



**AIRPORTS COMPANY OF SOUTH AFRICA**

**CONTRACT NO: ELA 6940/2022/RFP**

**RETURNABLE**

**NOTE:**

- The Form of Offer and Acceptance (C1.1) is on **pages 3-6** of this document.
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**THE CLIENT:**

Airports Company South Africa SOC Ltd  
Western Precinct, Aviation Park,  
O.R. Tambo International Airport  
1 Jones Road, Kempton Park  
Gauteng, South Africa  
1632

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**SEPTEMBER 2022**

**CONSTRUCTION CONTRACT**

**AIRPORTS COMPANY SOUTH AFRICA SOC LIMITED**

**CONTRACT NUMBER: ELA 6940/2022/RFP**

**TITLE OF PROJECT: APPOINTMENT OF A CONTRACTOR FOR THE  
CONSTRUCTION OF THE PHOTOVOLTAIC SOLAR PLANT AT  
KING PHALO AIRPORT**

**NEC 3: ENGINEERING AND CONSTRUCTION CONTRACT (ECC)**

**Between AIRPORTS COMPANY SOUTH AFRICA SOC LIMITED**  
**Applicable at King Phalo Airport**  
(Registration Number: 1993/004149/30)

and \_\_\_\_\_  
(Registration Number: \_\_\_\_\_)

for **CONSTRUCTION OF THE 650KWP PHOTOVOLTAIC SOLAR  
PLANT AT KING PHALO AIRPORT**

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<b>Contents:</b>		<b>No of pages</b>
Part C1	Agreements & Contract Data	[26]
Part C2	Pricing Data	[21]
Part C3	Scope of Works	[28]
Part C4	Site Information	[04]

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**Part C1: Agreements and Contract Data**

**C1.1: Form of Offer and Acceptance**

**Offer**

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract for the CONSTRUCTION OF A 650 KWP PV PLANT AT KING PHALO AIRPORT

The tenderer, identified in the Offer signature block, has examined the documents listed in the Tender Data and addenda thereto as listed in the Returnable Schedules, 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.

**THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF VAT IS:**

(in words)..... Rands;

(in figures) **R**.....

**THE OFFERED PRICES ARE AS STATED IN THE PRICING SCHEDULE**

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)

Capacity

**For the Bidder:**

Name & signature of witness

*(Insert name and address of organisation)*

Date

**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. 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 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

**the  
Employer**

*(Insert name and address of  
organisation)*

Name  
& signature  
of witness

Date

.....

**Schedule of Deviations**

1 Subject .....

Details .....

.....

.....

.....

2 Subject .....

Details .....

.....

.....

.....

3 Subject .....

Details .....

.....

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By the duly authorised representatives signing this agreement, the Employer and the Tenderer agree to and accept the foregoing schedule of deviations as the only deviations from and amendments to the documents listed in the Tender Data and addenda thereto as listed in the returnable 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 Agreement shall have any meaning or effect in the contract between the parties arising from this agreement.

**For the Employer**

**For the Bidder**

Signature (s)	.....	.....
Name (s)	.....	.....
Capacity	.....	.....
<b>Name and Address</b>	<b>Airports Company South Africa SOC Limited</b>	
Name & Signature of witness	<i>(Insert name and address of organisation)</i>	<i>(Insert name and address of organisation)</i>
Date	.....	.....

## Part C1.2a Contract Data

### Part one – Data provided by the *Employer*

The Conditions of contract are selected from the NEC3 Engineering and Construction Contract, April 2013.

Each item of data given below is cross-referenced to the NEC3 Engineering Construction Contract which requires it.

Clause	Statement	Data
<b>1</b>	<b>General</b>	
	The <i>conditions of contract</i> are the core clauses and the clauses for Main Option	
	Main Option	<b>A: Priced contract with activity schedule</b>
	Dispute resolution Option	<b>W1: Dispute resolution procedure</b>
	Secondary Options (incorporating amendments)	<b>X2: Changes in the law</b> <b>X7: Delay damages</b> <b>X13: Performance Bond</b> <b>X16: Retention</b> <b>X18: Limitation of liability</b> <b>Z: Additional conditions of contract</b> of the NEC3 Engineering and Construction Contract, April 2013
10.1	The <i>Employer</i> is (Name)	Airports Company South Africa SOC Limited,
	Address	Airports Company South Africa SOC Limited  Western Precinct, Aviation Park, O.R. Tambo International Airport 1 Jones Road, Kempton Park Gauteng, South Africa
	Telephone	1632
	Fax	011 723 1400 011 453 9353

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10.1	The <i>Project Manager</i> is	
	Contact Person:	Thato Thabane
	Address:	ACSA Offices, OR Tambo Airport, 1 Jones Road, Kempton Park, Johannesburg, 1632
	Telephone	011 723 1579
	E-mail address	Thato.Tabane@airports.co.za

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10.1	The <i>Supervisor</i> is	Delta Built Environment Consultants Pty (Ltd.)
	Address	320 The Hillside Road, Rynlal building Lynnwood, Pretoria, 0180
	Telephone	012 368 1850
	Fax	012 348 4738
	Email	Herman.malan@deltabec.com

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11.2	The <i>works</i> are	CONSTRUCTION OF A 650 kWp PV PLANT AT KING PHALO AIRPORT
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11.2	The following matters will be included in the Risk Register	<ul style="list-style-type: none"> <li>• Availability of As Built information</li> <li>• Access to Site</li> <li>• Site Constraints and Constructability</li> <li>• Municipal Approval</li> <li>• SACAA glare approval</li> </ul>
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11.2	The <i>Works Information</i> is in	Part C3 'Scope of Works' section of this contract
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11.2	The <i>Site Information</i> is in	Part C4 'Works Information' section of this contract
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11.2	The <i>boundary of the site</i> is	As indicated on site layout
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12.2	The <i>law of the contract</i> is the law of	the Republic of South Africa
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13.1	The <i>language of this contract</i> is	English
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13.3	The <i>period of reply</i> is	Seven (7) days
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<b>3</b>	<b>Time</b>	
31.2	The <i>starting date</i> is	TBC
11.2	The <i>completion date</i> is	TBC
30.1	The <i>access date</i> is	TBC
31.1	The <i>Contractor</i> submits a first (preliminary) programme with the tender by the tender closing date	TBC
32.2	The <i>Contractor</i> submits revised programmes at intervals no longer than	Two (2) weeks
35.1	The <i>Employer</i> is not willing to take over the works before the <i>completion date</i>	The <i>Employer</i> and Others will have access to the <i>works</i> during construction or prior to completion. Such access by the <i>Employer</i> and Others shall not relieve the <i>Contractor</i> from liability for the completion of the <i>works</i> in accordance with the Works Information and in terms of this contract.
<b>4</b>	<b>Testing and Defects</b>	
42.2	The <i>defects date</i> is	Twelve (12) months after Completion of the whole of the <i>works</i>
43.2	The <i>defects correction period</i> is	Two (2) weeks
<b>5</b>	<b>Payment</b>	
50.1	The <i>assessment interval</i> is	Four (4) weeks
50.1	The <i>currency of this contract</i> is the	South African Rand
51.2	The period within which payment is made is	Four (4) weeks
51.4	The <i>interest rate</i> is	The prime lending rate of the Nedbank Bank. as determined from time to time
<b>6</b>	<b>Compensation events</b>	
60.1	The <i>weather measurements</i> to be recorded for each calendar month are	the cumulative rainfall (mm) the number of days with rainfall more than 10 mm the number of days with minimum air temperature less than 0 degrees Celsius
60.1	The place where weather is to be recorded (on the Site) is	At the Construction Site Office and the records to be kept on site in a file clearly marked for this purpose

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60.1	Assumed values for the ten year return <i>weather data</i> for each <i>weather measurement</i> for each calendar month are	Month	Days	Month	Days
		January	1	July	4
		February	1	August	3
		March	2	September	2
		April	2	October	2
		May	3	November	2
		June	3	December	1
<b>7</b>	<b>Title</b>	No data required for this section of the <i>conditions of contract</i>			
<b>8</b>	<b>Risks and Insurance</b>				
84.1	The <i>Employer</i> provides these insurances	Refer to the Insurance Clauses which is attached at the end of the Contract Data			
84.2	The <i>Contractor</i> provides the insurance stated in	The Insurance Clauses which is attached at the end of the Contract Data. The insurances are in the joint names of the Parties and provide cover for events which are at the Contractor's risk from the starting date until the Defects Certificate or a termination certificate has been issued.			
	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			
<b>9</b>	<b>Termination</b>	No data required for this section of the <i>conditions of contract</i>			
<b>10</b>	<b>Data for Main Options</b>				
<b>A</b>	Priced contract with activity schedule	Tenderer to provide activity schedule with pricing information, based on works description			
<b>11</b>	<b>Data for Option W1</b>				
W1.1	The <i>Adjudicator</i> is	The person appointed jointly by the parties from the list of adjudicators contained below			
W1.2	The <i>Adjudicator nominating body</i> is	The current Chairman of Johannesburg Advocate's Bar Council			
W1.4	The <i>tribunal</i> is	Arbitration			

W1.4	If the <i>tribunal</i> is arbitration, the arbitration procedure is	The <i>arbitration procedure</i> is set out in The Rules for the Conduct of Arbitrations 2013 Edition, 7th Edition, published by The Association of Arbitrators, (Southern Africa)
W1.4	The place where arbitration is to be held is	Johannesburg, South Africa.
W1.4	The person or organisation who will choose an arbitrator	The Arbitrator is the person selected by the Parties as and when a dispute arises in terms of the relevant Z Clause, from the Panel of Arbitrators provided under the relevant Z clause if the arbitration procedure does not state who selects an arbitrator. The Arbitrator nominating body is the Chairman of the Johannesburg Advocates Bar Council.
<b>12</b>	<b>Data for Secondary Option Clauses</b>	
<b>X7</b>	<b>Delay Damages</b>	
	Delay damages of the <i>works</i> are	Amount per day is 0.05%, to the maximum of 10% of the Contract value
<b>X13</b>	<b>Performance bond</b>	
X13.1	The amount of the performance bond is	10% of the contract value. Pro-forma draft of a performance bond to be used is attached to this contract.
<b>X16</b>	<b>Retention</b>	
X16.1	The <i>retention percentage</i> is	5% of the Contract value.
<b>X18</b>	<b>Limitation of Liability</b>	
X18.1	The <i>Contractor's</i> liability to the <i>Employer</i> for indirect or consequential loss is limited to	Nil - Neither Party is liable to the other for any consequential or indirect loss, including but not limited to loss of profit, loss of income or loss of revenue
X18.2	For any one event, the <i>Contractor's</i> liability to the <i>Employer</i> for loss of or damage to the <i>Employer's</i> property is limited to	The total of the Prices
X18.3	The <i>Contractor's</i> total liability to the Employer for defects due to his design which are not listed on the Defects Certificate is limited to	The total of the Prices

- 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 *Contractor's* total direct liability to the *Employer* for all matters arising under or in connection with this contract, other than the excluded matters, is limited to the total of the Prices and applies in contract, tort or delict and otherwise to the extent allowed under the law of the contract.

The excluded matters are amounts payable by the *Contractor* as stated in this contract for

- Loss of or damage to the *Employer's* property,
- Delay damages,
- Defects liability,
- Insurance liability to the extent of the *Contractor's* risks
- loss of or damage to property (other than the *works*, *Plant* and *Materials*),
- death of or injury to a person;
- damage to third party property; and
- infringement of an intellectual property right

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**Z The *Additional conditions of Z1 – Z20 contract* are**

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**Amendments to the Core Clauses**

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**Z1 Interpretation of the law**

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**Z1.1 Add to core clause 12.3:**

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.

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**Z2 Providing the Works:**

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**Z2.1 Delete core clause 20.1 and replace with the following:**

The *Contractor* provides the works in accordance with the Works Information and warrants that the results of the Works, when complete, shall be fit for their intended purpose

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**Z3 Other responsibilities:**

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**Add the following at the end of core clause 27:**

**Z3.1** The *Contractor* shall have satisfied himself, prior to the Contract Date, as to the completeness, sufficiency and accuracy of all information and drawings provided to him as at the Contract Date

**Z3.2** The *Contractor* shall be responsible for the correct setting out of the *Works* in accordance with the original points, lines and levels stated in the *Works* Information or notified by the *Project Manager*, *Supervisor* or the *Employer*. Any errors in the positioning of the *Works* shall be rectified by the *Contractor* at the *Contractor's* own costs.

