill of Quantities is the *bill of quantities* as changed in accordance with this contract to accommodate implemented compensation events and for accepted quotations for acceleration.

(28) The Price for Work Done to Date is the total of

- the quantity of the work which the *Contractor* has completed for each item in the Bill of Quantities multiplied by the rate and
- a proportion of each lump sum which is the proportion of the work covered by the item which the *Contractor* has completed.

Completed work is work without Defects which would either delay or be covered by immediately following work.

(31) The Prices are the lump sums and the amounts obtained by multiplying the rates by the quantities for the items in the Bill of Quantities.

This confirms that Option B is a re-measurement contract and the bill comprises only items measured using quantities and rates or stated as lump sums. Value related items are not used. Time related items are items measured using rates where the rate is a unit of time.

Function of the Bill of Quantities

Clause 55.1 in Option B states, “Information in the Bill of Quantities is not Works Information or Site Information”. This confirms that specifications and descriptions of the work or any constraints on how it is to be done are not included in the Bill, but in the Works Information. This is further confirmed by Clause 20.1 which states, “The *Contractor* Provides the Works in accordance with the Works Information”. Hence the *Contractor* does **not** Provide the Works in accordance with the Bill of Quantities. The Bill of Quantities is only a pricing document.

Guidance before pricing and measuring

Employers preparing tenders or contract documents, and tendering contractors are advised to consult the sections dealing with the bill of quantities in the NEC3 Engineering and Construction Contract Guidance Notes before preparing the *bill of quantities* or before entering rates and lump sums into the *bill*.

There is no general provision in Option B for payment for materials on Site before incorporation into the *works*. If secondary Option X14 Advanced payment has not been used then the tendering contractor may obtain the same effect by inserting appropriate items in the method related charges where the *method of measurement* allows, or alternatively making allowance in the rates of the *bill of quantities* for the financing of Plant and Materials until they are incorporated in the *works.*

When compensation events arise, the default position is that the Bill of Quantities is not used to calculate the cost effect of the event. Defined Cost and the resulting Fee is used and Defined Cost includes all components of cost which the *Contractor* is likely to incur, including so called P & G items. Rates and lump sums from the Bill of Quantities, or from any other source, may be used instead of Defined Cost and the Fee only if the *Contractor* and *Project Manager* agree. If they are unable to agree, then Defined Cost plus Fee is used.

Measurement and payment

Symbols

The units of measurement described in the Bill of Quantities are metric units abbreviated as follows:

Abbreviation	Unit
%	percent
h	hour
ha	hectare
kg	kilogram
kl	kilolitre
km	kilometre
km-pass	kilometre-pass
kPa	kilopascal
kW	kilowatt
l	litre
m	metre
mm	millimetre
m^2	square metre
m^2-pass	square metre pass
m^3	cubic metre
m^3-km	cubic metre-kilometre
MN	meganewton
MN.m	meganewton-metre
MPa	megapascal
No.	number
sum	Lump sum
t	tonne (1000kg)

General assumptions

Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance has been made in the quantities for waste.

The Prices and rates stated for each item in the Bill of Quantities shall be treated as being fully inclusive of all work, risks, liabilities, obligations, overheads, profit and everything necessary as incurred or required by the *Contractor* in carrying out or providing that item.

An item against which no Price is entered will be treated as covered by other Prices or rates in the *bill of quantities*.

The quantities contained in the Bill of Quantities may not be final and do not necessarily represent the actual amount of work to be done. The quantities of work assessed and certified for payment by the *Project Manager* at each assessment date will be used for determining payments due.

The short descriptions of the items of payment given in the *bill of quantities* are only for the purposes of identifying the items. Detail regarding the extent of the work entailed under each item is provided in the Works Information.

C2.2 the *bill of quantities*

The **estimated** Bill of Quantities for the **"Supply and Install"** of the necessary repairs or replacements are as per below:

Item	Bill description	SANS/Eskom Reference	Unit	Bill quantity	Rate	Amount	Scheduled Item Notes:
A	**P&G's**						
	Fixed Based						
	Time Based						
	SECTION A: INSTALLATION OF MICROPILE STAYS						
	Excavate including disposal of all surplus material on site (The rate tendered shall be deemed to be inclusive of all expenditure)						
	Restricted excavations	**SANS 1200 8.3.3 a)**	m^3	204			
	Extra Over:						
A1.1	Excavations - Intermediate	SANS 1200 8.3.3 b)	m^3	163			
A1.2	Excavations - Hard	SANS 1200 8.3.3 b)	m^3	41			
	Backfill and Compact						
A1.3	Backfill and Compact Normal - 90% Mod AASHTO (100% for sand)	SANS 1200 8.3.9	m^3	163			
	Install Stays:						
A1.4	Install Stays: Make-off	TRMSCAAC6.0 / DWC-7602-20-01-00	each	184			The rate shall cover all material required and the complete installation of the stays as specified in TRMSCAAC and on Drawing DWC-7602-20-01-00
A1.5	Install Temporary Stays	TRMSCAAC6.0	each	46			The rate shall cover all material required and the complete installation and removal of the stays as specified in TRMSCAAC
	Testing						
A1.6	Concrete Cube Test (Set of 3 cubes per 4 stays)		each	46			
A1.7	Pile tests - As per TRMSCAAC 6	TRMSCAAC6.0	each	20			The rate shall include setting up, testing and removal of the test rig and the various positions.
	Micropiling						
A1.8	Set out pile position and rake	TRMSCAAC6.0	ea	184			The rate shall include all cost (surveyor if required etc.) associated with setting out the pile positions
A1.9	Set up rig at pile position	TRMSCAAC6.0	ea	184			This rate shall include the transporting, off loading, positioning and loading of the piling rig and grouting station at the various positions.
A1.10	Install Galvanised T40/20, SDA Rod (3m) with 0.4 W/C grout as per installation specification provided	RECOMMENDED INSTALLATION GUIDE FOR PRESSURE GROUTED MICROPILES / DWC-7602-20-01-00	m	276			This rate shall include all material not catered for in the Bill and labour required as specified in "RECOMMENDED INSTALLATION GUIDE FOR PRESSURE GROUTED MICROPILES" and drawing DWC-7602-20-01-00
A1.11	Install HDPE Sleeve + 30 Mpa/19mm concrete	DWC-7602-20-01-00	ea	276			This rate shall include the excavation, backfilling, fixing of HDPE sleeve as per drawing DWC-7602-20-01-00.
B	**SECTION B: MATERIAL FOR MICROPILES**						
	30MPa/19mm						
B1.1	30MPa /19mm concrete		m^3	10			
	Pilling Material						
B1.2	Carbide button Drill Bit - 70mm		ea	196			
B1.3	40/20 Coupler		ea	388			
B1.4	Nut eye - To fit on 40mm rod		ea	204			
B1.5	HDPE Pipe 200mm x 7.4mm thick x 400mm length sleeve		ea	204			
B1.6	Addaptor 30mm to 40mm		ea	184			
B1.7	Galvanised T40/20, SDA Rod 3m		ea	204			
B1.8	Galvanised T40/20, SDA Rod 1m		ea	204			
B1.9	Cement HIGH STRENGTH 42.5R (50kg)		ea	230			

PART 3: SCOPE OF WORK

C3.1: EMPLOYER'S WORKS INFORMATION

Description of the *works*

Buffelspoort-Ladismith 132kV Overhead Line Stay Wire Replacement (Approximately 23 strain towers each having 8 stays)

