



## PASSENGER RAIL AGENCY OF SOUTH AFRICA

### SPECIFICATION AND SCOPE OF WORK

Supply and installation of phase and earth wires for 44kV transmission line.

CIDB (Construction Industry Development Board) = 4EP and above

*(NOTE: project will be executed on alternative and direct current high voltage environment)*

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## **SCOPE OF WORK**

### **1.1 Description of work**

- 1.1.1 Supply and installation of phase and earth wires for 44kV transmission line and all the associated works.
- 1.1.2 Supply and installation of 44kV MOD and all the associated works.
- 1.1.3 Dismantling and removal of existing broken phase and earth wires and all the associated works.
- 1.1.4 Transporting of dismantled phase and earth wires from site to Rebecca depot.

### **1.2 General**

- 1.2.1 Metrorail reserves the right to inspect and/or test any material or equipment during installation process.
- 1.2.2 Completion of work shall be subject to the approval of the Regional Technical Manager.
- 1.2.3 All fittings, accessories or apparatus which may not have been specially mentioned in this scope of work/specification, but which are otherwise necessary for the satisfactory operation of the transmission line shall be deemed to have been included in the scope of supply.
- 1.2.4 All work shall have a minimum of twelve months guarantee after the acceptance of completion by Metrorail Technical Manager.
- 1.2.5 All work shall comply with SANS standards and Metrorail engineering instructions/specification.

### **1.3 Contract area**

- 1.3.1 Pretoria substation
- 1.3.2 Between Bosman train station and Mitchell relay room
- 1.3.3 Between Barracks train station and Mitchell relay room
- 1.3.4 Between Hercules substation and Technikon Rant train station
- 1.3.5 Between Electro train station and Cordelfos substation
- 1.3.6 Between Golf and Schuttestraat train station

### **1.4 The following activities form part of this contract:**

- 1.4.1 Supply and installation of 212.09mm<sup>2</sup> ACSR phase wires for 44kV transmission line and all the associated works.
- 1.4.2 Supply and installation of 50mm<sup>2</sup> ACSR earth wires for 44kV transmission line and all the associated works.
- 1.4.3 Dismantling and removal of existing equipment e.g., broken phase wires, earth wires, insulators, jumpers, clamps etc. and all the associated works.
- 1.4.4 The Contractor shall be responsible for the transport to site, off-loading, handling and storage of all materials required for the execution of the works.

1.4.5 All materials required for the completion of work, shall be supplied and delivered to site by the Contractor.

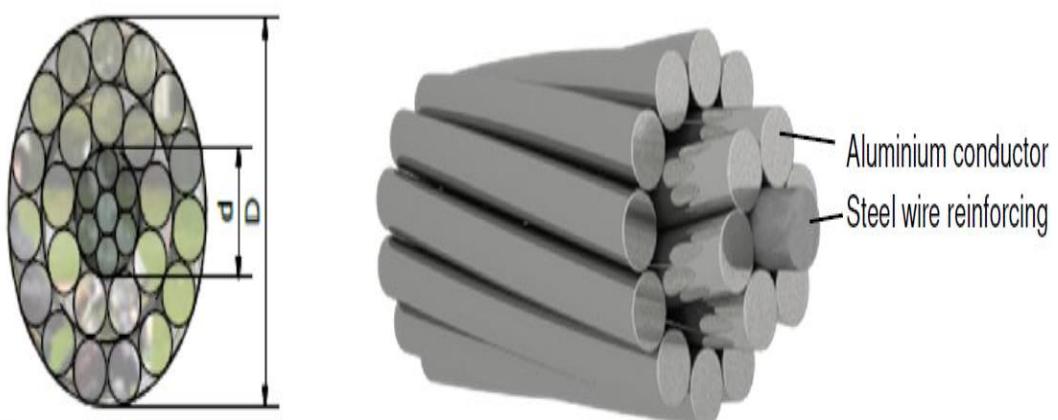
1.4.6 The Contractor shall, on completion of the works, clear the site of all leftovers or remaining materials, such as empty cable drums, cable off-cuts, empty tins, etc., to the satisfaction of Metrorail Electrical Department.

## 1.5 212.09mm<sup>2</sup> ACSR wire/conductor

1.5.1 The wire consists of 18 aluminum conductors and 1 steel wire.

1.5.2 The cross-sectional area of the steel wire is 11.2 mm<sup>2</sup> and that of aluminum conductors is 200.9 mm<sup>2</sup>.