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<b>Z4</b>	<b>Extending the defects date:</b>
	<b>Add the following as a new core clause 46:</b>
<b>Z4.1</b>	If the <i>Employer</i> cannot use the <i>works</i> due to a Defect, which arises after Completion and before the <i>defects date</i> , the <i>defects date</i> is delayed by a period equal to that during which the <i>Employer</i> , due to a Defect, is unable to use the <i>works</i>
<b>Z4.2</b>	If part of the <i>works</i> is replaced due to a Defect arising after Completion and before the <i>defects date</i> , the <i>defects date</i> for the part of the <i>works</i> which is replaced is delayed by a period equal to that between Completion and the date by when the part has been replaced
<b>Z4.3</b>	The <i>Project Manager</i> notifies the <i>Contractor</i> of the change to a <i>defect date</i> when the delay occurs. The period between Completion and an extended <i>defects date</i> does not exceed twice the period between Completion and the <i>defects date</i> stated in the Contract Data
<b>Z5</b>	<b>Termination</b>
<b>Z5.1</b>	<b>Add the following to core clause 91.1, at the second main bullet, fifth sub-bullet point, after the words “assets or”:</b> “business rescue proceedings are initiated or steps are taken to initiate business rescue proceedings”.
<b>Amendment to the Secondary Option Clauses</b>	
<b>Z6</b>	<b>Performance Bond</b>
<b>Z6.1</b>	<b>Amend the first sentence of clause X13.1 to read as follows:</b> The <i>Contractor</i> gives the <i>Employer</i> an unconditional, on-demand performance bond, provided by a bank which the <i>Project Manager</i> and the <i>Employer</i> have accepted, for the amount stated in the Contract Data and in the form set out in Annexure C.ii of this Contract Data.
<b>Z6.2</b>	<b>Add the following new clause as Option X13.2:</b> The <i>Contractor ensures</i> that the performance bond is valid and enforceable until the end of the <i>contract period</i> . If the terms of the performance bond specify its expiry date and the end of the <i>contract period</i> does not coincide with such expiry date, four weeks prior to the said expiry date, the <i>Contractor</i> extends the validity of the performance bond until the end of the <i>contract period</i> . If the <i>Contractor</i> fails to so extend the validity of the performance bond, the <i>Employer</i> may claim the full amount of the performance bond and retain the proceeds as cash security
<b>Z7</b>	<b>Limitation of liability:</b>
	<b>Insert the following new clause as Option X18.6:</b>
<b>Z7.1</b>	The <i>Employer's</i> liability to the <i>Contractor</i> for the <i>Contractor's</i> indirect or consequential loss is limited to R0.00
<b>Z7.2</b>	Notwithstanding any other clause in this contract, any proceeds received from any insurances or any proceeds which would have been received from any insurances but for the conduct of the <i>Contractor</i> shall be excluded from the calculation of the limitations of liability listed in the contract
<b>Additional Z Clauses</b>	
<b>Z8</b>	<b>Cession, delegation and assignment</b>

<b>Z8.1</b>	The <i>Contractor</i> shall not cede, delegate or assign any of its rights or obligations to any person without the written consent of the <i>Employer</i> , which consent shall not be unreasonably withheld. This clause shall be binding on the liquidator/business rescue practitioner /trustee (whether provisional or not) of the <i>Contractor</i>
<b>Z8.2</b>	The <i>Employer</i> may cede and delegate its rights and obligations under this contract to any person or entity
<b>Z9</b>	<b>Joint and several liability</b>
<b>Z9.1</b>	If the <i>Contractor</i> constitutes a joint venture, consortium or other unincorporated grouping of two or more persons, these persons are deemed to be jointly and severally liable to the <i>Employer</i> for the performance of the Contract.
<b>Z9.2</b>	The <i>Contractor</i> shall, within 1 week of the Contract Date, notify the <i>Project Manager</i> and the <i>Employer</i> of the key person who has the authority to bind the <i>Contractor</i> on their behalf.
<b>Z9.3</b>	The <i>Contractor</i> does not materially alter the composition of the joint venture, consortium or other unincorporated grouping of two or more persons without prior written consent of the <i>Employer</i> .
<b>Z10</b>	<b>Ethics</b>
<b>Z10.1</b>	The <i>Contractor</i> undertakes:
<b>Z10.1.1</b>	not to give any offer, payment, consideration, or benefit of any kind, which constitutes or could be construed as an illegal or corrupt practice, either directly or indirectly, as an inducement or reward for the award or in execution of this contract;
<b>Z10.1.2</b>	to comply with all laws, regulations or policies relating to the prevention and combating of bribery, corruption and money laundering to which it or the <i>Employer</i> is subject, including but not limited to the Prevention and Combating of Corrupt Activities Act, 12 of 2004.
<b>Z10.3</b>	The <i>Contractor's</i> breach of this clause constitutes grounds for terminating the <i>Contractor's</i> obligation to Provide the Works or taking any other action as appropriate against the <i>Contractor</i> (including civil or criminal action). However, lawful inducements and rewards shall not constitute grounds for termination.
<b>Z10.4</b>	If the <i>Contractor</i> is found guilty by a competent court, administrative or regulatory body of participating in illegal or corrupt practices, including but not limited to the making of offers (directly or indirectly), payments, gifts, gratuity, commission or benefits of any kind, which are in any way whatsoever in connection with the contract with the <i>Employer</i> , the <i>Employer</i> shall be entitled to terminate the contract in accordance with the procedures stated in core clause 92.2. the amount due on termination is A1.
<b>Z11</b>	<b>Confidentiality</b>
<b>Z11.1</b>	All information obtained in terms of this contract or arising from the implementation of this contract shall be treated as confidential by the <i>Contractor</i> and shall not be used or divulged or published to any person not being a party to this contract, without the prior written consent of the <i>Project Manager</i> or the <i>Employer</i> , which consent shall not be unreasonably withheld.

- Z11.2** If the *Contractor* is uncertain about whether any such information is confidential, it is to be regarded as such until otherwise notified by the *Project Manager*.
- Z11.3** This undertaking shall not apply to –
- Z11.3.1** Information disclosed to the employees of the *Contractor* for the purposes of the implementation of this agreement. The *Contractor* undertakes to procure that its employees are aware of the confidential nature of the information so disclosed and that they comply with the provisions of this clause;
- Z11.3.2** Information which the *Contractor* is required by law to disclose, provided that the *Contractor* notifies the *Employer* prior to disclosure so as to enable the *Employer* to take the appropriate action to protect such information. The *Contractor* may disclose such information only to the extent required by law and shall use reasonable efforts to obtain assurances that confidential treatment will be afforded to the information so disclosed;
- Z11.3.3** 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);
- Z11.4** 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*
- Z11.5** The *Contractor* ensures that all his Subcontractors abide by the undertakings in this clause.

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**Z12**     ***Employer's Step-in rights***

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- Z12.1** If the *Contractor* defaults by failing to comply with his obligations and fails to remedy such default within 2 weeks of the notification of the default by the *Project Manager*, the *Employer*, without prejudice to his other rights, powers and remedies under the contract, may remedy the default either himself or procure a third party (including any subcontractor or supplier of the *Contractor*) to do so on his behalf. The reasonable costs of such remedial works shall be borne by the *Contractor*
- Z12.2** The *Contractor* co-operates with the *Employer* and facilitates and permits the use of all required information, materials and other matter (including but not limited to documents and all other drawings, CAD materials, data, software, models, plans, designs, programs, diagrams, evaluations, materials, specifications, schedules, reports, calculations, manuals or other documents or recorded information (electronic or otherwise) which have been or are at any time prepared by or on behalf of the *Contractor* under the contract or otherwise for and/or in connection with the *works*) and generally does all things required by the *Project Manager* to achieve this end.

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**Z13**     ***Liens and Encumbrances***

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- Z13.1** The *Contractor* keeps the Equipment used to Provide the Services free of all liens and other encumbrances at all times. The *Contractor*, vis-a-vis the *Employer*, waives all and any liens which he may from time to time have, or become entitled to over such Equipment and any part thereof and procures that his Subcontractors similarly, vis-a-vis the *Employer*, waive all liens they may have or become entitled to over such Equipment from time to time

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<b>Z14</b>	<b>Intellectual Property</b>
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<b>Z14.1</b>	Intellectual Property (“IP”) rights means all rights in and to any patent, design, copyright, trade mark, trade name, trade secret or other intellectual or industrial property right relating to the Works.
<b>Z14.2</b>	IP rights remain vested in the originator and shall not be used for any reason whatsoever other than carrying out the <i>works</i> .
<b>Z14.3</b>	The <i>Contractor</i> gives the <i>Employer</i> an irrevocable, transferrable, non-exclusive, royalty free licence to use and copy all IP related to the <i>works</i> for the purposes of constructing, repairing, demolishing, operating and maintaining the works
<b>Z14.4</b>	The written approval of the <i>Contractor</i> is to be obtained before the <i>Contractor's</i> IP made available to any third party which approval will not be unreasonably withheld or delayed. Prior to making any <i>Contractor's</i> IP available to any third party the <i>Employer</i> shall obtain a written confidentiality undertaking from any such third party on terms no less onerous than the terms the <i>Employer</i> would use to protect its IP
<b>Z14.5</b>	The <i>Contractor</i> shall indemnify and hold the <i>Employer</i> harmless against and from any claim alleging an infringement of IP rights (“ <b>the claim</b> ”), which arises out of or in relation to:
<b>Z14.5.1</b>	the <i>Contractor's</i> design, manufacture, construction or execution of the Works
<b>Z14.5.2</b>	the use of the <i>Contractor's</i> Equipment, or
<b>Z14.5.3</b>	the proper use of the Works.
<b>Z14.6</b>	The <i>Employer</i> shall, at the request and cost of the <i>Contractor</i> , assist in contesting the claim and the <i>Contractor</i> may (at its cost) conduct negotiations for the settlement of the claim, and any litigation or arbitration which may arise from it.

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<b>Z15</b>	<b>Dispute resolution:</b>
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**Z15.1 Appointment of the Adjudicator**


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An *Adjudicator* is appointed Panel of Adjudicators

when a dispute arises, from the Panel of Adjudicators below. The referring party nominates an Adjudicator, which nomination is either accepted or rejected by the other party. In the instance of a rejection of the nominated *Adjudicator*, the referring Party refers the appointment deadlock to the Chairman of the Johannesburg Bar Council, who appoints an *Adjudicator* listed in the Panel of Adjudicators below

The Parties appoint the *Adjudicator* under the NEC3 Adjudicator's Contract, April 2013

Name	Location	Contact details (phone & e mail)
Adv. Ghandi Badela	Gauteng	+27 11 282 3700 <a href="mailto:ghandi@badela.co.za">ghandi@badela.co.za</a>
Mr. Errol Tate Pr. Eng.	Durban	+27 11 262 4001 <a href="mailto:Errol.tate@mweb.co.za">Errol.tate@mweb.co.za</a>
Adv. Saleem Ebrahim	Gauteng	+27 11 535-1800 <a href="mailto:salimebrahim@mweb.co.za">salimebrahim@mweb.co.za</a>
Mr. Sebe Msutwana Pr. Eng.	Gauteng	+27 11 442 8555 <a href="mailto:sebe@civilprojects.co.za">sebe@civilprojects.co.za</a>
Mr. Sam Amod	Gauteng	<a href="mailto:sam@samamod.com">sam@samamod.com</a>
Adv. Sias Ryneke SC	Gauteng	083 653 2281 <a href="mailto:ryneke@duma.nokwe.co.za">ryneke@duma.nokwe.co.za</a>
Mr. Emeka Ogbugo (Quantity Surveyor)	Pretoria	+27 12 349 2027 <a href="mailto:emeka@gosiame.co.za">emeka@gosiame.co.za</a>

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**Z15.2 Appointment of the Arbitrator**


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An *Arbitrator* is appointed when a dispute arises from the Panel of Arbitrators below. The referring party nominates an Arbitrator, which nomination is either accepted or rejected by the other party. In the instance of a rejection of the nominated *Arbitrator*, the referring Party refers the appointment deadlock to the Chairman of the Johannesburg Bar Council, who appoints an *Arbitrator* listed in the Panel of *Arbitrators* below

Name	Location	Contact details (phone & e mail)
Adv. Ghandi Badela	Gauteng	+27 11 282 3700 <a href="mailto:ghandi@badela.co.za">ghandi@badela.co.za</a>
Mr. Errol Tate Pr. Eng.	Durban	+27 11 262 4001 <a href="mailto:Errol.tate@mweb.co.za">Errol.tate@mweb.co.za</a>
Adv. Saleem Ebrahim	Gauteng	+27 11 535-1800 <a href="mailto:salimebrahim@mweb.co.za">salimebrahim@mweb.co.za</a>
Mr. Sebe Msutwana Pr. Eng.	Gauteng	+27 11 442 8555 <a href="mailto:sebe@civilprojects.co.za">sebe@civilprojects.co.za</a>
Mr. Sam Amod	Gauteng	<a href="mailto:sam@samamod.com">sam@samamod.com</a>
Adv. Sias Ryneke SC	Gauteng	083 653 2281 <a href="mailto:ryneke@duma.nokwe.co.za">ryneke@duma.nokwe.co.za</a>
Mr. Emeka Ogbugo (Quantity Surveyor)	Pretoria	+27 12 349 2027 <a href="mailto:emeka@gosiame.co.za">emeka@gosiame.co.za</a>

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**Z16 Notification of a compensation event**


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**Z16.1** Delete “eight weeks” in clause 61.3 and replace with “four weeks”. Delete the words “unless the event arises from the Project Manager or the Supervisor giving an instruction, issuing a certificate, changing an earlier decision or correcting an assumption.”

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**Z17 BBEE Certificate**


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**Z17.1** The *Contractor* shall be expected to annually present a compliant BEE Certificate. Failure to do adhere to these requirements shall be considered a material breach of the conditions of this Contract, the sanction for which may be a cancellation of this Contract.

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**Z18 Communication**


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**Z18.1** **Add a new Core Clause** 14.5 and 14.6 to read as follows:  
The *Project Manager* requires the written consent of the Employer if an action will result in a change to the design, scope, and Works information that is 5% or more

**Z18.2** The *Project Manager* requires the written consent of the Employer if an action will result in the Completion Date being extended by more than 30 days.

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**Z19      Delegation**

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As stipulated by Section 37(2) of the Occupational Health and Safety Act No. 85 of 1993 as amended the *Contractor* agrees to the following:

**Z19.1**      As part of this contract the *Contractor* acknowledge that it (mandatory) is an employer in its own right with duties as prescribed in the Occupational Health and Safety Act No 85 of 1993 as amended and agree to ensure that all work being performed, or Equipment, Plant and Materials being used, are in accordance with the provisions of the said Act, and in particular with regard to the Construction Regulations

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**PART C1.2b CONTRACT DATA****PART TWO – DATA PROVIDED BY THE CONTRACTOR**

<b>Clause</b>	<b>Statement</b>	<b>Data</b>
10.1	The Contractor is (Name): Address:  Telephone No. Fax No.	
11.2	The <i>working areas</i> are	Only the Site Area. See C4 'Site Information'
24.1	The <i>Contractor's Key people</i> are:	<b>CV's to be appended to Tender Schedule</b>
	Name:	
	Job:	
	Responsibility:	
	Qualifications:	
	Experience:	
	Name:	
	Job:	
	Responsibility:	
	Qualifications:	
	Experience:	
	Name:	
	Job:	
	Responsibility:	
	Qualifications:	
	Experience:	

Name:

Job:

Responsibility:

Qualifications:

Experience:

11.2	The <i>completion date</i> is	TBC
11.2	The following matters will be included in the Risk Register	<ul style="list-style-type: none"> <li>• Existing Services</li> <li>• Access to Site</li> <li>• Delay in supply of material and/or equipment</li> <li>• Progress of the works against the program</li> <li>• Travelling public and ACSA stakeholders</li> </ul>
11.2	The <i>Works Information</i> is in	Part C3 'Scope of Works' section of this contract
31.1	The programme identified in the	Programme listed in Schedule 6 of Part T2.2

**Part C1: Agreements and Contract Data**

**C1.3: Form of Guarantee**

**PRO FORMA FOR PERFORMANCE BOND**

**PERFORMANCE BOND**

**[TO BE REPLICATED ON BANK'S LETTERHEAD]**

Brief description of contract.....

Name and address of Beneficiary.....

..... (whom the contract defines as the Contractor).

We, the undersigned ..... and..... in our capacities as Guarantor's..... of ..... (**Registration Number: ...**) (hereinafter called "the Bank") have been informed that ..... hereinafter called the 'Principal') is your Contractor under such contract, which requires him to obtain an irrevocable, unconditional performance security.