Section 1:
Design and Construction Philosophy

1. Executive Summary

The Buffelspoort / Ladismith 132kV line is approximately 28 km long, 18 years old and situated in the Ladismith area. The line consists of steel pole stayed strain structures (called the Cigar structure) and planted intermediate mono poles. All strains are kept up by stays that prevent the strain structure from toppling over. The strain structures are consequently dependent on the condition of the stays to ensure the entire line's integrity. [1][2]

The stayed structures are held up by 6 stays, either as an inline strain or angle strain. Additional to these angle stays are 2 bi-sector stays keeping the hinged pivot structure up during erection and acting as wind stays for inline strains. The line has recently seen numerous mechanical failures of the stay wires which are related to corrosion of the stay rods just below the ground level

See D-WC-7602-03-03 illustrating the orientation and assembly details of the existing stay arrangements. The soil type observed appears to be mostly shale and difficult to excavate. About a quarter of the line traverses over hills and might be somewhat difficult to access. {find aerial view of line as per Google Earth / .kmz in provided}

2. Specifications

This project shall be carried out fully in accordance with this Detailed Project Specification, the referred Technical Specifications and the relevant drawings and documentation supplied by Eskom. All information highlighted in the design philosophy must be read in conjunction with DSP240-47172520 - THE STANDARD FOR THE CONSTRUCTION OF OVERHEAD POWERLINES.

This project shall conform in all instances to the Occupational, Health and Safety Act, and regulations, (Act No. 85 of 1993) and any amendments thereto, including the Safety Specification in terms of Regulation 4 thereof. In terms thereof, the Contractor is to provide a Health and Safety Plan to comply with the Occupational, Health and Safety Act and Regulations, (Act No. 85 of 1993).

3. Scope

Replace the corroded strain tower stay foundations, approximately 23 strain towers each having 8 stays, with the associated stay wires on the Buffelspoort / Ladismith 132 kV line by:

(1) affecting the necessary repairs as per the micropile system / solution as per drawings provided.
(2) The proposed micropile system design and methodology should be presented and approved at Dx WCOU DRT meeting for approval and acceptance by Eskom.
(3) The proposed repairs should consider possible ways to coat parts extending into the soil as well as possible alternatives such as rust anodes, sacrificial anodes etc.

Eskom reports also suggest that for the stayed structures it might be useful to earth the base of the structure, thereby assisting as a path for stray currents / sacrificial anode.

3.1. Construction Activities

The contractor shall be responsible for but not limited to:

- Re-evaluation of constructability once the contractor is on site.
- Establish and maintain the necessary Site Offices and facilities.
- Communicate with all landowners along the line route advising them of work done and the contractors' presence.
- String, join, make off, regulate, clamp in etc. all stay wires where required.
- Safe work procedure shall be applied to the process of Micro Pile foundation installation and describes all its sub-activities i.e.
    - Inspection Hole
    - Test Anchor
    - Sump
    - Drilling
    - Drilling rate and cleaning and flushing out the hole
    - Dynamic Pressure Grouting with grout suspension
    - Further detailed provided in "RECOMMENDED INSTALLATION GUIDE FOR PRESSURE GROUTED MICROPILES"
- The Contractor will procure, supply and install all material as shown in the Bill of materials as per specifications (including drawing D-WC-7602 provided) from approved vendors
- The Contractor is to supply all other items such as rods, pipes, grout and miscellaneous materials as per drawings and specifications.
- Complete all quality documentation and mark up any changes to drawings
- Clear and clean the total site upon completion of the contracted works
- Liaise with property owners to obtain Clearance Certificates on completion of the contract
- Provide the employer with completed contract documentation. All documentation to be handed to the Employer for filing.

4. Power Line route

The soil type observed appears to be mostly shale and difficult to excavate. About a quarter of the line traverses over hills and might be somewhat difficult to access. The aerial view of the line as per Google Earth / .kmz provided and is as per below pictures:

5. Insulation and Hardware

5.1 Hardware and Assemblies

Assemblies must comply with the Code of Practice for overhead power line for conductors prevailing in South Africa, SANS 10280.

5.2 Structures

There is a high probability that the integrity of the structures of the Buffelspoort / Ladismith 132kV line has deteriorated further due to old age and other factors such as corrosion, therefore care must be taken when inspecting, assessing and working on the line and the affected stay wires.

6. Outage Specifications

All outage requirements if for the stay wire repairs, crossings and commissioning of the line shall be approved by the Project Manager in consultation with the relevant Field Services personnel and Network Optimization Department where / if required.

7. Construction / Execution Plan

The constructability of this project needs to be reassessed once the contractor/s are appointed and are on site. A route walk down, before construction commences is recommended, to ensure there are no constraints that might hinder proper execution by the contractor.

Important Notes:
Any planned activity using vehicles or lifting gear should be assessed in terms of close proximity and risk, well in advance, in order to make timeous arrangements. Consultation with Network Optimization and System Control is critical to ensure correct configuration of the network before an outage is allowed.

8. Standards and References

The following listings are only some of the standards and procedures that might be appropriate in the execution of the scope. The appointed contractor must contact Eskom or its appointed agent for any standards or references required. The latest versions of the specifications should always be used unless stated otherwise.

Note: Only local Eskom standards are provided with the design. It is the contractor's responsibility to subscribe to the (non-Eskom) national and international standards used.

- 240-47172520: TRMSCAAC 6: The Standard for the Construction of Overhead Power lines
- DSP 34-2051: Design, Manufacturing and Testing Requirements for Fabricated Steel Overhead Line Structures and Components.
- SCSASABF9: Distribution Standard Part 6: Sub-transmission Lines, Section 6: Earthing of sub-transmission line structures
- TPC 41-701: Approval and registration of drawings submitted by Contractors
- TST 41-168: Quality requirements for the procurement of assets, goods and services.
- DSP 32-136: Standard Contractor Health and Safety Requirements
- DPC 34-333: Health and Safety Requirements to be met by Principal Contractors employed by Eskom Distribution
- EPC32-245: Waste Management Procedure

The appointed contractor must contact Eskom for any standards or references listed above. The above are only some of the standards applied to the design.

Section 2:
Bill of Materials & Bill of Quantities

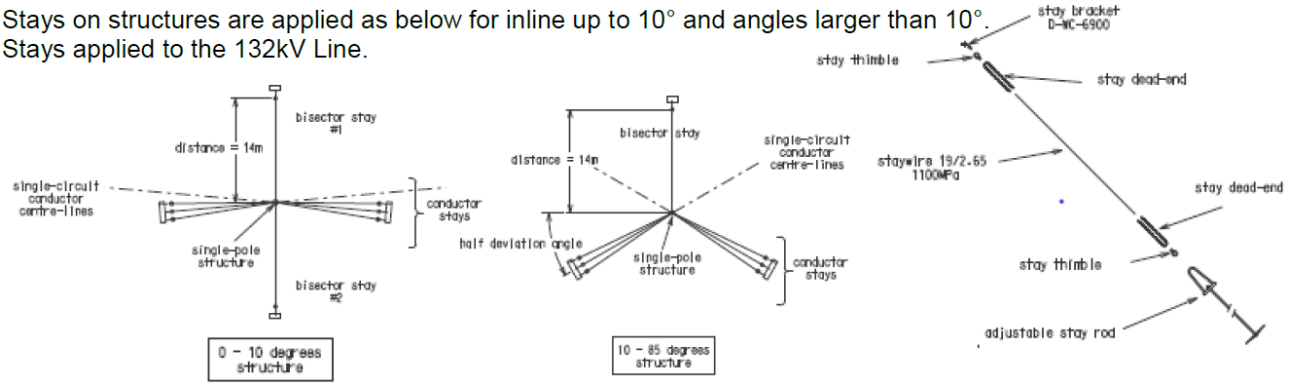
(Refer to Project Specification Page 26 - 29)

Note: Please see attached price list for pricing purposes.