1.5.3 Technical data of the chickadee wire to be supplied and installed.

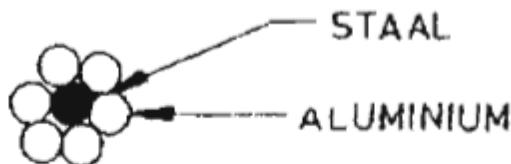


Construction and dimensions	Conductor name	Steel core			Aluminium Outer layer(s)			Total Conductor			Outer layer Lay direction	Standard drum length	Specification	
		Number/Size	dia.	area	mass	Number/Size	area	mass	dia.	area				
			mm	mm <sup>2</sup>	kg/km		mm <sup>2</sup>	kg/km	mm	mm <sup>2</sup>				
			Nom.	Nom.	Nom.		Nom.	Nom.	Nom.	Nom.				
<b>1 Steel + 18 Aluminium</b>														
	Dingo	1 / 3.35	10.23	8.8	69	18 / 3.35	158.7	429	16.75	167.47	498	(Z) RH	3000	ASTM
	Chickadee	1 / 3.77	11.51	11.2	88	18 / 3.77	200.9	543	18.85	212.09	631	(Z) RH	3000	CAN
	Pelican	1 / 4.14	12.64	13.5	106	18 / 4.14	242.3	655	20.70	255.77	761	(Z) RH	3000	CAN
	Osprey	1 / 4.47	13.65	15.7	123	18 / 4.47	282.5	764	22.35	298.17	887	(Z) RH	3000	CAN
	Kingbird	1 / 4.78	14.60	17.9	141	18 / 4.78	323.0	873	23.90	340.96	1014	(Z) RH	3000	ASTM

Figure 1.5. 1 technical data of the chickadee wire

## 1.6 50mm<sup>2</sup> ACSR earth wire

- 1.6.1 The wire consists of 6 aluminum conductors and 1 steel wire.
- 1.6.2 The cross-sectional area of the steel wire and that of the aluminum conductors is 3.77mm<sup>2</sup>.
- 1.6.3 Technical data of the earth wire to be installed.



6/1/3,35 ACSR (50mm<sup>2</sup>) EARTH WIRE  
DIAM: 10,05 mm  
MASS: 214 kg/km  
ULT. STRENGTH: 18,4 kN

Figure 1.6. 1 technical data of the earth wire

## 1.7 44kV composite tension and suspension insulators

- 1.7.1 The rated voltage for the suspension and tension insulators to be supplied and installed shall be 44kV or higher.
- 1.7.2 The type of housing for the suspension and tension insulators shall be composite or polymeric.

## 1.8 44kV MOD

- 1.8.1 Nominal system voltage: 44kV
- 1.8.2 Rated current: 800 A
- 1.8.3 The control panel for MOD shall be installed inside the substation.
- 1.8.4 The control panel shall have the local remote switch, closing and opening switches.
- 1.8.5 The opening and closing switch shall also be on the outside box.
- 1.8.6 All cabling for the MOD shall be the responsibility of the contractor e.g., cabling required to connect the MOD to the tele-control.

## 1.9 Health and safety

- 1.9.1 The contractor shall comply with the requirements of safety legislation and regulation in all respect.

- 1.9.2 The contractor shall perform all work in accordance with the occupational Health and Safety Act, 1993 (Act No: 85 of 1993). A copy of the act shall be kept on site at all times for the duration of the project.
- 1.9.3 The Contractor shall be responsible for providing a safety officer who will be on site for the duration of the project.
- 1.9.4 The contractor shall prepare and submit to PRASA at the start of the contract, a comprehensive safety file.
- 1.9.5 The safety file to be submitted shall include valid certificates of First Aiders, lifting equipment (cranes and slings) and medicals of staff assigned to the work. Notification to the Department of labour (if required) should be included.
- 1.9.6 The site access certificate shall only be issued (to the successful bidder) after the evaluation and approval of the safety file.
- 1.9.7 The contractor shall comply with all applicable legislation and Metrorail's safety requirement adopted from time to time and instructed by the Project Manager/Technical Officer. Such compliances shall be entirely at the contractor's cost and shall be deemed to have been allowed for in the rates and prices in the contract.
- 1.9.8 The contractor shall be required to work under direct supervision of Metrorail's personnel on site and shall be required to work only in areas which shall be demarcated by barriers.
- 1.9.9 The contractor shall ensure that a safety representative is at site all the times.
- 1.9.10 The contractor shall make necessary arrangement for sanitation, water and electricity at site during the installation of the equipment.
- 1.9.11 The contractor shall report all incidents in writing to the Project Manager/Technical Officer. Any incident resulting in death of or injury to any person on the work shall be reported within 48 hours of its occurrence.

## 1.10 Site Book

- 1.10.1 A site diary to record all incidents as well as the progress of work done during the project execution shall be supplied by the contractor. The site diary shall be kept on site for the duration of the contract.
- 1.10.2 This book (site diary) shall be used to record any unusual events during the period of the work.
- 1.10.3 Any delays to the work shall also be recorded such as delays caused by poor weather conditions, delays caused by permits being cancelled etc.
- 1.10.4 Other delays such as non-availability of equipment from third party suppliers must be communicated to Metrorail Technical Officer/Project Manager.