At the request of the Principal, we .....(name of bank) hereby irrevocably undertake to pay you, the Employer, any sum or sums not exceeding in total the amount of .....(the "Guaranteed Amount") upon receipt by us of your first written demand stating that such an amount (or lesser amount) as may be claimed is due and payable to the Employer.

This guarantee constitute an irrevocable, unconditional, non-negotiable and non-transferable undertaking to pay in accordance with the above, subject to the proviso that this Letter will not be interpreted as extending the Bank's liability to anything more than the Guaranteed Amount.

Notwithstanding anything to the contrary herein contained, the Bank's obligation shall be construed as principal and not as accessory to the contract and shall not be delayed or discharged by the fact that a dispute exists between the Employer and the Contractor.

We undertake to pay you such Guaranteed Amount upon receipt by us, within such period of 14 days, of your first written demand stating that such an amount (or lesser amount) as may be claimed is due and payable to the Employer.

The guarantee shall be governed by and construed in accordance with the laws of the Republic of South Africa

Signed at \_\_\_\_\_ on \_\_\_\_\_ 20....

For:  
**Registration Number:**

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**Name & Position**

As witnesses:

1. \_\_\_\_\_

2. \_\_\_\_\_

**PART C1: AGREEMENTS AND CONTRACT DATA**

**C1.4: OCCUPATIONAL HEALTH AND SAFETY AGREEMENT**

**OCCUPATIONAL HEALTH AND SAFETY AGREEMENT**

**AGREEMENT IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH & SAFETY ACT (ACT 85 Of 1993) & CONSTRUCTION REGULATION 5.1(k)**

**OBJECTIVES**

To assist Airport Company South Africa (ACSA) in order to comply with the requirements of:

1. The Occupational Health & Safety (Act 85 of 1993) and its regulations and
2. The Compensation for Occupational Injuries & Diseases Act (Act 130 of 1993) also known as the (COID Act).

**To this end an Agreement must be concluded before any contractor/ subcontracted work may commence**

**The parties to this Agreement are:**

<b>Name of Organisation:</b>  <b>AIRPORTS COMPANY SOUTH AFRICA KING PHALO AIRPORT</b>
<b>Physical Address:</b> <b>Airport Company South Africa 68 Settlersway Greenfields East London 5200</b>

**Hereinafter referred to as “Client”**

<b>Name of organisation:</b>
<b>Physical Address</b>

**Hereinafter referred to as “the Mandatary/ Principal Contractor”**

**MANDATORY'S MAIN SCOPE OF WORK**

***CONSTRUCTION OF A 650 KWP PHOTOVOLTAIC PLANT AT KING PHALO AIRPORT***

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**GENERAL INFORMATION FORMING PART OF THIS AGREEMENT**

1. The Occupational Health & Safety Act comprises of SECTION 1-50 and all unrepealed REGULATIONS promulgated in terms of the former Machinery and Occupational Safety Act No.6 of 1983 as amended as well as other REGULATIONS which may be promulgated in terms of the Act and other relevant Acts pertaining to the job in hand.
2. "Mandatory" is defined as including as agent, a principal contractor or a contractor for work, but WITHOUT DEROGATING FROM HIS/HER STATUS IN HIS/HER RIGHT AS AN EMPLOYER or user of the plant
3. Section 37 of the Occupational Health & Safety Act potentially punishes Employers (PRINCIPAL CONTRACTOR) for unlawful acts or omissions of Mandataries (CONTRACTORS) save where a Written Agreement between the parties has been concluded containing arrangements and procedures to ensure compliance with the said Act BY THE MANDATARY.
4. All documents attached or refer to in the above Agreement form an integral part of the Agreement.
5. To perform in terms of this agreement Mandataries must be familiar and conversant with the relevant provisions of the Occupational Health & Safety Act 85 of 1993 (OHS Act) and applicable Regulations.
6. Mandatories who utilise the services of their own Mandatories (contractors) must conclude a similar Written Agreement with them.
7. Be advised that this Agreement places the onus on the Mandatory to contact the CLIENT in the event of inability to perform as per this Agreement.
8. This Agreement shall be binding for all work the Mandatory undertakes for the client.
9. All documentation according to the Safety checklist including a copy of the written Construction Manager appointment in terms of construction regulation 8, must be submitted 7 days before work commences.

**THE UNDERTAKING**

The Mandatory undertakes to comply with:

**INSURANCE**

1. The Mandatory warrants that all their employees and/or their contractor's employees if any are covered in terms of the COID Act, which shall remain in force whilst any such employees are present on the Client's premises. A letter is required prior commencing any work on site confirming that the Principal contractor or contractor is in good standing with the Compensation Fund or Licensed Insurer.
2. The Mandatory warrants that they are in possession of the following insurance cover, which cover shall remain in force whilst they and /or their employees are present on the Client's premises, or which shall remain in force for that duration of their contractual relationship with the Client, whichever period is the longest.
  - a. Public Liability Insurance Cover as required by the Subcontract Agreement.
  - b. Any other Insurance cover that will adequately makes provision for any possible losses and/or claims arising from their and /or their Subcontractors and/or their respective employee's acts

and/or omissions on the Client's premises.

<b>COMPLIANCE WITH THE OCCUPATIONAL HEALTH &amp; SAFETY ACT 85 OF 1993</b>
--

The Mandatary undertakes to ensure that they and/or their subcontractors if any and/or their respective employees will at all times comply with the following conditions:

1. All work performed by the Mandatary on the Client's premises must be performed under the close supervision of the Mandatary's employees who are to be trained to understand the hazards associated with any work that the Mandatary performs on the Client's premises.
2. The Mandatary shall be assigned the responsibility in terms of Section 16(1) of the OHSAct 85 of 1993, if the Mandatary assigns any duty in terms of Section 16(2), a copy of such written assignment shall immediately be forwarded to the Client.
3. The Mandatary shall ensure that he/she familiarise himself/herself with the requirements of the OHSAct 85 of 1993 and that s/he and his/her employees and any of his subcontractors comply with the requirements.
4. The Mandatary shall ensure that a baseline risk assessment is performed by a competent person before commencement of any work in the Client's premises. A baseline risk assessment document will include identification of hazards and risk, analysis and evaluation of the risks and hazards identified, a documented plan and safe work procedures to mitigate, reduce or control the risks identified, and a monitoring and review plan of the risks and hazards.
5. The Mandatary shall appoint competent persons who shall be trained on any Occupational Health & Safety aspect pertaining to them or to the work that is to be performed.
6. The Mandatary shall ensure that discipline regarding Occupational Health & Safety shall be strictly enforced.
7. Any personal protective equipment required shall be issued by the Mandatary to his/her employees and shall be worn at all times.
8. Written safe working practices/procedures and precautionary measures shall be made available and enforced and all employees shall be made conversant with the contents of these practises.
9. No unsafe equipment/machinery and/or articles shall be used by the Mandatary or contractor on the Client's premises.
10. All incidents/accidents referred to in OHSAct shall be reported by the Mandatary to the Provincial Director: Department of Labour as well as to the Client.
11. No user shall be made by the Mandatary and/or their employees and or their subcontractors of any of the Client's machinery/article/substance/plant/personal protective equipment without prior written approval.
12. The Mandatary shall ensure that work for which the issuing of permit is required shall not be performed prior to the obtaining of a duly completed approved permit.
13. The Mandatary shall ensure that no alcohol or any other intoxicating substance shall be allowed on the Client's premises. Anyone suspected to be under the influence of alcohol or any other intoxicating substance shall not be allowed on the premises. Anyone found on the premises suspected to be under the influence of alcohol or any other intoxicating substance shall be escorted off the said premises immediately.
14. Full participation by the Mandatary shall be given to the employees of the Client if and when they inquire into Occupational Health & Safety.

**FURTHER UNDERTAKING**

1. Only a duly authorised representative appointed in terms of Section 16.2 of the OHS Act is eligible to sign this agreement on behalf of the Mandatary. The signing power of this representative must be designated in writing by the Chief Executive Officer of the Mandatary. A copy of this letter must be made available to the Client.
2. The Mandatary confirms that he has been informed that he must report to the Client's management, in writing anything he/she deems to be unhealthy and /or unsafe. He has versed his employees in this regard.
3. The Mandatary warrants that he/she shall not endanger the health & safety of the Client's employees and other persons in any way whilst performing work on the Client's premises.
4. The Mandatary understands that no work may commence on the Client's premises until this procedure is duly completed, signed and received by the Client.
5. Non-compliance with any of the above clauses may lead to an immediate cancellation of the contract.

**ACCEPTANCE BY MANDATARY**

In terms of section 37(2) of the Occupational Health & Safety Act 85 of 1993 and section 5.1(k) of the Construction Regulations 2014,

I ..... a duly authorised 16.2 Appointee acting for and on behalf of ..... (company name) undertake to ensure that the requirements and the provision of the OHSAct 85 of 1993 and its regulations are complied with.

Mandatary – WCA/ Federated Employers Mutual No.....

Expiry date .....

\_\_\_\_\_  
**SIGNATURE ON BEHALF OF MANDATARY**  
(Warrant his authority to sign)

\_\_\_\_\_  
**DATE**

\_\_\_\_\_  
**SIGNATURE ON BEHALF OF THE CLIENT**  
**AIRPORT COMPANY SOUTH AFRICA**

\_\_\_\_\_  
**DATE**

## **PART C1: AGREEMENTS AND CONTRACT DATA**

### **C1.5: ACSA INSURANCE CLAUSES**

#### **INSURANCE CLAUSES FOR CAPEX PROJECTS**

The insurance clauses in this document should be extracted and attached to tender documents and to contracts.

#### **SECTION A: DEFINITIONS**

**Landside** refers to:

- Areas of the airport before the security points, and
- The restricted area beyond the security points but, within the perimeter of gatehouses, passenger terminals and cargo buildings

**Airside** refers to:

- The Apron / manoeuvring areas
- Area within the airside boundary/perimeter fence, excluding the internal areas of the passenger terminals, perimeter gatehouses and cargo building.

#### **SECTION B: INSURANCE CLAUSES**

##### **1. Insurance requirements for contracts with a value below R50million on the LANDSIDE**

###### **1.1 Contract Works**

- With regards to contract works claims, the contractor/consultant is responsible for a deductible (excess) of R250 000.
- Contractors / consultants may re-insure the deductible

###### **1.2 Public Liability**

- In the event of a claim against the contractor / consultant for 3<sup>rd</sup> party property damage the contractor / consultant will be responsible for a deductible (excess) of R275 000
- In the event of a claim against the contractor / consultant for removal of lateral support, the contractor / consultant will be responsible for a deductible (excess) of R500 000
- Contractors / consultants may re-insure the deductibles

###### **1.3 Professional Indemnity**

- All consultants are responsible for Professional Indemnity cover of R5million
- Contractors who have a material design element, excluding typical P & G related work, as part of their scope, are responsible for Professional Indemnity cover of R5million

- In the event of a claim above R5million, the ACSA PI cover will kick in for the amount in excess of R5m.
- Proof of cover in the form of a certificate of insurance should be provided to ACSA before a contract is signed between ACSA and the contractor and/or consultant.

## **2. Insurance requirements for contracts below R50million on the AIRSIDE**

### **2.1 Contract Works**

- With regards to contract works claims, the contractor / consultant is responsible for a deductible (excess) of R250 000.
- Contractors / consultants may re-insure the deductible

### **2.2 Public Liability**

- In the event of a claim brought against the contractor / consultant for 3<sup>rd</sup> party property damage the contractor / consultant will be responsible for a deductible (excess) of R525 000
- In the event of a claim brought against the contractor / consultant for removal of lateral support, the contractor / consultant will be responsible for a deductible (excess) of R650 000
- In the event of a claim brought against the contractor / consultant for damage to aircraft, the contractor / consultant will be responsible for a deductible (excess) of R650 000
- Contractors / consultants may re-insure the deductibles

### **2.3 Professional Indemnity**

- All consultants are responsible for Professional Indemnity cover of R5million
- Contractors who have a material design element, excluding typical P & G related work, as part of their scope, are responsible for a Professional Indemnity cover of R5million.
- In the event of a claim above R5million, the ACSA PI cover will kick in for the amount in excess of R5million.
- Proof of cover in the form of a certificate of insurance should be provided to ACSA before a contract is signed between ACSA and the contractor and/or consultant.

## **3. Insurance requirements for contracts with a value above R50 million on the LANDSIDE**

- Contracts with a value of more R50 million are not automatically covered under the construction policies. A separate quote is provided by insurers per contract.

### **3.1 Contract Works**

With regards to contract works claims, the contractor / consultant is responsible for the following deductibles:

- All Civil Work and Earthworks – R300 000 deductible (excess)
- All other claims – R300 000 deductible (excess)
- Other property insured – R700 000 deductible (excess)

- Contractors / consultants may re-insure the deductibles

### **3.2 Public Liability**

- In the event of a claim brought against the contractor / consultant for 3<sup>rd</sup> party property damage the contractor / consultant will be responsible for a deductible (excess) of R275 000
- In the event of a claim brought against the contractor / consultant for removal of lateral support, the contractor / consultant will be responsible for a deductible (excess) of R500 000
- Contractors / consultants may re-insure the deductibles

### **3.3 Professional Indemnity**

- All consultants are responsible for Professional Indemnity cover of R10million
- Contractors who have a material design element, excluding typical P & G related work, as part of their scope, are responsible for a Professional Indemnity cover of R10million
- In the event of a claim above R10million, the ACSA PI cover will kick in for the amount in excess of R10m
- Proof of cover in the form of a certificate of insurance should be provided to ACSA before a contract is signed between ACSA and the contractor and/or consultant.

## **4. Insurance requirements for contracts with a value above R50 million on the AIRSIDE**

- Contracts with a value of more R50 million are not automatically covered under the construction policies. A separate quote is provided by insurers per contract.

### **4.1 Contract Works**

With regards to contract works claims, the contractor / consultant is responsible for the following deductibles:

- All Civil Work and Earthworks excluding Runways – R300 000 deductible (excess)
- Runway Rehabilitation – R300 000 deductible (excess)
- New Runway Construction – R700 000 deductible (excess)
- All other claims – R300 000 deductible (excess)
- Other property insured – R700 000 deductible (excess)
- Contractors / consultants may re-insure the deductibles

### **4.2 Public Liability**

- In the event of a claim brought against the contractor / consultant for 3<sup>rd</sup> party property damages the contractor / consultant will be responsible for a deductible (excess) of R1 025 000

- In the event of a claim brought against the contractor / consultant for removal of lateral support, the contractor / consultant will be responsible for a deductible (excess) of R1 250 000
- In the event of a claim for damage to aircraft, the contractor / consultant will be responsible for a deductible (excess) of R1 250 000
- Contractors / consultants may re-insure the deductibles

#### **4.3 Professional Indemnity**

- All consultants are responsible for Professional Indemnity cover of R10million
- Contractors who have a material design element, excluding typical P & G related work, as part of their scope, are responsible for a Professional Indemnity cover of R10million
- In the event of a claim above R10million, the ACSA PI cover will kick in for the amount in excess of R10m
- Proof of cover in the form of a certificate of insurance should be provided to ACSA before a contract is signed between ACSA and the contractor and/or consultant.