Section 3:
Structure Drawings

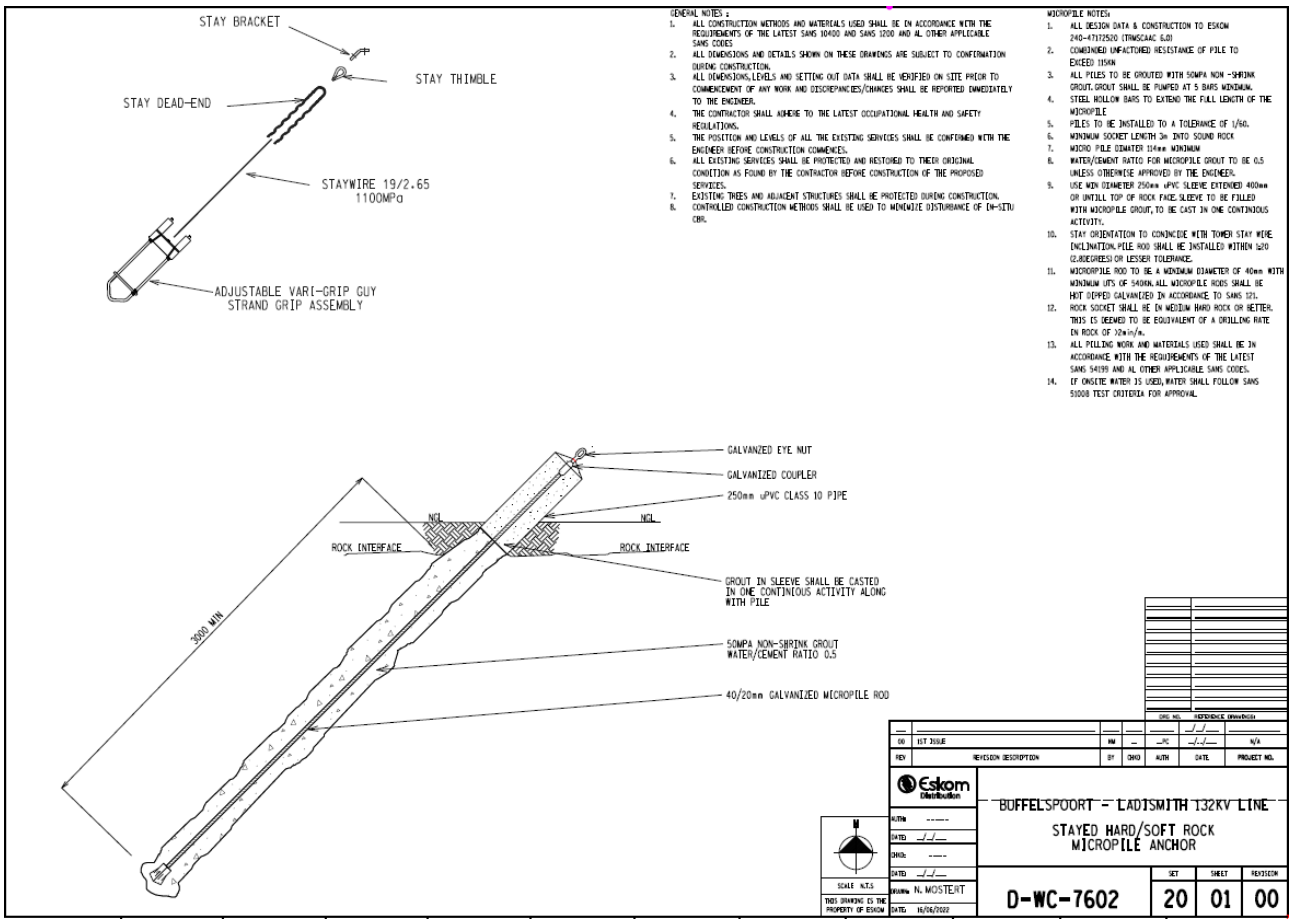
Indication of existing stay wire arrangement below:

Stays on structures are applied as below for inline up to 10° and angles larger than 10°.
Stays applied to the 132kV Line.



Section 4:
Hardware Assembly Drawings

The stayed micropiled anchor wire is as per below drawing D-WC-7602 provided:



Section 8:
Foundation Drawings & Geo Technical Report

The recommended installation guide for pressure grouted micropiles should be followed as per guide provided underpinned by the Standard for the Construction of Overhead Powerlines (240-47172520)

Staking table for the strain structures are as per below for reference:

structure_number	structure_name	station	units3	x	units4	y	units2	z	units6	line_angle	units7	Test pit Done + Refusal
2	stlsc6020chic4.140	40.4	m	-626.29	m	-3706539.93	m	411.13	m	2.85	deg	
5	stlsc6020chic4.140	764.15	m	96.59	m	-3706575.4	m	405.36	m	29.46	deg	600mm
12	stlsc6020chic4.140	2504.54	m	1568.26	m	-3707504.47	m	448.98	m	-28.57	deg	700mm
15	stlsc6020chic4.140	3052.96	m	2115.53	m	-3707539.76	m	414.93	m	5.01	deg	300mm
23	stlsc6020chic4.140	5129.34	m	4168.01	m	-3707853.97	m	408.58	m	0	deg	
31	stlsc6020chic4.140	7092.88	m	6108.94	m	-3708151.11	m	413.83	m	25.03	deg	600mm
39	stlsc6020chic4.140	9069.24	m	7752.46	m	-3709248.74	m	371.98	m	30.96	deg	700mm
40	stlsc6020chic4.140	9365.51	m	7879.09	m	-3709516.6	m	364.54	m	-59.85	deg	500mm
47	stlsc6020chic4.140	11241.77	m	9748.64	m	-3709675.07	m	385.58	m	0	deg	
54	stlsc6020chic4.140	12959.61	m	11460.35	m	-3709820.17	m	402.56	m	23.98	deg	245mm
65	stlsc6020chic4.140	15683.52	m	13846.79	m	-3711133.4	m	418.4	m	-28.29	deg	1500mm
74	stlsc6020chic4.140	17712.05	m	15875.23	m	-3711152.13	m	384.77	m	7.56	deg	600mm
84	stlsc6020chic4.140	20056.69	m	18196.52	m	-3711482.13	m	469.26	m	-31.82	deg	
93	stlsc6020chic4.140	21996.36	m	19972.17	m	-3710701.48	m	511.94	m	-59.35	deg	
95	stlsc6020chic4.140	22803.46	m	20069.37	m	-3709900.25	m	630.54	m	64.42	deg	370mm
97	stlsc6020chic4.140	23297.53	m	20537.45	m	-3709742.13	m	633.35	m	-43.95	deg	490mm
98	stlsc6020chic4.140	23396.91	m	20583.16	m	-3709653.88	m	633.62	m	0	deg	
99	stlsc6020chic4.140	24067.67	m	20891.65	m	-3709058.27	m	508.55	m	52.37	deg	
105	stlsc6020chic4.140	25379.45	m	22182.49	m	-3708824.81	m	529.25	m	9.52	deg	300mm
108	stlsc6020chic4.140	26022.27	m	22825.25	m	-3708816.56	m	554.59	m	-6.52	deg	500mm
112	stlsc6020chic4.140	27034.71	m	23829.59	m	-3708688.73	m	549.06	m	-10.34	deg	1000mm
116	stlsc6020chic4.140	27793.9	m	24553.26	m	-3708459.23	m	538.68	m	-53.85	deg	450mm
118	stlsc6020chic4.140	28063.74	m	24639.11	m	-3708203.41	m	538.46	m	0	deg	1000mm

Total Number of Strains	23

Section 9:
Buyer's Guide Specifications

Note: Supply and Install.