## 1.11 Guarantee and Defects

- 1.11.1 All work undertaken by the Contractor shall be subjected to a guarantee for a minimum of twelve months against faulty or inferior workmanship and material.
- 1.11.2 The guarantee period shall commence the day the installation is formally handed over to and accepted by the local Gauteng North Regional Engineer or Gauteng North

Technical Manager.

- 1.11.3 Any defects that may become apparent during the guarantee period shall be rectified to the satisfaction of and free of costs to Metrorail.
- 1.11.4 The contractor shall undertake work on the rectification of any defects that may arise during the guarantee period within 7 days after being notified by Metrorail Technical Staff.
- 1.11.5 Should the Contractor fail to comply with the requirements stipulated above, Metrorail shall be entitled to undertake the necessary repair of work or effect replacement of defects apparatus or material and the contractor shall reimburse the client the total cost of such repair or replacement, including labour costs incurred in replacing defective apparatus or materials.
- 1.11.6 If urgent repairs have to be carried out by Metrorail staff to maintain supply during the guarantee period, the Contractor shall reimburse Metrorail the cost of material and labour.

## 1.12 Breach of contract

- 1.12.1 In the event that the Contractor does not commence on the agreed date with the work or does not work at reasonable pace or deliver work of unacceptable nature or otherwise contravenes any of the clauses of these conditions, Metrorail may give the Contractor 7 days' notice to rectify or remedy it. Should the contractor not comply with this instruction then Metrorail shall be entitled to cancel the contract and claim damages from the contractor.
- 1.12.2 Should the contractor fail to carry out the work, the Technical Manager shall be entitled to suspend operations and if the Contractor fail to remedy any breach within 24 hours after written notice has been given to him. Metrorail shall be entitled to cancel the agreement in which all amounts used by the contractor shall be forfeited as liquidated and ascertain damages and Metrorail shall be free to make such arrangements in regard to the carrying out the work as it may deem fit.

## 2. Penalties

- 2.1.1 If the Contractor fails to complete the Services within the time stipulated in this Contract for completion of Services or a part or portion of Services, the Contractor shall be liable to the Employer for an amount calculated at 0.3% of the Contract Price per delayed Day per order, which shall be paid for every Day which shall elapse between the time for due completion and completion of the relevant Services. However, the total amount due under this sub-clause shall not exceed the maximum of 10% of the Contract Price.
- 2.1.2 The imposition of such penalty shall not relieve the Contractor from its obligation to complete Services or from any of its obligations and liabilities under the Contract,

2.1.3 Such penalties are not payable for late completion of work where the delays are attributed to circumstances beyond the contractor's control, like citizen unrest or strikes, exceptional inclement weather conditions and inaccessibility to work site etc.

### 3. Security

- 3.1.1 The contractor shall be responsible for providing security on site until the site is handed over to Metrorail.
- 3.1.2 Any stolen material shall be replaced by the contractor at his own cost.

### 4. Site and site inspection

4.1. Bidders shall visit the site for site briefing session to thoroughly inspect the site, in order to make themselves (bidders) aware of the nature of work involved.

### 5. Financials

- 5.1. Payments shall be made for fully functional equipment only, that is, all work completed.
- 5.2. All prices quoted shall be fixed and firm for the duration of the contract.
- 5.4 Rates supplied in the BOQ shall be used to calculate the final payment for equipment.

### 6. Duration of the contract

6.1. Together with his/her quotation, the bidder shall submit a work program detailing the time frames of each and every task in the form of a Gantt chart or any acceptable formats.

### 7. SHE File Check List

7.1. The SHE file checklist is attached and it shall be used to compile the safety file by the successful bidder.

### 8. Occupation

- 8.1. PRASA shall apply for occupations before the start of the execution phase on site.
- 8.2. Work done by all disciplines shall be completed during these occupations in order for Metrorail to open the track for normal rail traffic.
- 8.3. The contractor shall conform to the duration of occupations as laid down by the Technical Officer. Occupation time used by the contractor in excess of the maximum

specified occupation time, will not be paid against overtime rates unless, the Technical Officers aggress upon it in writing before the start of occupation and it can be proved by the contractor that the delays caused by PRASA resulted in an overtime claim. In case the contractor wants to claim standing time.

- 8.4. Before the end of each occupation, the contractor will be advised in writing of the commencement time and duration of the following occupation.
- 8.5. There is a possibility of the occupation being granted during the night and during the weekend from 21h00 PM until late.