## AIRPORTS COMPANY OF SOUTH AFRICA

### CONTRACT NO: ELA 6940/2022/RFP – CONSTRUCTION OF A 650 KWP PHOTOVOLTAIC PLANT AT KING PHALO AIRPORT

#### C2.1 Pricing Assumptions and General Notes

1. The contractor shall, as per the NEC3, contract option A: Priced contract with activity schedule provide a fully priced activity schedule, to be handed in with this tender.
2. A reference bill of quantities is provided with the documentation. The reference bill of quantities aims provide information to the contractor in regard to measured quantities, distances, etc.
3. The reference bill of quantities also provides an overview to the contractor on which items is expected to be included in the works, and serve as a checklist to the contractor to ensure all items are accounted for.
4. The reference Bill of Quantities contain pages numbered consecutively in each bill as indicated in the Master Index. Before the Bidder submits his Bid, he should check the number of pages, and if any are found missing or duplicated or the figures or writing indistinct, or the Bill of Quantities contain any obvious errors, he should apply to the Engineer at once and have same rectified, as no liability whatsoever will be admitted by the Engineer in respect of errors in the Bid due to the foregoing.
5. The Total Bid Sum shall include the Contract Price for the Civil related works and Building Related works of the successful Bidder. They are advised to check their item extensions and total additions, as no claim for arithmetical errors will be considered.
6. The Priced schedule of activities of the successful Bidder will be checked and the Engineer reserves the right to call for reasonable adjustments to any individual price and to rectify any discrepancy, whilst the Total Bid Price, as submitted, remains unaltered.
7. The responsibility for the accuracy of the quantities written into the activity schedule remains with the party who prepared the activity schedule. The Bidder are to ensure that the measuring of quantities at the tender stage, and the Bid Sum submitted are correct and include all items required for the installation of the works, as described in the works information section of this document.
8. The quantities in the reference Bill of Quantities are not to be used for ordering purposes. Quantities set out in this document are to be regarded as provisional only. The activity schedule provided by the bidder shall supersede the reference bill of quantities.
9. **Unless separate rates for the supply and for the installation of any item is specifically called for, the supply and installation costs of any item shall be fully included in the unit price.**

The description of each item shall, unless otherwise stated herein, be held to include making, conveying and delivering, unloading, storing, unpacking, hoisting, setting, fitting and fixing in position, cutting and waste, patterns, models and templates, plant, temporary works, return of packings, establishment charges, profit and all other obligations arising out of the Conditions of Contract.

11. Tenderers shall price the Preliminaries under any or all of three groups, via:
- (a) a Fixed Amount
  - (b) an amount varied in proportion to the Final Contract Value as compared to the Tender Price
  - (c) an amount varied in proportion to the Final Contract Period as compared to the Originally Specified Contract Period.

The allocation of prices to the three categories listed above must be realistic and the Contractor may be required to justify the allocation of the prices.

12. Provision is made on the Final Summary for the applicable Value Added Tax to be added, or not added, as indicated.
13. Abbreviations which may be used in the reference Bills of Quantities are as follows:

mm	=	millimetre	MPa	=	megapascal
m	=	metre	h	=	hour
km	=	kilometre	kg	=	kilogram
m <sup>2</sup>	=	square metre	t	=	ton (1000 kg)
m <sup>2</sup> .pass	=	square metre-pass	No.	=	number
ha	=	hectare	sum	=	lump sum
m <sup>3</sup>	=	cubic metre	MN	=	meganewton
m <sup>3</sup> .km	=	cubic metre-kilometre	P C sum	=	Prime Cost sum
l	=	litre	Prov sum	=	Provisional sum
kl	=	kilolitre	kW	=	kilowatt
MI	=	megalitre	%	=	percent

14. All prices shall be tendered in South African Rands. Prices for equipment or material sourced from outside South Africa shall be subject to linear adjustment for movement in exchange rates. The tenderer shall specify the underlying foreign currency elements which were used for these elements. The day-rate of the South African Reserve Bank will be selected to determine the tenderer's final price on the day of appointment. The tenderer shall specify foreign currency elements in the table below.

Component	% Foreign Content	Currency	RoE to ZAR	Date	Indicator
Example: PV-modules	100%	USD	13.51	2017-08-11	SARS day-rate
Monitoring devices					
Cables					
Other: (specify)					

NAME OF FIRM: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

DATE: \_\_\_\_\_

**AIRPORTS COMPANY OF SOUTH AFRICA**

**CONTRACT NO: ELA 6940/2022/RFP – CONSTRUCTION OF A 650 KWP PHOTOVOLTAIC PLANT AT KING PHALO AIRPORT**

**C2.2 Schedule of Activities**

SUMMARY		Amount	
		R	c
ITEM NO.	DESCRIPTION		
1	Bill No 1: Preliminaries and General		
2	Bill No 2: Solar Installation		
3	Bill No 3: Electrical Infrastructure		
4	Bill No 4: Structural Works		
5	Bill No 5: Civil Works		
6	Bill No 6: PC Sums and Provisional Amounts		
7	Bill No 7: Operations and Maintenance		
<b>SUB-TOTAL</b>		R	
* <b>CONTINGENCIES</b> Allow the sum of <b>10%</b> (ten percent) of the above Sub-total for Contingencies to be spent as the Engineer may direct and to be deducted in whole or in part if not required.		R	
<b>TOTAL INCLUDING CONTINGENCIES</b>		R	
<b>VALUE ADDED TAX</b> _____ ADD: VAT at the rate of 15%		R	
<b>TOTAL Carried to part C1.1 Form of Offer and Acceptance</b>		R	
<b>CONTRACT PERIOD: .....WEEKS</b>			
* Amount allowed for the use of the Engineer only.			

**DETAILED BILL OF QUANTITIES**

<b>ITEM</b>	<b>DESCRIPTION</b>	<b>UNIT</b>	<b>QTY</b>	<b>RATE</b>	<b>AMOUNT</b>
	<b><u>BILL NO. 1</u></b>				
	<b><u>PRELIMINARIES AND GENERAL</u></b>	-			
1	Fixed costs	Item	1		
2	Time-Related costs	Item	1		
3	Value-related costs	Item	1		
4	Generator hire	Item	1		
5	Training of maintenance and operator personnel	Item	1		
6	Permits Required for all construction workers, vehicles, etc. for the works	SUM	1		
7	Dismantling and removal of equipment, including administrative works	Item	1		
8	Any additional items to be listed	Item	1		
9	Design & Engineering	Item	1		
	<b>TOTAL (Excluding VAT) - CARRIED TO FINAL SUMMARY</b>				

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	<b><u>BILL NO. 2</u></b>				
	<b><u>SOLAR INSTALLATION</u></b>	-			
	- <b><u>PV Modules</u></b>	-			
	PV modules to meet local content requirements as per specifications and shall be rated for a 25-year lifetime.	-			
1	Installation of 330 Wp ( <b>JKM33099-A</b> ) PV modules, with Anti-Reflective Coating (ARC),PV Modules supplied by client	Item	1 976		
	- <b><u>Inverters</u></b>	-			
	Inverter installation rates are to include all programming, commissioning, mounting brackets, installation, etc. Inverters are to include a conopy to protect the inverter from direct sunlight and rain	-			
2	Installation of 36 kW ( <b>SUN200-36KTL</b> ) Inverters, inverters supplied by client	Item	17		
	- <b><u>Cabling and Electrical Distribution</u></b>	-			
	Cabling, switchgear and enclosures to meet local content requirements as per specifications and shall be rated for a lifespan of 25 years in an outdoor environment. Cables shall be UV protected. Enclosures shall be certified for a 25-year lifespan in outdoor conditions and shall have a rating of at least IP44 for outdoor installations. All DC and AC cables shall be labelled at 3-metre intervals using UV-resistant labels which are mechanically attached to the cables using cable ties or similar methods. Rates for distribution boards and combiner boxes shall include all enclosures, switchgear, fuses, glands, busbars, and labels required for a complete, fit for purpose installation. All new DC and AC boards shall be clearly labelled as a secondary supply derived from a solar photovoltaic installation. Similarly, the existing DB to which the PV system is connected shall also be labelled appropriately to indicate a secondary supply.	-			
3	AC and DC Cabling	Item	1		

<b>SOLAR INSTALLATION - CARRIED FORWARD</b>					
<b>ITEM</b>	<b>DESCRIPTION</b>	<b>UNIT</b>	<b>QTY</b>	<b>RATE</b>	<b>AMOUNT</b>
	<b>Brought Forward</b>				
4	Cable labelling	Item	1		
5	AC distribution boards	Item	1		
6	DC distribution boards	Item	1		
	<b><u>Wireways</u></b>	-			
		-			
7	Conduit, trunking, cable trays, cable ladders, etc.	Item	1		
	<b><u>Control and Monitoring</u></b>	-			
		-			
	Only applicable in the event that the inverters does not provide control and monitoring	-			
		-			
8	Control and monitoring hardware, software, and licences	Item	1		
	<b><u>Weather Station</u></b>	-			
		-			
		-			
	A weather monitoring station shall be included for the purposes of benchmarking the performance of the PV installation. The weather station shall measure ambient air temperature and PV module temperature and shall have a pyranometer and anemometer (speed and direction). The weather station shall be connected to the client / end-user network system via TCP/IP Ethernet and all data shall be collected and stored in a system which is accessible by the end-user	-			
9	Weather Station installation, Pyranometer supplied by client	No	1		
<b>SOLAR INSTALLATION - CARRIED FORWARD</b>					

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	<b>Brought Forward</b>				
	- <b><u>Lightning Protection and Surge Arrest</u></b>	-			
	All components of the system must be earthed and bonded in accordance with SANS 10142-1 and other applicable standards. Rates for earthing and bonding must be included in the sections above for PV modules, inverters, cabling and wireways. Additionally, the contractor shall ensure that the PV installation is sufficiently protected from lightning strikes and surges.	-			
10	Lightning Protection Installation	No	1		
	- <b><u>Information Display</u></b>	-			
	Information Display to provide infographic information to the public in regard to energy produced, equivalent environmental impact, etc. To include display installed in terminal building (electrical works included), wireless communication from plant to display (appropriate for use at airport), etc.	-			
11	Display installation	Item	1		
12	Display software	Item	1		
13	Wireless communications/internet connection	Item	1		
	- <b><u>Testing, Commissioning and Handover</u></b>	-			
	Only applicable in the event that the inverters does not provide control and monitoring	-			
14	Preparation of acceptance tests, for approval	Item	1		
15	Preparation of as-built drawings and documentation	Item	1		
16	Preparation of handover documentation	Item	1		
17	Commissioning of equipment including CoC	No	1		
	<b><u>Training</u></b>				
18	Training of client and end-user staff	No	1		

	<b>TOTAL (Excluding VAT) - CARRIED TO FINAL SUMMARY</b>				
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ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	<b><u>BILL NO. 3</u></b>				
	<b><u>ELECTRICAL INFRASTRUCTURE</u></b>	-			
	-	-			
	<b><u>Transformer to distribute over 11kV network</u></b>	-			
	Client supplied, 800kVA dry type mini-sub complete with ABB RMU, including enclosure, temperature sensor, etc.				
1	Mini-Sub Installation, including transportation from current location to site, approximately 1800m.	Item	1		
	Minisub Transformer earthing installation, to be installed in the minisub. To include earth bar in Minisub and bonding				
2	Supply and Install Minisub plinth	No	1		
3	Supply and Install	No	1		
	-	-			
	<b><u>Cabling</u></b>	-			
4	70mm <sup>2</sup> 3-Core XLPE MV cable installed in trenches	m	1 164		
5	Labour	m	1 714		
6	70mm <sup>2</sup> BCEW installed in trenches	m	1 714		
7	70mm <sup>2</sup> 3-Core XLPE MV cable terminations	No	4		
8	70mm <sup>2</sup> BCEW cable terminations	No	4		
9	70mm <sup>2</sup> 3-Core XLPE MV cable joints	No	1		
10	25mm <sup>2</sup> 4-Core Cu PVC SWA armoured 600V/1000V cable	m	20		
11	25mm <sup>2</sup> 4-Core Cu PVC SWA armoured 600V/1000V cable terminations	No	4		
12	70mm <sup>2</sup> BCEW	m	120		

13	70mm <sup>2</sup> BCEW terminations	No	36		
	Trenching for MV cable reticulation, including excavation, bedding, backfill, warning tape, etc., as per MV trench detail	-			
14	Excavation	m	550		
	<u>Cable test</u>	-			
		-			
15	11kV Cable Pressure test	No	2		
	<u>Commissioning of installation</u>				
16	Coordination to Integrate into main MV network	No	1		
17	Commissioning of equipment including CoC	No	1		
	<b>TOTAL (Excluding VAT) - CARRIED TO FINAL SUMMARY</b>				

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	<b><u>BILL NO. 4</u></b>				
	<b><u>PV Module Mounting Frames</u></b>	-			
	Installation of PV Mounting frames including assembly and transporting from current location within the airport to site, approximately 1800m. Frames supplied by client	Item	1,00		
	<b>TOTAL (Excluding VAT) - CARRIED TO FINAL SUMMARY</b>				

PAYMENT REFERS TO	ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		<b><u>BILL NO. 5</u></b> <b>Civil Works</b>				
SABS 1200 A	<b>110.00</b>	<b><u>GENERAL</u></b>				
8.3.1	<b>110.01</b>	<b>Fixed-charge and value-related items:</b>				
		.01 Fixed preliminary and general charges	Lump Sum	1,00		
8.4.1	<b>110.02</b>	<b>Scheduled time-related items:</b>				
		.01 Time-related preliminary and general charges	Lump Sum	1,00		
PSA 8.6	110.04	<b>Prime Cost Sums:</b>				
		.01 Additional tests required by the Engineer				
		.01 Soil Tests	No	5		
8.8.4	110.05	<b>Existing services</b>				
		.03 Excavation by hand in soft material to expose all services	m <sup>3</sup>	35		
SABS 1200 C	<b>130.00</b>	<b><u>SITE CLEARANCE</u></b>				
PSC 8.2.1	<b>130.01</b>	<b>Clear and grub:</b>				
		.01 Areas	m <sup>2</sup>	11 500,00		
8.2.2	<b>130.02</b>	<b>Remove and grub large trees and tree stumps of girth:</b>				
		.01 Over 1m and up to and including 2m	No	30,00		