(Refer to Project Specification and scope)

Section 10:
Health and Safety Specification

(Refer to Project Specifications provided)

Section 11:
Location

(Refer to power line route pictures provided or aerial view of the line as per Google Earth / .kmz provided)

Specifications

TITLE	Doc No.	Date or revision	Tick if publicly available
SAFETY AND ORHVS STANDARDS			
HEALTH AND SAFETY STANDARD FOR CONTRACTORS AND SUBCONTRACTORS WORKING FOR ESKOM	**34-333**	Latest Revision	Attached
CONSTRUCTION SAFETY, HEALTH, AND ENVIRONMENTAL MANAGEMENT	**32-136**	Latest Revision	Attached
WORKING AT HEIGHT	**32-418**	Latest Revision	Attached
POWER DELIVERY OPERATING ASSESSMENT, AUTHORISATION AND TRAINING STANDARD	**240-70413865**	Latest Revision	REFER TO IARC
SUPERVISION OF PEOPLE IN ELECTRICALLY HAZARDOUS LOCATIONS	**34-1954**	Latest Revision	Attached
THE FOLLOWING DOCUMENTS WILL FORM PART OF THE PORTFOLIO OF EVIDENCE WITH REGARDS TO ORHVS AUTHORISATION :			
STANDARD FOR THE USE OF EQUIPOTENTIAL FOOTPLATES	**240-69125290**	Latest Revision	REFER TO IARC
ROUTINE INSPECTION AND MAINTENANCE OF SUB-TRANSMISSION AND DISTRIBUTION LINES	**240-138196972**	Latest Revision	REFER TO IARC
STANDARD FOR USE AND MAINTENANCE OF PORTABLE EARTHING GEAR	**240-78692652**	Latest Revision	REFER TO IARC
OTHER			
VEGETATION MANAGEMENT AND MAINTENANCE WITHIN ESKOM LAND, SERVITUDES AND RIGHTS OF WAY	**240-70172585**	Latest Revision	REFER TO IARC
STANDARD FOR THE LABELLING OF ELECTRICAL EQUIPMENT WITHIN ESKOM WIRES NETWORKS	**240-120804300**	Latest Revision	REFER TO IARC
DISTRIBUTION STANDARD - CARE, USE, INSPECTION AND MAINTENANCE OF CONDUCTIVE AND NON-CONDUCTIVE LADDERS	**240-125124036**	Latest Revision	REFER TO IARC
DISTRIBUTION STANDARD - CARE, USE, INSPECTION AND MAINTENANCE OF CONDUCTIVE AND NON-CONDUCTIVE LADDERS	**240-125124036**	Latest Revision	REFER TO IARC
ACCESS TO FARMS	**DISADABQ9**	Latest Revision	REFER TO IARC
OPENING AND CLOSING OF FUSES	**240-129773090**	Latest Revision	REFER TO IARC
EARTHING IN LIMITED SPACES	**240-129773139**	Latest	REFER TO

		Revision	IARC
PERSONEL SAFETY WHEN SWITCHING INDOOR CIRCUIT BREAKERS	**240 129772828**	Latest Revision	REFER TO IARC
APPARATUS NOT PART OF THE POWER SYSTEM	**240 129772856**	Latest Revision	REFER TO IARC
HANDOVER IN TERMS OF ORHVS REG 5 3 6 3	**240 129773058**	Latest Revision	REFER TO IARC
OPERATING OF VT ION METALCLAD SWITCHGEAR	**240 129772620**	Latest Revision	REFER TO IARC
PERMISSION TO SECTIONALISE	**240 129772790**	Latest Revision	REFER TO IARC
PERMISSION TO OPERATE AND WORK INSTRUCTION	**240-129772726**	Latest Revision	REFER TO IARC
ISSUEING AND LOGGING OF PERMITS AT CONTROL CENTRE	**240 12977 9728**	Latest Revision	REFER TO IARC
TESTING APPARATUS REG 5 9 2	**240 130139031**	Latest Revision	REFER TO IARC
REPLACEMENT OF MV DROP OUT SURGE ARRESTERS WITHOUT REF TO CONTROL OFFICER	**240 131628848**	Latest Revision	REFER TO IARC
VEHICLE ACCESS TO PROHIBITED AREAS	**240-136724448**	Latest Revision	REFER TO IARC
CONTACT AND PROXIMITY TYPE VOLTAGE TESTERS DETECTORS	**240-74732327**	Latest Revision	REFER TO IARC
EARTHING OF APPARATUS THAT CANNOT BE SAFETY TESTED - ORHVS REG. 5.3.3	**240-155812280**	Latest Revision	REFER TO IARC
APPROVED TESTING DEVICES	**WTB006**	Latest Revision	REFER TO IARC
ON-LOAD SWITCHING OF THREE PHASE POLE MOUNTED LOAD BREAK SWITCH DISCONNECTORS	**WTI007**	Latest Revision	REFER TO IARC
OPERATING OF MEDIUM VOLTAGE FUSED SWITCH DISCONNECTORS	**WTI008**	Latest Revision	REFER TO IARC

Constraints on how the Contractor Provides the Works

Quality Plan

The *Contractor* needs to submit a quality plan indicating the control points for quality to ensure that the *works* are done according to specification.

Access to the site

- The Employer will provide the Contractor with an Access Certificate to formally provide access to the site and works implementation.
- The Contractor shall ensure that he is familiar with conditions of access roads and sites as well as subsurface conditions.
- The Contractor will adhere to all the requirements as per the specification **Access to Sites** which includes, but is not restricted to:

    1. Identity cards with photographs
    2. Clearly marked vehicles NB: All contractor vehicles need to be marked with a sticker stating "Eskom Contractor" but should be on Eskom Standard. All Contractor staff should be identifiable by the use of PPE and bibbons reflecting company's name.
    3. Cooperation in order to help Eskom provide the customer with a project schedule reflecting the period during which the construction and commissioning activities will take place.

- The Contractor shall be responsible for negotiation with customers with regard to use of access routes on farms etc.

- The Contractor will be responsible for negotiation with land or business owners and / or the Local Authority with regard to the works.
- The Contractor will be responsible for external disputes which may occur with regard to the works.
- The Contractor is when necessary or needed required making all the necessary arrangements with the Local Authorities for road crossing structures and removal thereof, e.g. Removal of pavements, thrust boring under roads, way leaves, etc.

The Contractor to ensure after completion of the *works*, that the attached "Final Release" form is fully completed by the affected landowners. The fully signed form(s) to be submitted to the Eskom representative. Final Payment will not be released unless this fully completed/signed form(s) is received by the Eskom Representative

Security of materials on sites

- Storage and security of material will be the responsibility of the Contractor until the Completion Certificate is certified. The Contractor is responsible for all costs involved to expedite lost, damaged or stolen material. All material to adhere to Eskom specification

Material and Bill of Quantities

- The Bill of Quantities is a provisional measure and quantities are subject to re measurement.
- Storage and security of material will be the responsibility of the Contractor until the Completion Certificate is certified. The Contractor is responsible for all costs involved to expedite lost, damaged or stolen material. All material to adhere to Eskom specification and criteria.
- Materials supplied by the Contractor for proposed projects will be in accordance with the latest revision of Eskom's Distribution standards, project drawings and specified bill of materials.
- Eskom's Bill of Quantities provided in the price list is provisional.
- Contractor to ensure that all materials used is in accordance with Eskom requirements.
- Contractor to indicate material availability as per BOQ supply and install items.
- Materials on site are to be safely secured and stored on Eskom's site for any payments claims to be assessed.
- Materials off site: No payment will be made for any materials stored off site or in transit.