## 9. Supervision and protection (To BE PROVIDED BY THE CONTRACTOR)

- 9.1 All work shall be performed under supervision by the contractor's suitable qualified personnel.
- 9.2 Protection should be by means of at least three flagmen in possession of valid flagmen certificate.
- 9.3 The flagmen will be tested (not trained) by Metrorail to ensure their efficiency.
- 9.4 The electrical work must be done by a qualified erectors or linesmen from the appointed contractor.

## 10. Subcontracting

- 10.1 The contractor shall not make use of any sub-contractors to perform the works or parts thereof without prior permission from PRASA.

## 11. Evaluation criteria

### **Technical or functional requirements**

Minimum Qualifications of the technical staff are outlined below. All educational qualifications should be SAQA accredited.

#### **11.1.1 ELECTRICAL INSTALLATION SUPERVISOR**

- a) National Certificate level 3 (N3) in Electrical Engineering (Heavy Current) or valid A-brown certificate.
- b) Trade test certificate.

#### **11.1.2 ELECTRICIAN**

- (a) National Certificate level 3 (N3) in Electrical Engineering (Heavy Current) or valid A-brown certificate.
- (b) Trade test certificate.

#### **11.1.3 ERECTOR**

- a) C Green
- b) Working at heights certificate

## Technical or functional requirements

<p><b>Organizational Experience</b></p> <p>Provide for each successfully completed project/s in the following sequence: Copy of an appointment letter/s on a company letterhead, description of the project, Client name, Client contact (i.e., email and office number), Project start date, project end date, extension of time where applicable, contract value inclusive of VAT.</p> <p>Furthermore, attach completion certificate signed by client or letter from the client confirming successful completion of the project.</p>	60	<p>Score will be based on successfully executed and completed similar projects in the installation/ repair of transmission lines and/ structures in the last fifteen (15) years.</p> <p>Zero (0) Similar Projects/non-submission/incomplete submission = <b>0</b></p> <p>1: 1 Similar project = <b>12 points</b></p> <p>2: 2 Similar projects = <b>24 points</b></p> <p>3: 3 Similar projects= <b>36 points</b></p> <p>4: 4 Similar projects = <b>48 points</b></p> <p><b>5: 5 similar projects = 60 points</b></p>
<p><b>Key Personnel Experience (based on Submitted CVs) of Key Staff</b></p> <p>a) Electrical Installation Supervisor</p> <p>b) Electrician</p> <p>c) Erector</p> <p>Provide copies of original qualifications and certificates of professional bodies. The copies must be certified by the commissioner of oath. The date on the stamp shall be three months or less old, before the closing date of the tender.</p> <p>If the qualification has been awarded in other language than English, please provide translation in English.</p>	30	<p>Detailed CVs of the team members who will be used in completing the works must submitted. Scores would be based on the experience in the installation/ repairs of transmission lines. The points will be based on the <b>three</b> key personnel listed here.</p> <p>No information provided/incomplete submission = <b>0 points</b></p> <p>1: Average &lt; 5 years of experience of Key Staff = <b>6 points</b></p> <p>2: Average &gt; = 5 up to 8 years of experience of Key Staff = <b>12 points</b></p> <p>3: Average &gt; 8 up to 10 years of experience of Key Staff = <b>18 points</b></p> <p>4: Average &gt; = 10 up to 15 years of experience of Key Staff = <b>24 points</b></p>

<p>Evaluation will be done on all 3 personnel and maximum points shall be obtained on 3 personnel. Each must have a minimum of 5 years.</p> <p>All educational qualifications should be SAQA accredited.</p>		<p>5: Average <math>\geq</math> 15 years of experience of Key Staff = <b>30 points</b></p>
<p><b>Project program (Work plan)</b></p> <p>Provide project schedule in MS projects that meets the client's timeline requirements and the schedule to cover the following key Milestones:</p> <ul style="list-style-type: none"> <li>• Project duration within the targeted duration of 6 weeks.</li> <li>• Resource allocation</li> <li>• Critical Path clearly highlighted</li> <li>• Activities showing safety measures to be taken activities included.</li> </ul> <p>The overall schedule should clearly indicate sequencing of activities with clear understanding of scope.</p>	10	<p>Score will be allocated for MS Project Schedule provided.</p> <p>No information provided = 0 points.</p> <p>1: Project schedule provided with relevant activities and 1 of the indicated elements addressed = 2.</p> <p>2: Project schedule provided with relevant activities and 2 of the indicated elements addressed = 4.</p> <p>3. Project schedule provided with relevant activities and 3 of the indicated elements addressed = 6.</p> <p>4: Project schedule provided with relevant activities and 4 of the indicated elements addressed = 8.</p> <p>5. Project schedule provided with relevant activities and all the indicated elements addressed = 10.</p>

**NOTE: The average minimum points of 80 are to be attained in the evaluation criteria stated above for a bidder to be shortlisted for this tender.**