8.2.10	130.11	<b>Remove topsoil to a nominal depth of 150mm and stockpile</b>	m <sup>3</sup>	1125		
SANS 1200D	140.00	- <b><u>EARTHWORKS</u></b>				
PSD 8.3.2	140.01	<b>Bulk Excavation</b>  (a) Excavate in all materials not exceeding 2m deep and use for embankment or backfill or spoil within 2km free haul distance	m <sup>3</sup>	1 500,00		
8.3.4	140.02	<b>Importing of Materials</b>  (a) Extra over for importation of materials from commercial source or from borrow pits .01 Selected backfilling, G7 material, at 95% Compaction	m <sup>3</sup>	200,00		
8.3.11	140.09	<b>Grassing or other vegetation cover</b>  .01 Re-top-soiling and Hydro-seeding. Excavate, load, haul and place from stockpile in 150mm thick layers not compacted including supply and installation of Hydro-seeding.	m <sup>2</sup>	4 000,00		
SANS 1200 MK		- <b><u>KERBING AND CHANNELLING</u></b>				
8.2.7		<b>Trimming of excavations for concrete-lined open drains in:</b>  .01 Soft material	m <sup>2</sup>	580		
SABS 1200 LE	214.00	<b><u>STORMWATER DRAINAGE</u></b>				
PSLE 8.2.14	214.16	<b>Inlet, outlet and other structures:</b>				

PA 12		(a) Benching in grade 25 MPa concrete with 20 mm rendering	m <sup>3</sup>	1,30		
		(b) 150mm Stone pitching	m <sup>2</sup>	2,50		
	<b>PA.01</b>	<b><u>FENCING</u></b>  <b>Supply and erection of new fencing material:</b>				
		.01 2.2m ClearVu Fence, Spikes, Posts	no	246,00		
	<b>PA.02</b>	<b>Gates:</b>  .01 Double leaf 3m per side ClearVu Gate	no	247,00		
	<b>PA.03</b>	<b>Installation</b> Dig, Erect, Cement	m	540,00		
			<b>TOTAL (Excluding VAT) - CARRIED TO FINAL SUMMARY</b>			

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	<b><u>BILL NO. 7</u></b>				
	<b><u>PC SUMS AND PROVISIONAL AMOUNTS</u></b>	-			
	<b><u>PC SUMS</u></b>	-			
1	CCTV and Security Lighting installation including mounting poles, distribution boards, cabling, electrical works, trenching, licencing, etc.	Item	1	R 1 580 800,00	R 1 580 800,00

2	extension poles for mounting structure, etc.	Item	1	R 300 000,00	R 300 000,00
3	Allow for profit and attendance	%	5%		R 79 040,00
	<b>TOTAL (Excluding VAT) - CARRIED TO FINAL SUMMARY</b>				<b>R 1 959 840,00</b>

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	<b><u>BILL NO. 7</u></b>				
	<b><u>OPERATIONS AND MAINTENANCE</u></b>				
	<b>Spare Stock</b>				
	<b>It shall be expressly noted that the award of the operations and maintenance portion of the contract is at the sole discretion of the Employer.</b>				
	Minimum inventory as to be stated on maintenance manual to be provided by contractor at time of completion.				
1	Maintenance minimum inventory stock	Item	1		
2	Training Manuals, operating instructions, etc.	Item	1		
3	Training on operation and maintenance of the installation	Item	1		
	<b>TOTAL (Excluding VAT) - CARRIED TO FINAL SUMMARY</b>				

**AIRPORTS COMPANY OF SOUTH AFRICA**

**CONTRACT NO: ELA 6940/2022/RFP – CONSTRUCTION OF A 650 KWP PHOTOVOLTAIC PLANT AT KING PHALO AIRPORT**

**C2.3 DECLARATION (In respect of completeness of Tender)**

I/we, the undersigned, do hereby declare that these are the properly priced according to part C2.2 of this Contract Document in consecutive order upon which my/our tender for **BID NO. : ELA 6940/2022/RFP CONSTRUCTION OF A 650 KWP PHOTOVOLTAIC PLANT AT KING PHALO AIRPORT** has been based.

-----  
SIGNATURE OF TENDERER/S

-----  
DATE

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**Part C3: Scope of Works**

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**Table of Contents**

<b>1 Introduction</b> .....	<b>56 -</b>
<b>2 Description of Works</b> .....	<b>57 -</b>
<b>3 Contract Management</b> .....	<b>59 -</b>
<b>4 Procurement</b> .....	<b>61 -</b>
<b>5 Construction</b> .....	<b>62 -</b>
<b>6 Previous Contractor Specifications</b> .....	<b>64 -</b>
<b>7 Operation and Maintenance</b> .....	<b>75 -</b>

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**C3: Employer's Works Information****TERMS AND ABBREVIATIONS**

<b>ACSA</b>	<b>AIRPORTS COMPANY OF SOUTH AFRICA SOC LIMITED</b>
<b>ARC</b>	<b>ANTI-REFLECTIVE COATING</b>
<b>CAD</b>	<b>COMPUTER AIDED DESIGN</b>
<b>GRID</b>	<b>THE TERM "GRID" IN THIS DOCUMENT REFERS TO THE LOCAL INTERNAL ELECTRICAL NETWORK OF THE JOHN ORR BUILDING, UNLESS OTHERWISE STATED.</b>
<b>KVA</b>	<b>KILOVOLT-AMPERE, A MEASUREMENT OF APPARENT ELECTRICAL POWER (1000 VA).</b>
<b>KW</b>	<b>KILOWATT, A MEASUREMENT OF ELECTRICAL POWER (1,000 WATT).</b>
<b>KWP</b>	<b>KILOWATT-PEAK, NORMALLY USED IN THE CONTEXT OF SOLAR PV SYSTEMS.</b>
<b>MPPT</b>	<b>MAXIMUM POWER POINT TRACKING, A SYSTEM INCORPORATED INTO GRID-TIE INVERTERS TO OBTAIN MAXIMUM POWER FROM SOLAR PV MODULES.</b>
<b>MW</b>	<b>MEGAWATT, A MEASUREMENT OF ELECTRICAL POWER (1,000,000 WATT).</b>
<b>MWP</b>	<b>MEGAWATT-PEAK, NORMALLY USED IN THE CONTEXT OF SOLAR PV SYSTEMS.</b>
<b>NERSA</b>	<b>NATIONAL ENERGY REGULATOR OF SOUTH AFRICA.</b>
<b>PV</b>	<b>PHOTOVOLTAIC (WITH REFERENCE TO PHOTOVOLTAIC SOLAR PANELS).</b>
<b>SANS</b>	<b>SOUTH AFRICAN NATIONAL STANDARDS.</b>
<b>SCADA</b>	<b>SUPERVISORY CONTROL AND DATA ACQUISITION, AN INDUSTRIAL CONTROL COMPUTER SYSTEM.</b>
<b>SACAA</b>	<b>SOUTH AFRICAN CIVIL AVIATION AUTHORITY</b>
<b>SLA</b>	<b>SERVICE LEVEL AGREEMENT</b>
<b>VA</b>	<b>VOLT-AMPERE, A MEASUREMENT OF APPARENT ELECTRICAL POWER.</b>
<b>W</b>	<b>WATT, A MEASUREMENT OF ELECTRICAL POWER</b>
<b>WP</b>	<b>WATT-PEAK, NORMALLY USED IN THE CONTEXT OF SOLAR PV SYSTEMS.</b>

**Engineer:** "Engineer" referred to in the works information is synonymous to the Supervisor for this contract, which is Delta Built Environment Consultants, as stated in Part C1.2 Contract data.

**The Client:** "The Client" referred to in the works information is synonymous to the The Employer for this contract, which is Delta Built Environment Consultants, as stated in Part C1.2 Contract data.

## 1. Introduction

This document, with its annexures, covers the technical requirements for the installation of a 650 kWp ground-mount solar PV plant, for the King Phalo airport. The project includes the installation of already delivered, 330W, JinkoPV panels, installation of already delivered Huawei, SUN2000-36KTL inverters, installation of already delivered PiA Solar fixed tilted mounting structure, earthworks, a boundary fence, CCTV and flood lighting installation for the PV installation, installation of an already delivered 800 kVA minisub, and tie-in to the existing 11 kV medium voltage network. The PV plant installation is also to include a lightning protection system, a weather monitoring installation, and a PV system information display installation at the terminal building.

The contract shall also include a maintenance contract for the works, priced separately, for a period of 3-years.

The solar PV plant site is located at the King Phalo airport, at coordinates 33° 1'56.98"S , 27°49'54.51"E. The complete set of coordinates for the site boundaries are shown in the reference design drawings.

Tenderers should note that all the works are located within the airport's airside. All contractor personnel and vehicles will require permits and adhere to ACSA's requirements for working at airside.

Tenderers are advised to visit the site and acquaint themselves with all local conditions pertaining to the execution of the installation before the tender closing date. Arrangement with ACSA will be required for this purpose.

'Document' shall mean the complete set of contract documents, including the tender conditions, the reference specifications, the drawings, and the sample BoQ.

The contractor appointed according to this document shall serve as the main contractor for this project. All subcontractors employed by the contractor shall fall under the responsibility of the contractor and the contractor shall manage and report on their works accordingly.

## 2. Description of Works

### 2.1 Overview of the Works

A 650 kWp ground-mount solar PV installation is to be installed at the King Phalo Airport. The installation shall include all equipment installation, electrical works, and civil works required to provide a complete solution for the installation of the PV solar plant tied into the King Phalo airport electrical network.

Equipment that has already been delivered to site will be free issue to the contractor once site handover has been achieved.

### 2.2 Scope of the Works

The contractor's scope of works includes:

- Installation of Ground-mounted 330 Wp (**JKM33099-A**) PV panel including free-standing mounting structures, mounting structures and PV panels supplied by client.
- Installation of 36 kW (**SUN200-36KTL**) Inverters, inverters supplied by client
- Solar DC (direct current) combiner boxes
- All cabling required for the system
- Installation of a 800kVA dry type minisub complete with ABB RMU and Step-up transformer supplied by client.
- MV cable installation and connection to existing MV switchgear, including trenching
- Weather station for the PV installation in order to accurately evaluate performance of the system
- Lightning protection for the installation
- Boundary fence, as indicated on the tender drawings and as per the specification provided in this document
- Display terminal located in the King Phalo airport terminal building, providing information on the PV installation performance
- Storm water system
- All cabling required for the system, noting that some MV and DC cabling will be supplied by the client
- All earthworks required for the installation
- Installation of CCTV cameras and security lighting that complies with the specification provided in this document.

### 2.3 Extent of the Works

The Contractor is responsible for the design, supply of all the materials except for

the material supplied by client and all the labour, manufacture, delivery to site, offloading, construction, erection, installation, off-site testing, on-site testing, commissioning, performance testing, provision of samples, preparation of all detail design drawings, as-built record drawings, maintenance manuals, instructions for the works and training, in accordance with the general requirements and performance requirements as detailed in this document.

The following table comprise the list of material that has been procured by the client and safely stored on site for this project and will be free issued to the contractor.

**Table 0-2: Materials on Site already procured by client**

<b>King Phalo Airport Solar Installation - Material On Site</b>			
<b>item</b>	<b>Description</b>	<b>unit</b>	<b>Qty</b>
1	32mm nex tube	m	500
2	70mm <sup>2</sup> x 3 MV cable	m	600
3	Huawie SUN2000-36KTL Inverters	No	17
4	Solar cable EN50618 6mm <sup>2</sup> 1.5kV Black	m	1500
5	Solar cable EN50618 6mm <sup>2</sup> 1.5kV Red	m	1500
6	800kVA Dry Type minisub	No	1
7	MC4 DC Connectors	No	120
8	Junko JKM330PP-72	No	1976
9	Paranometer c/w steel pole	No	1
10	110V 3A BTU	No	3
11	50mm Flexible sprag	m	100
12	150mm Flexible sprag	m	50

The following items comprise the extent of the works for this project:

- Detailed design of PV plant based on performance specifications and PV panels specification provided in this document.
- Submission of design documents to employer and engineer for approval prior to commencement of installation and equipment procurement.
- Liaison with all relevant regulatory and municipal bodies, including all applications that may be relevant to this installation. See exclusions below.
- Procurement of the rest of the equipment not supplied by client and required for a successful installation, including replacement PV modules where applicable, balance of cables, wireways, balance of fixing structures where applicable, enclosures, lightning and surge protection equipment, data acquisition equipment, monitoring and control system, and all other peripheral equipment required for the successful installation and integration of the PV plant.
- Transportation of all equipment to site.
- Establishment of the contractor's office.
- Erection of temporary hoarding to separate construction and installation areas from public areas throughout the buildings under this contract.
- All signage as may be required in terms of the OHS Act.

- All civil work that may be required by the installation.
- Installation of all equipment as per scope of works and specifications.
- Installation of new wireways (existing wireways to be reused wherever possible).
- Integration of PV system with existing electrical network, according to all applicable regulations.
- Detail Design and installation of CCTV and security lighting based on the specification provided in this document.
- Detail Design and installation of boundary fence based on the specification provided in this document.
- Commissioning and start-up of PV plant.
- Preparation of acceptance test procedures.
- Submission of test procedure to employer and engineer for approval prior to commencement of acceptance tests.
- Conducting acceptance tests (to be witnessed by engineer).
- Submission of documentation as prescribed in employer's requirements.
- Training of Employer staff relating to the operation and maintenance of the PV installations.
- Delivery of spares and special test equipment.
- Finishing the site (removal of all hoarding, unused installation material, building rubble).

The following items are excluded from the works:

- All fees relating to municipal or regulatory applications are the responsibility of the employer.
- Council submission has been applied for the proposed solar installation, based on the reference design. It is the contractor's responsibility to ensure that the local municipal bodies are aware of any changes to the design and obtain approval for the new design.

The contractor will be responsible to coordinate any shut-down times required for the installation of equipment with ACSA. Due to the nature of the equipment, limited windows will be available for shutdowns and overruns on shutdown times are not acceptable.

### **3. Contract Management**

#### **3.1 Management Meetings**

Meetings will be held on a 2-weekly basis and chaired by Delta Built Environment Consultants. The 2-weekly schedule will comprise of the following:

- A project meeting every 4 weeks at King Phalo Airport.
- A site visit every 4 weeks at King Phalo Airport.