Site Establishment and De-establishment

- The Contractor will be required to establish a Site Office on Site where meetings can be held and will ensure that basic amenities are available, such as a table and chairs.
- *Contractor* to clear and de-establish total site on completion of proposed *works*.
- Contractor is required to collect, load, transport and cart away all rubble and surplus demolished *works* to an approved dumping site.
- Contractor to apply good housekeeping at all times.
- Where applicable, Site Establishment will make provision for costs to be incurred by the *Contractor* to ensure adherence to the Environmental Management Plans and Specifications attached to this contract.

Carrying out the *works*

- The Scope of "*Works*" is an extension of the drawings, specifications and bills of quantities listed. The *Contractor* shall notify the *Employer* of any discrepancies before commencement of the *works.* The bill of materials is the master reference of the scope of works
- The *Contractor* shall complete all quality documentation and mark up any changes to drawings
- The onus is on the *Contractor* to obtain the latest revision of standards applicable. (registration on Eskom IARC web)
- The *Contractor* is required to supply all labour, plant, equipment, loose tools, consumables and transport for the duration and completion of the project.
- *Contractor* to provide summary of all costs for the execution of the *works* of the complete project.

- The *Contractor* must immediately notify the *Employer* in writing of scope and site variations.
- The *Contractor* will report all obstacles on site that could impact negatively on time and cost in writing to the *Employer.*
- The Contractor will be responsible for providing the PPE for their Employees.

Subcontracting

- The *Contractor* will have to notify Eskom (Procurement) in the event of using any Sub-contractor. Subcontractor cannot subcontract work to another subcontractor. Subcontractor preferable must be Eskom Vendor and it is subject to Eskom agreeing to use that subcontractor. Subcontractor must be familiar with the required work and should submit CV's of past experience.

Wayleaves and other

- The Contractor shall adhere to all the requirements of the applicable Local Authority when arranging and completing road and rail crossing. Way-leaves to be obtained from Land Development. All costs for damaged fences and road reserve shall be borne by the Contractor.

Invoicing and payment

- The Contractor will submit his claim as per the NEC Payment Certificate format as attached to this contract with supporting Bill of Quantities on the assessment day. The Contract Number must be clearly visible on the NEC Payment Certificate.
- The Employer will assess Payment certificates on actual work completed. Any possible issues regarding the claim will be addressed by the Employer to the Contractor.
- On acceptance of the Payment Certificate by the Employer the Contractor submits his invoice as agreed upon with the Employer. Payment will take place as per ESKOM Payment Terms and not as per the NEC Conditions of Contract.

In terms of core clause 50 the *Contractor* assesses the amount due and applies to the *Employer* for payment. The *Contractor* applies for payment with a draft tax invoice addressed to the *Employer* as follows:

The *Contractor* includes the following information on each tax invoice:

1. The words "TAX INVOICE" in a prominent place (preferably at the top of the page).
2. Name, address and VAT registration number of the supplier.
3. Name, address and VAT registration number of the recipient. *

   Please note: Eskom's name has to be reflected as Eskom Holdings SOC Limited on all tax invoices and Eskom's VAT number is 4740101508. The word just Eskom is not acceptable.
4. An individual serial number (tax invoice number) and date issued.
5. A full and proper description of goods and/or services supplied.

   Please note: Merely referring to a contract is not sufficient.
6. The quantity or volume of goods or services supplied.*
7. Where the supply is subject to VAT at the standard rate, the following in Rand:
   - The pre-VAT value, VAT amount and consideration OR
   - The total consideration with a statement that VAT is included @14% OR

- The total consideration and the Rand amount of VAT charged.

8. The Contractor attaches the detail assessment of the amount due to each tax invoice showing the Price for Work Done to Date for each item in the Price List for work which he has completed.
9. The Employer will assess Payment certificates on actual work completed. Any possible issues regarding the claim will be addressed by the Employer to the Contractor.
10. On acceptance of the Payment Certificate by the Employer the Contractor submits his invoice as agreed upon with the Employer. Payment will take place as per ESKOM Payment Terms and not as per the NEC Conditions of Contract.

E-invoicing:

CREATE .pdf invoice

Tax Requirement

- A PDF file that was created directly from a system meets the definition of original document and is allowed (including saving documents from excel to PDF, word to PDF etc.)
- An Invoice that was printed and then scanned to PDF by the Vendor is not acceptable as this is not an original tax invoice by SARS definition but a copy.
- The following wording needs to appear on the invoice: “Your invoice is encrypted in order to comply with SARS requirements that invoices and statements sent electronically are tamperproof.”

CRITICAL INFO ON .pdf invoice

- Ensure that the Eskom order number is clearly indicated on your invoice together with the line number on the order you are billing for. No order number, invoice not processed.
- Each PDF file should contain one invoice; or one debit note; or one credit note only as Eskom’s SAP system does not support more than one PDF being linked into workflow at a time.
- All Electronic invoices must be sent in PDF format only. Excel or other format, invoice not processed.
- For Foreign invoices, suppliers will still be required to physically deliver hard copies of original documents to the respective documentation management centers even though you have e-mailed those invoices. Eskom is still seeking clarity from the South African Reserve Bank regarding e-invoicing for Foreign Invoices or invoices in foreign currency. Current requirements are that these manual invoices should still be submitted. You can send the invoice copy to the email addresses indicated below

WHERE TO MAIL THE .pdf invoice

Email addresses for invoice submission:

- Local Eskom invoices (excluding Primary Energy, Group Capital, Eskom Enterprises and Eskom Development Foundation): invoiceseskomlocal@eskom.co.za
- Foreign Eskom invoices (excluding Primary Energy, Group Capital, Eskom Enterprises and Eskom Development Foundation): invoiceseskomforeign@eskom.co.za

- Primary Energy invoices: invoicesprimaryenergy@eskom.co.za
- Group Capital Power Delivery Projects (PDP): invoicesgrpcapitalPDP@eskom.co.za
- Group Capital Medupi, HO, PDD: invoicesgrpcapitalMHP@eskom.co.za
- Group Capital Mphum & Komati Project: invoicesgrpcapitalOTH@eskom.co.za

- Group Capital Kusile & Peaking: invoicesgrpcapitalKCT@eskom.co.za
- Eskom Enterprises: invoiceseskomenterprises@eskom.co.za
- Eskom Development foundation: invoicesdevfoundation@eskom.co.za

FOLLOW UP with Shared Services (fss)

1. All queries and follow up on invoice payments should made by contacting the FSS Contact Centre: Tel: 011 800 5060 e-mail: fss@eskom.co.za
2. Introduction of electronic invoicing does not guarantee payment but will ensure visibility of all invoices and ensure that no invoices get lost. If the goods receipt is not done the invoice will be parked and the system will automatically send an e-mail to the end user to do the goods receipt. This is also tracked by Eskom through the park invoice report.
3. Your company can request a park invoice report from the Finance Shared Services (FSS) contact center which can then be followed up and corrected. You are welcome to forward the details of invoices corrected to the FSS contact center.
4. You do not require a goods receipt (GR) number to submit your invoices. When the GR number is received you can then send the GR number to the above contact details BUT quoting the GR if you have it, will eliminate parking the invoice “no GR”

Performance Management

- The Contractor’s Performance will be assessed in accordance with the Performance Appraisal Process attached to this contract.

Health and Safety Management

The Contractor shall ensure adherence to Eskom’s Life-saving Rules

Eskom views health and safety in high esteem and encourages that any organisation who performs work for Eskom in Eskom adopt the same view.