#### **3.2 Health and Safety Risk management**

All employees of the contractor that needs to work on site will have to be inducted and needs to go through a security clearance process of the airport after which permits will be issued to allow movements of employees during

works.

The contractor will therefore not have the flexibility to change employees at any time.

### **3.3 Environmental Constraints and Management**

Works on the airside, as well as in terminals, shall be coordinated with flight schedules. Certain works cannot be completed while runways and terminals are occupied.

**\* The installation contractor shall be liable for any environmental impacts arising from the plant installation and defects liability period as per requirement in Annexure J: Environmental Impacts of the Annexures for Solar Photovoltaic Plant Project Briefs.**

### **3.4 Quality Assurance Requirements**

The contractor will be responsible for all physical related quality control systems for construction.

Within the period stated in the Contact Data, the *Contractor* submits his complete quality control and assurance system (with all quality control and assurance procedures and manuals) for review and acceptance by the *Employer*. The manual includes pro-forma checklists for all requirements of the *Contractor's* quality control and assurance program and those called for in the Scope.

Acceptance by the *Employer* of the *Contractor's* quality assurance programme, quality plans and/or inspection and/or test plans, or of those of his Subcontractors will not relieve the *Contractor* of his obligation to provide services which meet the requirements of the Contract.

### **3.5 Insurance Provided by the Employer**

See ACSA Insurance provisions included.

### **3.6 Provisions of Bonds and Guarantees**

Without limitation to the Employer's rights under the Contract, the *Employer* may withhold payment of amounts due to the *Contractor* until the bond or guarantee required in terms of this contract has been received and accepted by the person notified to the *Contractor* by the *Project Manager* to receive and accept such bond or guarantee. Such withholding of payment due to the *Contractor* does not affect the *Employer's* right to termination stated in this contract.

### **3.7 Training Workshops and Technology Transfer**

The contractor shall provide a training programme with detailed information on

items that will be covered and length of the training programme, for the engineer's approval. The training shall prepare the King Phalo Airport's maintenance operators to adequately maintain and operate the installation. The training shall include hard- and soft copies of the training material to be handed over to the employer.

#### **4. Procurement**

##### **4.1 Personnel**

Minimum Requirements of people employed on the site:

- No criminal Record

The contractor shall provide a complete list of staff that will execute works on site as all personnel needs to be security screened and be issued a permit for works.

##### **4.2 Subcontracting**

Limitations on subcontracting:

- The contractor may not subcontract more than 30% of the works

Sub-contractors shall be disclosed at tender stage.

##### **4.3 Plant and Materials**

Plant & Materials provided "free issue" by the employer:

- None

The employer will provide water and electricity to the contractor. These items will be metered and the cost recovered from the contractor.

##### **4.4 Factory Acceptance Tests and Site Acceptance Tests**

All newly transformers and distribution boards shall undergo a factory acceptance test as well as a site acceptance test upon arrival on site. The contractor shall submit the factory and site test procedure, for approval before testing is to commence, for all newly assembled equipment.

The test certificates for the factory acceptance test and site acceptance tests shall be submitted to the engineer.

The factory acceptance tests are to be witnessed by the Supervisor and an employer representative.

**\* The plant equipment tests and testing procedures shall comply to provisions in Annexure K: Testing, Commissioning and Handover of the Annexures for Solar Photovoltaic Plant Project Briefs for**

#### **4.5 Marking Plant and Materials outside the Working Areas**

The contract data requires that proof of ownership is to be provided for equipment outside the working areas if payment is made on the equipment. The contractor shall also mark the equipment stating the project number, client name and area where the equipment is to be installed. The contractor shall submit proposals for the marking of the equipment to the engineer, for approval.

#### **5. Construction**

This section covers temporary works and construction restraints.

##### **5.1 Restrictions to Access to site**

Restrictions to site, security control, permits and site regulations will be according to King Phalo Airport requirements. The requirements will be covered at the airport's site induction.

##### **5.2 Commissioning**

The equipment equipped as part of this project will be in use immediately after installation.

The equipment shall be commissioned as whole.

**\* The plant commissioning procedures shall comply to provisions in Annexure K: Testing, Commissioning and Handover of the Annexures for Solar Photovoltaic Plant Project Briefs for**

##### **5.3 Take Over Procedures**

The project engineer cannot certify completion until all the work has been completed and is also free of defect which would have, in his opinion, prevented the employer from using the works and others from doing their work.

The engineer will inspect all equipment before take over.

Core clause 43.4; The engineer will arrange for the employer to allow the contractor access to and use of a part of the works which has been taken over if needed to correct a defect. After the works have been put into operation, the employer may require the contractor to undertake certain procedures before such access can be granted.

**\* The plant takeover procedures shall comply to provisions in Annexure K: Testing, Commissioning and Handover of the Annexures for Solar Photovoltaic Plant Project Briefs for**

#### **5.4 Title to materials from demolition and excavations**

Core clause 73.2; The contractor has title to material and excavation and demolition, unless required for backfilling or otherwise stated.

#### **5.5 Contractor's Equipment and Facilities**

The employer will keep record of all contractor equipment and facilities on site.

The contractor shall submit, for approval, all required site facilities to the engineer. All facilities that do not form part of the works shall be removed by the contractor before contract completion.

#### **5.6 Shut Down Periods**

Where shutdown periods are required for the installation of equipment, the contractor shall submit shutdown requirements for approval at least 4 weeks in advance. Due to the nature of the site, the contractor shall note that shutdown periods for some equipment will only be possible outside of normal working hours.

No shutdowns shall be performed without expressed written approval from ACSA. The shutdown periods shall not deviate from the approved periods.

#### **5.7 Site Services and Facilities Provided by the Employer**

Plant & Materials provided by the employer:

- Electricity and Water (will be metered and cost recovered from contractor)

The contractor shall provide all other services and facilities necessary for providing the works.

## 6. Previous Contractor Specifications

The design in appendix D of section C3 forms part of the reference design and all performance characteristics described therein forms part of the reference specifications.

**\* Annexures A, Annexure suite for Solar Photovoltaic Plant forms part of the specification and must be read and applied in conjunction with the overall tender specification. These provisions shall apply over and above the generic specification of this tender.**

### 6.1 Applicable Standards

All work shall be carried out according to the specifications provided in this document, as well as all applicable local municipal standards, South African national standards (SANS) and/or international electrotechnical commission (IEC) standards including, but not limited to:

- SANS 10142-1: The wiring of premises part1: Low-voltage installations
- SANS 10142-2: The wiring of premises part2: Medium-voltage installations above 1 kV a.c. not exceeding 22 kV a.c. and up to and including 3 000 kW installed capacity
- SANS 1507: Electrical Cables with Extruded Solid Dielectric Insulation for Fixed Installations
- SANS 97: Electrical Cables – Impregnated Paper Insulated Metal-sheathed Cables for rated voltages 3,3/3,3 kV to 19/33 kV
- SANS 1339: Electrical Cables – Cross-Linked Polyethylene insulated cables for rated voltages 3,8 kV to 19/33 kV
- SANS 780: Distribution Transformers
- SANS-IEC 60076: Power Transformers
- SANS 10400: The application of the National Building Regulations
- IEC 60529: International Protection Marking
- Occupational Health and Safety Act, 1993 (Act No 85 of 1993) and the regulations promulgated in terms of the Act.
- NRS 097-2-1: Grid interconnection of embedded generation, Part 2: Small-scale embedded generation, Section 1: Utility interface.
- NRS 048/9: Monitoring equipment for importing/exporting of power
- SANS 62305-1: Protection against lightning Part 1: General principles
- NERSA: Grid connection code for renewable power plants (RPPs) connected to the electricity transmission system (TS) or the distribution system (DS) in South Africa
- NERSA: The South African Grid Code
- Municipal, supply authority and regulatory standards and bylaws.
- The local Fire Department Regulations.

**\* All work shall also be carried out in accordance to local municipal standards, South African national standards (SANS) and/or international electrotechnical commission (IEC) standards provided in;**

**Annexure C: Design Flexibility**  
**Annexure D: Photovoltaic Panel**  
**Annexure E: Installation**  
**Annexure F: Electrical**  
**Annexure G: Maintenance**  
**Annexure H: Operational Parameters and Plant output**  
**Annexure I: Guarantees, Warranties and Insurances Underwriting**  
**Annexure J: Environmental Impacts**  
**Annexure K: Testing, Commissioning and Handover**

**of the Annexures for Solar Photovoltaic Plant Project Briefs.**

## **6.2 Performance Specifications**

### **6.2.1 Glare Requirements**

The Solar PV installation is located close to one of King Phalo airport's active runways. The Solar PV installation is to fulfil the SACAA requirements for glare in the flightpath.

The reference design was tilted, from an optimal 26-degrees with 0-degree orientation, to a 33-degree tilt and 350-degree orientation. This was required, along with ARC (Anti-Reflective Coating) to meet the minimum glare requirements. Preliminary approval was obtained from SACAA for the glare simulations..

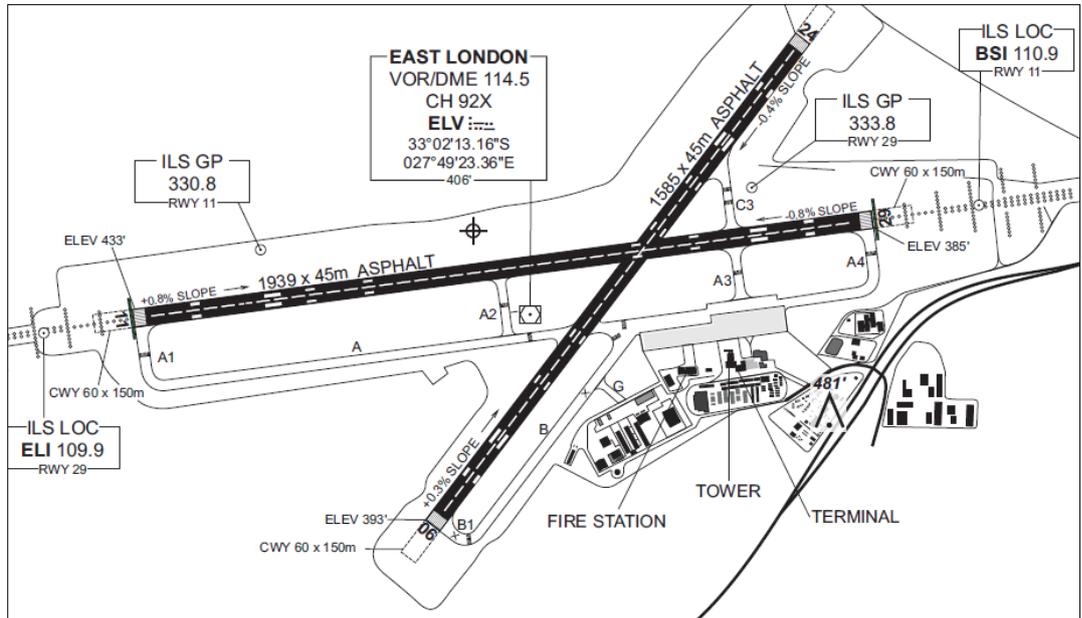
#### **6.2.1.1. Reference Glare Simulations**

The glare analysis is used to demonstrate that the proposed PV energy system meets the following FAA standards:

- 1) No potential for glint or glare in the existing or planned Airport Traffic Control Tower (ATCT) cab, and
- 2) No potential for glare or 'low potential for after-image' (shown in green in Table 0-1) along the final approach path for any existing landing threshold or future landing thresholds (including any planned interim phases of the landing thresholds) as shown on the current FAA-approved Airport Layout Plan (ALP). The final approach path is defined as two miles from fifty feet above the landing threshold using a standard three-degree glidepath. Ocular impact must be analysed over the entire calendar year in one-minute intervals from when the sun rises above the horizon until the sun sets below the horizon.

The Aerodrome chart for King Phalo on Figure 0-1 shows all four runways and their corresponding threshold elevations.

As part of the detailed design stages, the simulation results will be coordinated with the South African Civil Aviation Authority (CAA) for final approval.



**Figure 0-1: FAEL Aerodrome Chart for King Phalo Airport**

Runway 24 and Runway 06 have no flight paths available. The orientation of the plant and the tilt of the panels were tweaked until the simulation results provided a panel orientation for glare to be within allowable levels. The most suitable placement of panels is therefore at 350° azimuth and 33° tilt. This orientation will result in an estimated reduction of 0.15% in annual output energy compared to the orientation of panels for the maximum generation of power and energy.

Results of the glare impact analysis on all four runways and from the perspective of the control tower are summarised in Table 0-1. In all simulations, no glare was experienced at the Air Traffic Control Tower.

**Table 0-1: Glare impact analysis results**

Runway→				
Observation Point ↓	06	11	24	29
ATCT	no glare			
Threshold	no glare	glare	no glare	no glare
¼ mile	no glare	glare	no glare	no glare
½ mile	no glare	glare	no glare	no glare
¾ mile	no glare	glare	no glare	no glare
1 mile	no glare	glare	no glare	no glare
1¼ mile	no glare	glare	no glare	glare
1½ mile	no glare	glare	no glare	glare

Runway→					
Observation Point ↓		06	11	24	29
1¾ mile		no glare	glare	no glare	glare
2 miles		no glare	glare	no glare	glare

KEY		FAA Compliance
	Low potential for temporary after-image	Acceptable
	Potential for temporary after-image	Not acceptable
	Potential for permanent eye damage	Not acceptable

### 6.5.1 System Capacity and performance

All power produced by each PV installation must be consumed by the load attached to the distribution board to which the PV system is connected. The PV plant must be designed and installed in such a manner that no power is exported into the local power authority MV network through the upstream transformer if the PV plant produces more power than is consumed by the airport. However, for maximum flexibility, the system must be configurable to disable this limitation, allowing for the possibility of future power export.

The anticipated system capacity is as follow:

<b>Main system parameters</b>	System type	Grid-Connected		
<b>Near Shadings</b>	Detailed electrical calculations	(acc. to module layout)		
PV Field Orientation	tilt	33°	azimuth	10°
PV modules	Model	CS6P - 265P	Pnom	265 Wp
PV Array	Nb. of modules	2457	Pnom total	<b>651 kWp</b>
Inverter	Model	Sunny Tripower	25000TL-30	25.00 kW ac
Inverter pack	Nb. of units	20.0	Pnom total	<b>500 kW ac</b>
User's needs	Unlimited load (grid)			
<b>Main simulation results</b>				
System Production	<b>Produced Energy</b>	<b>1124 MWh/year</b>	Specific prod.	1727 kWh/kWp/year
	Performance Ratio PR	81.3 %		

**Figure 2: 650 kWp PVsyst Simulation Results**

The simulation above does not take dust built-up into account, nor is yearly degradation of the system's output calculated.

**\* The plant performance must meet the requirements in Annexure H: Operational Parameters and Plant output, Annexure I: Guarantees, Warranties and Insurances Underwriting and item A3 of Annexure A: Economic Aspects of the Annexures for Solar Photovoltaic Plant Project Briefs.**

### 6.2.2.1 Future Expansion

A battery backup system is envisaged in the future for the PV plant. The battery backup system envisioned will also require an increase in the overall generating capacity of the plant.

The design shall allow the addition of a battery system and expansion of the PV plant with relative ease. In order to achieve this, the system shall follow a modular design.

### 6.2.3 Integration with existing electrical infrastructure

The contractor will be responsible for all integration with existing electrical infrastructure. If the need arises to appoint a specialist to assist with the integration, the costs for this specialist will be borne by the main contractor unless otherwise agreed with the employer.

Existing MV switchgear are located at the King Phalo airport main substation. Spare equipment has been identified for use to tie-in the PV solar installation. The connection and integration to the existing switchgear is to be included in the costs provided by the contractor.

The provision of new MV switchgear is not to be included in the costs.

#### 6.2.3.1 Power and Energy Logging

The Contractor will be required to install load logging equipment where the solar PV equipment will be connected, in order to verify the existing measurements.

The measurement should last at least seven days during a typical usage period, and shall measure at least the following as a function of time:

- Overall power usage (kVA and kW), peak and averaged over each time denomination.
- Power factor
- Electrical current (A)
- Voltage and frequency fluctuations
- Harmonics
- Phase imbalances

The resolution of each time denomination shall be five minutes or less.

**\* The plant performance monitoring systems shall be in accordance to the requirements in Annexure H: Operational Parameters, of the Annexures for Solar Photovoltaic Plant Project Briefs.**

## 6.2.4 Equipment Specifications

### 6.2.4.1 Climatic Information

Atmospheric Temperature:	-5 °C min, 40 °C max
Altitude:	Sea level
Lightning and Dust:	standard
Average Power Factor:	0.8
Maximum Humidity:	95 %

### 6.2.4.2 Photovoltaic Modules

The client will supply Polycrystalline Grade A modules of type **Jinko Solar (JKM330P-72-A)** shall be installed.

The modules shall be certified to conform to the following standards:

- ISO 9001
- IEC/EN 61215: Terrestrial Photovoltaic Modules
- IEC/EN 61730: Photovoltaic Module Safety Qualification
- IEC 60068-1: Environmental Testing
- IEC 61853: Performance Testing and Energy rating

Defective panels will not be accepted under any circumstances. Any panels found to be defective must be replaced at the expense of the contractor. The defect liability period is to be defined by the contract governing the installation.

Where additional PV panel may be required bidder shall only supply PV Panel type equal to **JKM330P-72-A** similar to the inverters supplied by client.

The Photovoltaic panels shall be rated for a 25-year lifetime.

**\* The photovoltaic panels supplied must meet the requirements in Annexure D: Photovoltaic Panel and the installation thereof must be in accordance to with provision in Annexure E: Installation, of the Annexures for Solar Photovoltaic Plant Project Briefs.**

### 6.2.4.3 Inverters

The Inverter, supplied by client, is of type Huawei smart string inverter equal to **SUN2000-36KTL**, there are 17 inverters on site, the contractor shall provide a detail design showing the configuration or exact location of the grid-tie inverters .

The inverters shall conform to the following minimum specifications:

- Certified conformance to NRS 097-2-1:2010
- Surge protection (DEHNguard or equal/better, preferably built-in)

- String inverters
- Multiple MPPT
- Rated IP66 or greater
- DC reverse polarity protection
- Reverse current protection
- Ground fault monitoring
- Galvanically isolated
- String failure detection

To minimize voltage drop losses, it is recommended that the inverters are installed as close as possible to the connection point to the local LV grid.

Where the inverters are installed outdoors, they shall be installed in such a way that the performance or lifetime of the inverters is not compromised through exposure to the elements. Therefore, inverters should be protected from direct sunlight, rain and lightning strikes.

Where additional inverters may be required, the bidder shall only supply inverter types equal to **SUN2000-36KTL** or similar to the inverters supplied by client.

The inverters shall comply with:

- IEC 60364-7-712
- IEC 62109 Safety Requirements

**\* The inverter modules shall meet the requirements in Annexure F: Electrical, of the Annexures for Solar Photovoltaic Plant Project Briefs.**

#### **6.2.4.4 Cable Management System**

Once appointed, the contractor shall provide detail design drawings of all cable management systems, including fixing and attachment methods.

#### **6.2.4.5 Cables and Connectors**

DC cabling should be specifically rated for outdoor solar PV installations and should be double-insulated, UV resistant and weather resistant. Positive and negative cables shall be laid separately to prevent short circuit faults. All connectors must have an ingress protection rating of IP 67.

Cables shall be installed in conduits and hooded cable trays. The cable return path should ensure that induction loops are avoided. Cables shall be terminated in UV resistant MC4 connectors.

All cable shall comply with SANS 1507.

**\* The cables shall meet the requirements in Annexure F: Electrical, of the Annexures for Solar Photovoltaic Plant Project Briefs.**

#### **6.2.4.6 Earthing**

All equipment and cabling shall be earthed in accordance with all relevant codes and regulations, and shall be suitably protected against lightning strikes and surges.

The earthing installation shall comply with SANS 10142-1, SANS 10142-2, and SANS 10292.

#### **6.2.4.7 Monitoring and Control**

A monitoring and control system must form part of the installation in the form of a software application or SCADA system.

The system should have the following functionality. This is a generic list of specifications and may not be possible to achieve by all manufacturers. Solutions proposed by bidders must meet the vast majority of the following specifications and any specification that cannot be met must be highlighted by bidders in their proposal.

- Data acquisition
  - Individual string performance
  - Inverter performance
  - AC panel status
  - Load (four-quadrant energy meter)
  - AC grid status
  - Generator status
- Trends
  - Historical
  - Real-time
- Alarm Manager
  - String performance
  - Device failure
  - Visual diagrams to indicate location of alarm or fault
  - Email / SMS notification
- Control
  - Remote isolation of fault-affected components
- Reporting

- Yield Reports
- Financial Reports
- Architecture
  - Support for open, non-proprietary communication protocols between SCADA and other field equipment (e.g. Modbus, OPC).
  - Scalable, support for future expansion
- Licensing
  - A once-off license is preferable to recurring license fees
- Maintenance Calendars
  - Support for maintenance activity calendar and alerts
  - Lifecycle status of all elements in PV plant
- User access rights (administrator plus at least one operator level)
- Import / export functionality of data and configuration settings
- Web interface for remote access.

The control and monitoring system must be scalable to accommodate future expansion, including PV installations on other surrounding buildings. Its architecture must be open and modular to accommodate data acquisition equipment from several manufacturers.

**\* The plant performance monitoring systems shall be in accordance to the requirements in Annexure H: Operational Parameters, of the Annexures for Solar Photovoltaic Plant Project Briefs.**

#### **6.2.4.8 Energy Metering**

A four-quadrant, three-phase net metering system shall be installed, by the contractor, at all points where the PV system connects to the local grid and will be integrated with the aforementioned monitoring and control system.

#### **6.2.4.9 Active Islanding Detection**

An active islanding detection must be incorporated into the system with a maximum switching time of 300 milliseconds. The island detection shall conform to IEC 62116 Performance of Islanding prevention

#### **6.2.4.10 Lightning Protection**

The solar PV plant shall be equipped with a lightning protection system in the form of air terminals / lightning rods. As part of their tender submissions, bidders must include information about the type of lightning protection system that will be

installed. Once appointed, the contractor shall then provide a detail design and specifications for the proposed lightning protection system.

Surge arrestors shall be installed to protect the installation from transient voltage spikes.

The lightning protection shall comply with SANS 10313.

### **6.3 Maintenance**

The contractor shall be required to provide maintenance schedules and requirements, including ancillary works to facilitate maintenance activities. This could include the provision of one or more water points to the site to facilitate cleaning of the PV modules.

The panel positioning and mounting structures should also be determined with maintenance requirements in mind.

#### **6.3.2 Weather Station**

The solar PV installations shall include a compact weather station for performance benchmarking purposes. The weather station shall have physical attributes suitable for the installation and shall have the following sensors as a minimum:

- Ambient Air Temperature
- PV Panel Temperature
- Pyranometer
- Anemometer (speed and direction)

The weather station output data shall be logged at 1-minute intervals. Logging intervals shall be configurable.

Pricing shall include all hardware, software, cabling, network interfaces, mounting brackets and electrical connections required for a complete and functional system.

**\* The weather observation station shall comply the international standard stipulated in Annexure H: Operational Parameters, of the Annexures for Solar Photovoltaic Plant Project Briefs.**

### 6.3.3 Public Information Display

The installation shall incorporate a visual display showing system performance. The display shall be an LED television display with the display size listed below, and shall be installed within the existing buildings, in the following locations:

- Building	- Display Size	- Location
- Terminal Building	- 50"	- Near reception/information kiosk, Exact position to be determined, wall-mount

The displays shall be configurable to display the following information in a clear, easy-to-read, meaningful manner:

- kWh (today, this week, this month, since day one).
- Graph showing daily power output (kW vs time).

Pricing shall include all hardware, software, cabling, network interfaces, mounting brackets and electrical connections required for a complete and functional system.

### 6.4 Security Camera Specification

The scope of work for installation of thermal bullet cameras is defined in the specification document provided by client to ensure that all security measures installed in the Solar PV farm are as per ACSA IT/ES standards and inline with ES security technology strategy i.e ISS.

The King Phalo Solar Farm Thermal Camera Specification is provided in Annexure G of the document.

### 6.5 Testing and availability

All live testing for the purposes of handover shall be based on the Acceptance Test Criteria described below.

**\* The plant commissioning procedures shall comply to provisions in Annexure K: Testing, Commissioning and Handover of the Annexures for Solar Photovoltaic Plant Project Briefs.**

#### 6.5.1 Acceptance Test Criteria

Acceptance test procedures are to be prepared by the contractor and must be approved by the engineer before any acceptance tests are conducted.

**\* The plant commissioning procedures shall comply to provisions in Annexure K: Testing, Commissioning and Handover of the Annexures for Solar Photovoltaic Plant Project Briefs.**

### **6.5.2 Availability**

Availability of the system shall be 99.5 %.

### **6.5.3 System up-time**

Downtime caused by external power failures, incorrect usage of the equipment, preventative maintenance, routine maintenance, etc. shall not be part of the equation to calculate system up-time. However, downtime caused by system failure and unresponsiveness will form part of the equation.

### **6.5.4 Confidence Trials**

These trials shall last for a minimum period of five calendar days starting on the day that the system is in full operational use. A day is defined as 24 hours. Confidence trials shall be completed once the following accumulative system up-time has been measured by the contractor over a period of five consecutive days and is proven to the engineer:

- Solar photovoltaic plant and associated systems: 99.5% collectively.

## **7 Operation and Maintenance**

### **7.1 General**

A separate request for tender will be made available for the operation and maintenance of the installation. The contractor shall note this and ensure all documentation and training is provided to ensure the successful operation and maintenance of the installation.

The contractor for the construction works (this tender) will be liable for defects for the full period as stated in the contract information.

The Contractor shall co-operate and co-ordinate with the Employer, Employer's representatives and Building Facility Managers in a best way to ensure the operation and maintenance activities are performed respecting all Employers' requirement and not effecting the regular Building Facility's (site) normal operation and maintenance.

The Contractor shall provide the minimum inventory level requirements, as stipulated in the maintenance manual, during the plant operation.

## **7.2 Operations and Maintenance Training**

- a) O&M Training shall be provided to the Employer and Employers' representatives within three (3) months after the issuance of substantial completion certificate. The Training shall be both, based on Classroom and Onsite Training. 16) The Contractor shall provide formal classroom training of the operations, maintenance prior to final hand-over of the plant (Final Acceptance Test) to ensure Employer's representatives has a sound understanding of the plant layout, characteristics and functionality.
- b) Training material for classroom training shall be based on O&M manual content (O&M Manual requirement is presented in in this document) and contain evaluation criteria on each section of the plant covered in order to establish the level of Employer's representatives' understanding
- c) The Contractor shall provide formal on-site training of the operations, maintenance prior to final hand-over (Final Acceptance Test) of the plant is essential to ensure Employer's representatives' have a sound understanding of the plant functionality and O&M requirements.
- d) Training material for on-site training shall be based on O&M manual (requirement of O&M Manual is presented in this document) in addition to detailed operating and maintenance plans and procedures.
- e) Training shall be focused on following area,
- f) Operation and Maintenance of the Facility
- g) Inverter Technician Training: specification, functioning and safe operation following Manufacturers O&M Manual (troubleshooting for error codes, repair, software for inverter, Fault finding on the DC Plant) and
- h) Data Acquisition System and PLC Training
- i) The Contractor shall provide all training materials of in hard copy and electronic copy to the trainees prior to the actual commencement of O&M training.

## **7.3 Maintenance Manual**

The Contractor shall provide comprehensive maintenance manuals for the entire plant including operational manuals for specific components, safety instruction, and preventive maintenance requirements. The maintenance manual shall state the minimum inventory level requirements. The contractor shall also ensure that the full compliment of minimum inventory is on site, as stated in the maintenance manual, before completion of the works.

Due to the maintenance of the installation being offered on a separate request for tender, the maintenance manual is required to be completed at least three months

before completion of the works. This is required to allow the employer sufficient time to complete the request for tender documentation and appoint a suitable contractor for the maintenance of the installation.

## 8 Project Specifications

### 8.5 Trenching

#### 8.5.1 General

The contractor shall be responsible for all trenching excavations unless specified to the contrary. Prior to cable laying, the trench shall be inspected thoroughly and all objects likely to cause damage to the cables either during or after laying shall be removed. Where ground conditions are likely to reduce maximum current carrying capacities of cables or where the cables are likely to be subjected to chemical or other damage or electrolytic action, the engineer shall be notified before installing the cables. The engineer will advise on the course of action to be taken.

The excavated material shall be placed adjacent to each trench in such a manner as to prevent nuisance, interference or damage to adjacent drains, gateways, trenches, water furrows, other works, properties or traffic. Where this is not possible the excavated materials shall be removed from site and returned for backfilling on completion of cable laying. Surplus material shall be removed from site and disposed of at the cost of the electrical subcontractor.