Five Life-saving rules have been developed that will apply to all Eskom Employees, agents, consultants, and contractors. Failure to adhere to these rules by any Eskom employee or employee of a Principal Contractor or appointed contractor will be considered a serious transgression. These rules are being implemented to prevent serious injury or death of any employee, labour broker or contractor working in any area within Eskom.

If any contractual work will be performed on any Eskom premises (including delivery of any product), then the rules shall be obeyed by any contractor and their employees.

The rules are:
Rule 1: OPEN, ISOLATE, TEST, EARTH, BOND, AND/OR INSULATE BEFORE TOUCH
(That is plant, any plant operating above 1000 V)
Rule 2: HOOK UP AT HEIGHTS
Working at height is defined as any work performed above a stable work surface or where a person puts himself/herself in a position where he/she exposes himself/herself to a fall from or into.
Rule 3: BUCKLE UP
No person may drive any vehicle on Eskom business and/or on Eskom premises: Unless the driver and all passengers are wearing seat belts.
Rule 4: BE SOBER
No person is allowed to be under the influence of intoxicating liquor or drugs while on duty
Rule 5: PERMIT TO WORK
Where an authorisation limitation exists, no person shall work without the required permit to work.

Eskom will take a stance of zero tolerance on these rules.

Non-compliance to a Life Saving rule will be considered serious misconduct and will lead to serious disciplinary action, which may include dismissal.
This is to ensure that every person who works on or visits an Eskom returns home safely to his or her family.

The *Contractor* shall comply with:

- The Occupational Health and Safety Act, 1993, and all regulations made there under as per the standard clause A1, stipulated on page 4 of this contract.
- The Construction Regulations, 2003.
- The Health and Safety Requirements of the Employer more fully set out in Distribution Standards 34-333 (The *Contractor* will sign page 36 of the specification as acknowledgement of receipt and adherence)
- All Eskom Safety and Operating Procedures as outlined in the ORHVS (Operating Regulations on High Voltage Systems) and the standards attached to this document i.e. 34-145 and 34-146.

The *Contractor* shall ensure that the Site supervisor has a valid and applicable ORHVS Authorisation.

The *Contractor* shall ensure that the *Contractor's* Responsible Person shall supervise the *works* at all times and be available to take permits where necessary.

Compensation for occupational Deceased Act Regulations 133/1993

The *Contractor* shall appoint a person who will liaise with the Eskom Safety Officer responsible for the premises relevant to this contract. The person so appointed shall:

- Supply the Eskom Safety Officer with copies of minutes of all Health and Safety Committee meetings (if relevant), on a monthly basis.
- Supply the Eskom Safety Officer with copies of all appointments in respect of employees employed on this contract, in terms of the Act and Regulations and shall advise the Eskom Safety Officer of any changes thereto – to be handed over to the *Employer* prior to construction start.

Eskom may, at any stage during the currency of this agreement, be entitled to;

- do safety audits at the Contractor's premises, its work-places and on its employees;
- refuse any employee, sub-contractor or agent of the Contractor access to its premises if such person has been found to commit any unlawful act or any unsafe working practice or is found to be not authorized or qualified in terms of the Act
- issue the Contractor with a work stop order or a compliance order should Eskom become aware of any unsafe working procedures or conditions or any non-compliance with the Act, Regulations and Procedures referred to in 1 above by the Contractor or any of its employees, sub-contractors or agents.

No extension of time will be allowed as a result of any action taken by Eskom in terms of the above and the *Contractor shall* have no claim against Eskom as a result thereof. Furthermore, no amendments to the Act or

the Regulations or reasonable amendment to Eskom's Safety and Operating Procedures will entitle the *Contractor* to claim any additional costs incurred in complying therewith from Eskom.

The *Contractor* shall be responsible for all expenses incurred to ensure adherence to Health and Safety Regulations as stipulated above which includes but is not restricted to ORHVS training courses, etc.

The Contractor shall ensure that he completes and submits a Safety Plan to the Employer with his tender.

- Typically, the following identified risks could endanger the work as done by the Contractor. The Contractor should identify mitigation actions for these risks, as well as identify any additional risks:

Typical Risk	Y/N	Detailed Description
WORK IN LIVE CHAMBERS/RESTRICTED AREAS	N	Buffelspoort and Ladismith substations entry
CLOSE PROXIMITY WORK TO LIVE EQUIPMENT	N	All work shall be done while the line is live however
OPERATING OF CRANES/VEHICLE MOUNTED	Y	Micropile boring
STATIC ELECTRICITY/INDUCTION	N	Working under / next to a live overhead line 132kV line
WORK WITH CHAINSAWS/MECHANICAL CUTTERS	Y	Bushing clearing where needed
MATERIALS HANDLING/ HEAVY EQUIPMENT HANDLING	Y	Material handling due to the stay wire replacement of the 132kV line
CONDUCTOR STRINGING AND TENSIONING	Y	Tensioning of the stay wires to the 132kV poles
VEHICLE RISKS	Y	Provincial Road Crossing and Municipal road crossings
BIOLOGICAL/HEALTH RISKS (CAMPS)	Y	Health risks because of the condition of the site and weather conditions
ERGONOMIC RISKS (BODY POSITION, FATIGUE)	Y	Stay wire replacement project works
PUBLIC SAFETY RISKS	Y	Multiple walkways and road crossings with pedestrians
WORK CLOSE TO PUBLIC ROADS	Y	Multiple Road Crossings
SAFETY & SECURITY	Y	Some of the line is close to an urban area and material might be prone to theft and vandalism

SHEQ Requirements:

In compliance to Eskom's SHEQ Policy, the Contractor to ensure;

- Commitment to safety, health and environmental excellence
- Conduct business with respect and care for people and minimise or avoid impact on the environment
- Compliance to environmental legislation, conditions of Environmental Authorisations and requirements set out in environmental management plans
- Acceptance that all injuries and occupational illnesses, as well as safety and environmental incidents are preventable
- Report, respond to, investigate, close-out, and share learning from safety and environmental incidents
- That SHE is an integral part of your operations and that:

- no operating condition, or urgency of service, can justify endangering the life of anyone or cause injury or damage to the environment

In addition, the Contractor to ensure as a tender returnable the following information (as per organogram) is provided to the Employer, stating who the relevant qualified person is as per various role levels of the below organogram with all required credentials.

Compensation for Occupational Injury and Diseases Act

- The Contractor shall submit with his tender proof of adherence to the above act.

Quality of workmanship

- The *Contractor* is required to employ a competent Supervisor or Forman on site for the duration of the project to implement workmanship quality checks. The Supervisor / Foreman appointed by the *Contractor* must be authorized to take a permit in terms of ORHVS and working earths.
- Eskom will do inspections and quality checks on installations completed by the *Contractor* prior to hand-over of each project.

Quality Assurance Requirements

- The Contractor shall comply with all quality requirements as set out in the document QM-58 i.e. Eskom Contract Quality Requirements Specification. The Contractor shall comply with ISO9001:2008 Quality Management System Requirements. The Contractor shall comply with all other regulatory and statutory requirements applicable to the works.

Environmental Management

- The *Contractor* shall receive an Environmental Management Plan and the *Contractor* must manage the documents.
- All environmental legal Liabilities and claims arising from the activities of the *Contractor* shall be for the *Contractors* expense.
- The *Contractor* shall have an understanding of Eskom's basic environmental principles and commitments.
- Contractor to provide toilet facilities.

Expanded Public Works Programme (EPWP)

- The Department of Public Works in conjunction with the Department of Minerals and Energy requires information for reporting purposes.