Trenches across roads, access ways or footpaths shall not be left open. If cables cannot be laid immediately the Contractor shall install temporary "bridges" or cover plates of sufficient strength to accommodate the traffic concerned.

The contractor shall take all the necessary precaution and provide the necessary warning signs and/lights to ensure that the public and/or employees on site is not endangered.

The Contractor shall provide shoring for use in locations where there is a danger of the sides of the trench collapsing due to waterlogging or other ground conditions. The strength of shoring must be adequate for site conditions prevailing and the shoring must be braced across the trench. The Contractor shall provide all pumps and equipment required to remove accumulated water from trenches. Water or any other liquid removed shall be disposed of without any nuisance or hazard.

The classification for type of soils for trenching purposes shall be as follows:

- Soft earth and rock: Shall mean rock and earth that can be loosened and removed by hand-pick and shovel.
- Hard rock: Shall mean granite, quartzitic sandstone, slate and rock of similar or greater hardness, solid shale and boulders in general requiring the use of jack hammers and other mechanical means of excavations.
- Very hard rock: Shall mean rock that can only be excavated by means of explosives.

Where very hard rock and hard rock are encountered, the prior approval of the Engineer shall be obtained before proceeding with the excavation. This requirement is stipulated in order to afford the engineer the opportunity to determine whether an alternative cable route is justified.

The engineer reserves the right to inspect the installation at any stage during the course of construction. Such inspections will however not deem the portions inspected as being complete or accepted and the contractor shall remain responsible for completing the installation fully.

The Contractor shall carry out a final "as built" survey of the cable routes and present to the engineer the "as built" route plans of the complete installation. The following information shall be reflected on the plans or submitted as separate schedules with the plans:

- Overall length of each cable.
- Locations of all joints (with dimensions shown).
- Identification of each cable.

#### **8.5.2 Trench Construction**

A typical detail for the MV and LV cable trenches are provided in the tender drawings. The contractor is to use the dimensions provided in the drawings to price for the trenching.

The bottom of the trench shall be of smooth contour, and shall have no sharp dips or rises which may cause tensile forces in the cable during backfilling.

Where trenches change direction or where cable slack is to be accommodated, the Contractor shall ensure that the requirements of the relevant SANS and manufacturer specification regarding the bending radii of cables are met when determining trench widths.

Power driven mechanical excavators may be used for trenching operations provided that they are not used in close proximity to other plant, services or other installations likely to be damaged by the use of such machinery. The use of power driven mechanical excavators shall be subject to the approval of the Engineer. Should the excavator produce trenches that exceed the required dimensions, payment based on volumetric excavation rates will be calculated on the required dimensions only.

The contractor shall not commence with the backfilling of trenches without prior notification to the Engineer so that the cable installation may be inspected. Should the Contractor fail to give a timeous notification, the trenches shall be re-opened at the Contractor's cost. Such an inspection will not be unreasonably delayed.

Backfilling shall be undertaken with soil suitable to ensure settling without voids. The maximum allowable diameter of stones present in the backfill material is 75mm. The Contractor shall have allowed in his tender for the importation of suitable backfill material if required. The backfill shall be compacted in layers of 150mm and sufficient allowance shall be made for final settlement. The Contractor

shall maintain the refilled trench at his expense for the duration of the contract. Surplus material shall be removed from site and suitably disposed of.

On completion, the surface shall be made good to match the surrounding area, in the case of roadways or paved areas the excavations shall be consolidated to the original density of the surrounding material and the surface finish reinstated.

Warning tape shall be installed above the cables, as shown in the drawings. The warning tape shall be yellow, marked with the words "ELECTRIC CABLE/ELEKTRIESE KABEL" in red. These markings shall not be more than 1m apart from centre to centre.

Cables for telephones, communication systems and other low voltage systems (less than 50 V) shall be separated from power cables by at least 1m. All control or pilot cables without a lead sheath and steel armouring shall be laid at least 300mm from power cables.

### **8.5.3 Cable Routes**

The electrical subcontractor shall, before trenching commences, familiarise himself with the routes, site conditions, existing services (storm water pipes, water mains, gas pipes, telephone cables, etc.) and the procedure and order of doing the work shall be planned in conjunction with the general construction programme for other services and building requirements. The contractor will be held responsible for damage to any existing services brought to his attention by the relevant authorities and shall be responsible for the cost of repairs. In the event of damage to other services or structures during trenching operations the Contractor shall immediately notify the engineer and institute repairs.

Trenches shall connect the points shown on the drawings in a straight line. Any deviations due to obstructions or existing services shall be approved by the engineer beforehand. The contractor shall ensure that the excavations will not endanger existing structures, roads, railways or other site constructions or property. The removal of obstructions along the cable routes shall be subject to the approval of the engineer.

### **8.5.4 Bedding**

The bottom of the trench shall be filled across the full width with a 50mm layer of suitable soil sifted through a 6mm mesh and levelled off. Only sandy clay or loam soil with a satisfactory thermal resistivity (not exceeding 1.5 °C m/W) may be used for this purpose. Ash, chalk, peat, clinker or clayey soil shall not be used. The use of crusher sand is acceptable. Where no suitable soil is available on site, the Contractor shall import fill from elsewhere and make all the necessary arrangements to do so. The cost of importing soil for bedding purposes shall be included in the unit rates for excavations.

## **8.1 Termination and Jointing Of Cables**

### **8.1.1 General**

All cable ends shall be supplied with the necessary earth connection.

Cable ends shall be terminated with glands or in cable boxes with the associated accessories such as clamps, shrouds, etc. A channel or other approved means of support shall be provided to remove mechanical stress from the glands.

The current-carrying capacity and breakdown voltage of the cable end shall be the same as for the complete cable.

### **8.1.2 Terminations**

All PVC insulated cables shall be terminated by means of adjustable glands.

Cross-linked polyethylene cables (XLPE) shall be terminated in accordance with section 4.2. The copper tapes of the earth screen on the cable shall be bonded to the main earth bar of the switchgear or transformer, but the bond shall be easily removable for testing purposes. The cable shall be firmly secured on the switchgear by means of a clamp to prevent mechanical stress on the cable and terminations.

Cables that are connected to clamp type terminals where the clamping screws are not in direct contact with the conductor need not be lugged but the correct terminal size shall be used.

Suitable lugs shall be used, preferably solidly sweated to the cable conductor ends. Lugs may be crimped, using mechanical or pneumatic tools designed for this purpose, on condition that evidence is submitted that the method used complies with the performance requirements of BS 4579, Part 1: "COMPRESSION JOINTS IN COPPER".

Contact surfaces shall be thoroughly cleaned and smoothed and fixing bolts shall match the hole size of the lug. When cutting away insulation from cable conductors to fit into lugs, care shall be taken that no strands are left exposed. Under no circumstances may any of the conductor strands be cut away to fit into lugs.

Ferrules shall be used as far as possible where cable conductors are connected directly to equipment with screws against the conductor strands.

### **8.1.3 Joints**

Joints in cable runs will not be allowed unless specified or authorised by the engineer. Jointing shall be carried out strictly in accordance with the manufacturer's instructions and by personnel competent in jointing the types of cables used. The joint shall not impair the anti-electrolysis characteristics of the cable.

The Contractor shall notify the Engineer timeously of the day on which jointing is to be carried out in order that an inspection may be arranged if so required. Any cable joint not inspected by the Engineer because of insufficient notice being given, shall be opened for inspection and redone at the discretion of the Engineer at the cost of the contractor.

During outdoor jointing operations, the joint bays shall be adequately covered by tents of waterproof material suitably supported. Where necessary a trench shall be excavated around the bay to prevent the ingress of moisture. The sides of the hole shall be draped with small tarpaulin or plastic sheeting to prevent loose earth from falling in during jointing operations. LV cable joints shall be of the epoxy-resin type.

HV cable joints on XLPE-insulated cables shall be of the heat shrinkable type or shall be based on a prefabricated system utilising pre-moulded slip-on stress cones. Joints shall be fully water and air tight and shall be free of voids and air pockets. The crossing of cores in joints will not be permitted under any circumstances.

## 8.2 Drawings

Drawings shall be produced according to SABS or equivalent standards. All drawings to be supplied by the equipment contractor have to be listed in the master document index (MDI). All drawings shall be made available on CD and hard copy. As a minimum, the MDI has to indicate the following drawings for approval:

- Wiring diagrams
- Installation drawings
- As-built drawings
- Documentation drawings for maintenance manuals.

Drawings shall be prepared specifically for this contract using CAD software and shall not be marked-up drawings.

## 8.3 Documentation

Upon completion of the project, the contractor shall hand over the following documentation:

- Set of installation drawings (for approval)
  - Layout drawings
  - Electrical single line diagrams
  - Block diagram (communication network and control system)
- Equipment documentation
  - Datasheets
  - User manuals
  - Factory test reports
  - Warranty / guarantee certificates
- Manuals (for approval)
  - Operator Manual
  - Maintenance Manual, including
    - Spares lists
    - Scheduled and unscheduled maintenance tasks
    - Maintenance procedures and instructions
    - Layout diagrams
    - Wiring, electrical and control diagrams

- Training documentation, including training aids and course notes
- Software
  - Full source code for all control or monitoring systems forming part of this installation, including any PLC, HMI, SCADA systems, or any application software custom-built for this installation
  - Full system backups, including configuration settings, for all control or monitoring systems forming part of this installation, including any PLC, HMI, SCADA systems, or any application software custom-built for this installation
  - Software installation files and discs
  - License keys or dongles
- Certificate of Compliance for electrical installation work
- Acceptance test procedure and acceptance test result sheets (for approval)
  - Acceptance test snag sheet
  - Final certificate of completion (for approval)
- \* **The consultant shall make available documentation on plant and plant performance as required in Annexure K: Testing, Commissioning and Handover and Annexure O: Knowledge Management, Skills Transfer and Learnings of the Annexures for Solar Photovoltaic Plant Project Briefs.**

## 9 Reference Documentation

The following documentation forms part of the reference design and can be found in the annexures:

- Annexure A: Annexure suite for Solar Photovoltaic Plant
- Annexure B: Environmental Management Plan
- Annexure C: Previous Contractor Storm Water Report
- Annexure D: Reference Design Drawings

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**PART C4: SITE INFORMATION**

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**PART C4: SITE INFORMATION**

<b>TABLE OF CONTENTS</b>	<b>PAGE</b>
<b>C4.1 Location of The Project.....</b>	<b>- 85 -</b>
<b>C4.2 Available Information.....</b>	<b>- 85 -</b>
<b>C4.3 Drawings.....</b>	<b>- 86 -</b>
<b>C4.4 Soil Resistivity.....</b>	<b>- 86 -</b>
<b>C4.5 Rainfall Data.....</b>	<b>- 86 -</b>
<b>C4.6 Site Survey.....</b>	<b>- 86 -</b>
<b>C4.7 Geotechnical Investigation.....</b>	<b>- 86 -</b>
<b>C4.8 Environmental Reports.....</b>	<b>- 86 -</b>
<b>C4.9 Town Planning.....</b>	<b>- 86 -</b>

## C4.1 Location of The Project

The site is located outside of East London, Eastern Cape at the King Phalo Airport. The solar PV installation site is located on the airside of the airport, as shown in the figure below.



## C4.2 Available Information

### 4.2.1 Disclaimer

The rules and regulations of ACSA that will apply will be strictly adhering to.

No construction activities will influence or stop the daily operational airport activities. When an electrical shutdown is required the Contractor will inform ACSA and the Engineer 2 weeks in advance and or a water disruption in the main water supply.

No responsibility for any consequence arising from variations between the actual material properties and those indicated in this document will be accepted.

The specifications and contract drawings shall always overrule this part of the contract documents.

### C4.2.2 Construction materials

- Water sources

Water will be available from Airports. The contract will have to make the necessary arrangement with responsible official. Any expenses regarding

the abovementioned will be for the Contractor's account. The quality of the water must also comply with the set standards.

- Deleterious materials

Any hazardous material must be removed by an accredited service provider, who can submit a certificate to the Contractor, to verify that material was destroyed or recycle according to the applicable environmental law.

#### **C4.3 Drawings**

The drawings issued to tenders as part of the tender documents must be regarded as provisional and preliminary for the tenderer's benefit to generally assess the scope of work. The drawings may be issued as a separate book of drawings or else bound in as part of this document.

#### **C4.4 Soil Resistivity**

A soil resistivity survey was completed by HHK in July 2017. Information on the soil resistivity survey is provided in the attached detail design report and associated appendices.

#### **C4.5 Rainfall Data**

Rainfall data is provided in the attached detail design report and associated appendices.

#### **C4.6 Site Survey**

A survey of the site was completed in August 2017. The survey data is available from the Supervisor.

#### **C4.7 Geotechnical Investigation**

A geotechnical investigation was completed in August 2017. Information in regard to the investigation results are provided in the attached detail design report and associated appendices.

#### **C4.8 Environmental Reports**

A vegetation report, biodiversity assessment, and environmental management plan has been prepared for the King Phalo solar plant. The reports are discussed and provided in the attached detail design report.

#### **C4.9 Town Planning**

All town zoning, title deeds, etc. are discussed in the attached detail design report and appendices.

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**ANNEXURES**

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**ANNEXURE A: ANNEXURE SUITE FOR SOLAR PHOTOVOLTAIC PLANT**

**ANNEXURE B: ENVIRONMENTAL MANAGEMENT PLAN**

**ANNEXURE C: PREVIOUS CONTRACTOR'S STORM WATER REPORT**

**ANNEXURE D: REFERENCE DESIGN DRAWINGS**

**ANNEXURE E: SOLAR PHOTOVOLTAIC PLANT PROJECT BRIEFS**

**ANNEXURE F: EL SOLAR FARM THERMAL CAMERA SPECIFICATION**

**ANNEXURE G: ACSA PERIMETER FENCE SPECIFICATION**

**ANNEXURE A**

**ANNEXURE SUITE FOR SOLAR PHOTOVOLTAIC PLANT**

**ANNEXURE B**  
**ENVIRONMENTAL MANAGEMENT PLAN**

**ANNEXURE C**

**STORM WATER REPORT**

**ANNEXURE D**  
**REFERENCE DESIGN DRAWINGS**

**ANNEXURE E**

**SOLAR PHOTOVOLTAIC PLANT PROJECT BRIEFS**

**ANNEXURE F**

**EL SOLAR FARM THERMAL CAMERA SPECIFICATION**

**ANNEXURE G**

**PERIMETER FENCE SPECIFICATION**