- Electrification, Sub-transmission and Refurbishment Projects:

  Please find attached Annexure A as included in DWN 34-1063 (Expanded Public Works Report - Divisional Capital Programme). Annexure A will be completed by the Contractor and submitted to the Project Co-ordinator as part of the close-out package (final invoice as well as all other monthly invoices. Please note that payments will not be processed unless Annexure A is completed in full and handed over to the Project Co-ordinator.

General

- Except for site management and specialised labour such as operators for plant and equipment, the *Contractor* is encouraged to use "local" labour on a temporary basis for all manual tasks.
- The *Contractor* will attend all site meetings as arranged by the *Employer*
- All Construction work shall be carried out in accordance with all the statutory requirements applicable to the area, Eskom's specifications, standards and regulations
- The *Contractor* will be given access to the proposed site and the *Contractor* must comply with Eskom's national, Provincial and local environmental policies and laws.
- The *Employer* reserves the right to alter the scope of the works and programme.
- The *Employer* reserves the right to remove certain sections from the detailed scope of works as described in this contract.
- The Contractor should preferable use Local labour and train skilled labour.
- Any compensation event that includes work as per rated items in the BOQ are to be priced using those respective BOQ rates.

Requirements for the programme

A programme showing the key activities is to be submitted with the tender documents showing the following:

- Provide Bar Chart outlining start and completion date for construction activities on site.
- The order and timing of operations which the Contractor plans in order to provide the works.

Strict adherence to the programme will be monitored and updated to achieve the completion dates and submitted to Eskom Project Co-ordinator. Non-conformance to the stated programme will be liable for delay damages. Any deviations on time and cost are subject to Eskom approval.

PART 4: SITE INFORMATION

PART 4: SITE INFORMATION

The aerial view of the line as per Google Earth / .kmz provided. The boundaries of the various servitudes of the line stretches from Buffelspoort substation to Ladismith substation. The majority of the circuit being located close to, or near the Ladismith area which is located in the Western Cape, Little Karoo area.

The line is located and falls under the Kannaland Local Municipality.
Ladismith Town's GPS coordinates are 33°29'34.5"S 21°16'08.2"E or -33.492925, 21.268952

In Contract Data, reference has been made to this Part 4 of the contract for the location of Site Information.

General description

1. The Contractor to ensure that he becomes fully aware of site conditions as well as access conditions such as soil/subsurface conditions prior to submitting a tender.

2. Contractor access is limited to the working area.

3. Access control to be strictly monitored by the contractor to avoid any negligent or illegal events on premises during and after working hours.

4. If an existing barrier fence is removed, it must be replaced the same day.

5. The contractor is deemed to execute safety procedures to ensure the safety of his staff, sub-contractors, Eskom staff and community during the contract period.

6. The safety of the contractor's employees, sub-contractors and community takes preference over the scope of the works.

7. The contractor, his staff and sub-contractors must maintain identification at all times e.g. uniforms etc.

8. The Contractor should take all reasonable steps to become fully aware of existing services.

9. No fires are allowed on site (to fully comply as per EMP).

10. Familiarise yourself with the following documents (as referred to in the *Scope of Work*):

    - CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP) FOR BUFFELSPORT-LADISMIT 132 KV STAYWIRE REFURBISHMENT
    - SHE SPECIFICATION: Buffelspoort / Ladismith 132kV Line Stay Repair
    - SCREENING REPORT FOR AN ENVIRONMENTAL AUTHORIZATION AS REQUIRED BY THE 2014 EIA REGULATIONS – PROPOSED SITE ENVIRONMENTAL SENSITIVITY
    - RECOMMENDED INSTALLATION GUIDE FOR PRESSURE GROUTED MICROPILES
    - Micropile system requirements (guide)
    - THE STANDARD FOR THE CONSTRUCTION OF OVERHEAD POWERLINES

The “RECOMMENDED INSTALLATION GUIDE FOR PRESSURE GROUTED MICROPILES” is listed below

1. PURPOSE

The purpose of this guide is to define the procedure to install Micro Pile foundation systems and is applicable to all Micro Pile foundation types for transmission line towers while prioritizing health, safety and environmental considerations.

2. SCOPE

This Safe Work Procedure shall be applicable for the contractor operation. It shall be applied to the process of Micro Pile foundation installation and describes all its sub-activities i.e.

- Inspection Hole
- Test Anchor
- Sump
- Drilling
- Drilling rate and cleaning and flushing out the hole
- Dynamic Pressure Grouting with grout suspension

3. REFERENCE

- Foundations and underpinning using Titan Micro piles
- 240-47172520 (TRMSCAAC5.2)
- Titan injection Pile design and construction manual

4. MICRO PILING METHODOLOGY

4.1 Inspection hole (With reference to 240-47172520)

- It is a hole next to foundation that needs to be drilled and flushed, with water only in order to determine the geotechnical conditions.
- From the changes of drilling rates at different depths, consistency of layers can be determined
- On the pumped-out suspension some of the soil and rock classifications can be determined i.e. sand, clay, soft rock or hard rock etc.
- This information must be recorded for all drilled hole foundations
- However, if there is a major difference between the inspection hole and the actual holes of the foundation, a further inspection hole on the opposite can be drilled to determine more accurate information of the geotechnical/ conditions

4.2 Test Anchor

- A test anchor shall be placed within a five-meter radius of the tower center. This anchor shall be drilled and flushed in the same manner as foundation anchors and with the same water cement mix.
- The test anchor shall be drilled at the same angle and the approximate same depths of the perceived foundation in the same soil type. This will also indicate if rock level has been reached.
- Once the soil type has been confirmed and recorded, the test anchor shall be retrieved.

4.3 Sump

- A sump shall be installed to collect the excess flushing from the installation of the pile. The sump shall be dug out approx. dimension (1m x 1m x 0.6m) and will be positioned approx. 1 meter away from the pile location so that the excessive flushing can flow away from the anchor pile towards the sump.
- All dug out material shall be stockpiled close to the sump, approximately 1 meter away from the edge of the sump.
- A narrow trench shall be dug out to guide the run off into the sump to collect the excess material from the pile injection. The trench is to be dug in a manner that the fall from flushing area of the anchor is towards the sump area.
- Before initiating any drilling, a one-piece plastic (min 100 micron thick) will be used to line the sump and the trench. This will act as a pooling area to safely collect all excess material.

4.4 Drilling

- Rotary percussive drilling in conjunction with a cement suspension displaces and improves the soil in the same way as a displacement pile.
- During the drilling procedure, the water is filtered off from the cement suspension to leave behind a filter cake that stabilizes the drilled hole.
- This filter cake can also be called the initial injection that improves the shear bond between the grout body and the soil.
- The cement forms a mechanical interlock with the microstructure of the soil.
- During the drilling with the flushing and drilling medium, the cement suspension forms a mechanical interlock with the microstructure of the soil.

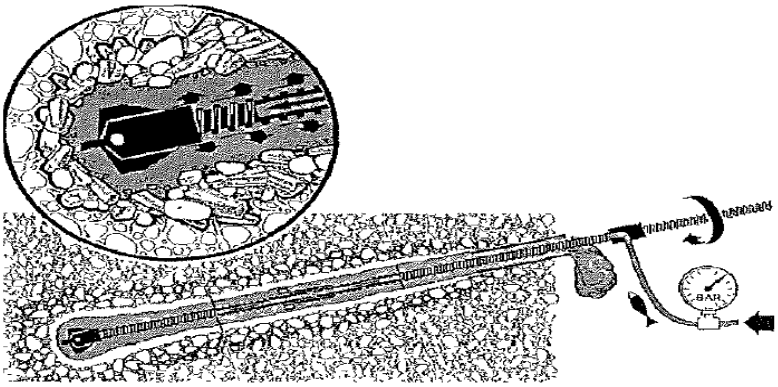
- The ensuing filter cake also improves the shear bond between the grout body and the soil.

4.5 Drilling rate, cleaning and flushing out the hole

- The quality of the grout body and the bond are improved by lowering the drilling rate (less than 1m/min) and cleaning out the hole more often.
- Cleaning out means repeatedly extracting and reinserting the drilling rod while continuing to rotate it and also continuing to flush out the hole under pressure.
- This method of working rinses the drilled hole clean and forces the remaining debris out of the top of the hole as a check.
- There should be no interruption in the flow out of the hole under pressure, if there is an interruption, or the medium disappears down the drilled hole, flushing and reaming should continue without drilling any deeper, possible with a thicker cement mix and higher pressure, until the cement suspension starts to flow out of the top of the hole again

4.6 The flushing/ cleaning medium

- A cement suspension with a water-cement (w/c) ratio of 0.6-0.8 (e.g. 60 to 80 liters of water per 100 kg of cement) with a strength of 35MPa, is a used as a flushing and drilling fluid.
- The use of water or thinner cement suspensions with water cement ratios of less than 0.8 can be considered as a flushing medium where geotechnical conditions and application warrants it.
- This will only be allowed with the geotechnical report and the approval of the Eskom Design engineer.
- A minimum grouting injection pressure of ±3 Bar must be maintained during the up and down reaming/flushing of every drill rod length whiles the flow out of the top of the hole must be maintained.
- The drill rod must be moved up and down at least twice at slow rate over the full length of each drill rod 3m section.



4.7 Dynamic Pressure Grouting with grout suspension.

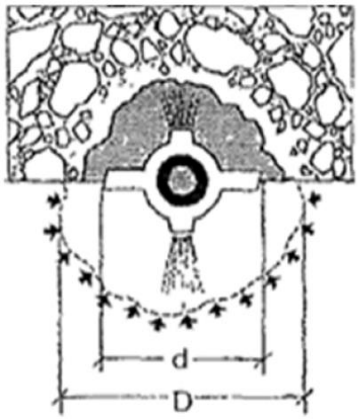
- Dynamic Pressure grouting is to inject the grout and rotate the tendon simultaneously.
- The cement suspension used on pressure grouting have a w/c ratio of 0.4-0.5
- This stiff mix displaces the flushing medium that supports the side of the drill hole, forcing it out of the top of the hole
- The increase in the injection pressure, despite the fact that the top of the drilled hole is open, is explained by the fact that the rapid hardening cement grout are pushing up the drilled hole to become a wedge between the rotating steel tendon and the surrounding soil, thus creating a natural blockage plug.
- <u>A rising injection pressure towards the end of the pressure grouting phase indicates a well installed pile.</u>

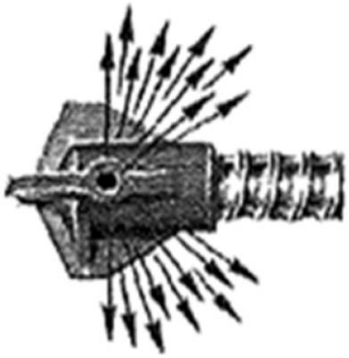
4.8 Under-reaming and dowelling procedure of Injected Pressure Grouting.

- The cement suspension used for pressure grouting must have a w/c ratio 0.4-0.5 and strength of 30MPa.
- The final drill rod section must be moved up and down at least twice after drilling at a slow rate (1m/min) over the full length of the final drill rod section (3m) while maintaining grout pressure to create the maximum grouting and compaction.
- The injection pressure at the end of the installation must be recorded and the final pressure must be more than 5 bars of pressure.
- More cleaning/flushing is necessary if the flow out of the hole is not sufficient during an injection pressure of 5 bars.

4.9 Widening of the drilled hole

- The drilling process with the radial Jets creates an annulus for the grout body which has a larger than that of the drill bit.
- It may be assumed that the pile diameter when installed with external Jetting is at least equal to the maximum diameter than that of the drill bits.





D= d +a
Widening value a ≥ 200mm
Empirical values measured on excavated bodies
a= 75 mm - medium and coarse gravel
a= 50 mm - sand and sandy gravel

4.10 Design Load (ultimate load) anchor test requirements

4.10.1 General and test setup requirements

- The Contractor shall if so instructed by the Design Engineer, install in each general soil type encountered and at any additional locations as stated in the design document, a test cast-in-situ anchor for the purpose of verifying the ultimate anchor capacity and concrete/soil friction resistance values.
- The Contractor shall provide the personnel and equipment capable of loading the anchor to perform the test.
- Design load test micro piles shall not form a part of a final tower anchors/ foundation.
- Tests shall be conducted in the presence of Eskom Site Representative.
- Micropile anchor foundations installed prior to acceptance by the Design
- Engineer of the test results will be subject to modification or replacement by the Contractor should the micropile fail the test.
- The test beam supports shall be placed outside the zone influenced by the skin friction of the micro piles to be tested.
- Two dial gauge micro meters shall be placed on a cleat angle either side of the anchor being pulled in order to eliminate errors due to rotation of the anchor rod. The micro meter's datum frame supports shall also be positioned 90 degrees to the test beam on the test rig supports. The angle cleat should be fixed to anchor rod directly above the grout and the ground level. The micro meters must read parallel to the anchor onto the angle cleat. The average reading of these gauges will represent the actual creep.

4.10.2 Anchor design load testing criteria

The design load shall be applied to the anchor during the test in appropriate increments to 50%, 75%, and 90%, each for a minimum holding period of 5 minutes, and finally 100% for at least half an hour. Successive load increments shall not be applied and the maximum test load shall be held until the rate of movement under the acting load has stabilized at a rate of movement not exceeding values as listed in TRMSCAAC 5.2 for each geotechnical parameter.

4.11 Proof load Anchor test requirements

4.11.1 General and test setup requirements

- Where instructed by the Eskom Site Representative or Design Engineer, the Contractor shall apply a contraction proof load test equal to 70% of the design loading conditions to the completed anchor for the purpose of verifying the maximum working load capacity of the anchor. To ensure quality assurance, anchor strength and construction integrity, the contractor shall execute proof load tests on a maximum of 10% of the anchors installed
- Micro pile proof load tests shall be conducted in the presence of the Eskom Site Representative.

- Micro pile foundations installed prior to acceptance by the Design Engineer of the micro pile test results will be subject to modification or replacement by the Contractor should the micro pile fail the test.
- The test beam supports shall be placed outside the zone influenced by the skin friction of the micro pile to be tested.
- Two dial gauge micro meters shall be placed on a cleat angle either side of the anchor being pulled in order to eliminate errors due to rotation of the anchor rod. The micro meter datum frame supports shall also be positioned 90 degree to the test beam on the test rig supports. The angle cleat should be fixed to the anchor rod directly above the grout and the ground level. The micro meters must read parallel to the anchor onto the angle cleat. The average reading of these gauges will represent the actual creep.
- The load shall be applied to the anchor in appropriate increments to 50%, 75%, 90% and 100% of the proof test load, and then unloaded to 50% and again loaded to 100% of the proof lest load, twice i.e. during two further cycles of loading. The Contractor shall monitor the micropile movement along the slope or vertical pile.
- Successive load increments shall not be applied until the rate of creep is less than or equal to the measurements given in TRMSCAAC 5.2.
- If the creep exceeds the limit set out in the acceptance criteria, the foundation shall be deemed to have failed, and will be required to be either modified or be replaced before being be re-tested
- A final report is drawn up which gives the results of the test earned out, consisting of
    1. A dimension sketch of the foundation
    2. Overall schematic diagram of the test equipment with a check of the specified dimensions and distances
    3. Data recording form