NEC3 Engineering & Construction Contract

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

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

for **Installation of CCTV Surveillance System at Hendrina Power Station**

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CONTRACT No.

Part C1: Agreements & Contract Data

Contents:

C1.1 Form of Offer & Acceptance

Offer

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

Installation of CCTV Surveillance System at Hendrina Power Station

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

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

Options A B, C or D	The offered total of the Prices exclusive of VAT is	**R**
Option E or F	The first forecast of the total Defined Cost plus the Fee exclusive of VAT is	**R**
	Sub total	**R**
	Value Added Tax @ 15% is	**R**
	The offered total of the amount due inclusive of VAT is[1]	**R**
	(in words)	

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

Signature(s) .....

Name(s) .....

Capacity .....

For the tenderer:

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

Name & signature of witness .....

Date .....

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

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

Acceptance

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

The terms of the contract, are contained in:

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

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

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

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

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

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

Signature(s) .....

Name(s) .....

Capacity .....

for the Employer

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

Name & signature of witness .....

Date .....

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

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

Note:

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

No.	Subject	Details
1		
2		
3		
4		
5		
6		
7		

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

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

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

C1.2 ECC3 Contract Data

Part one - Data provided by the *Employer*

1. Please read the relevant clauses in the conditions of contract before you enter data. The number of the clause which requires the data is shown in the left hand column for each statement however other clauses may also use the same data.

1. Some ECC3 options are always selected by Eskom Holdings SOC Ltd. The remaining ECC3 options are identified by shading in the left hand column. In the event that the option is not required select and delete the whole row. Where the following symbol is used "**[•]" -** data is required to be inserted relevant to the specific option selected.]

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

Clause	Statement	Data
1	**General**	
	The *conditions of contract* are the core clauses and the clauses for main Option	
		A: **Priced contract with activity schedule**
	dispute resolution Option	**W1:** **Dispute resolution procedure**
	and secondary Options	
		X2 **Changes in the law**
		X5: **Sectional Completion**
		X7: **Delay damages**
		X16: **Retention**
		X18: **Limitation of liability**
		Z: ***Additional conditions of contract***
	of the NEC3 Engineering and Construction Contract, April 2013 (ECC3)	
10.1	The *Employer* is (Name):	**Eskom Holdings SOC Ltd (reg no: 2002/015527/30), a state owned company incorporated in terms of the company laws of the Republic of South Africa**
	Address	**Registered office at Megawatt Park, Maxwell Drive, Sandton, Johannesburg**
10.1	The *Project Manager* is: (Name)	
	Address	**Hendrina Power Station** **Impala Road / P/Bag X1003**

		Pullenshope **1096**
	Tel	
	Fax	
	e-mail	
10.1	The *Supervisor* is: (Name)	
	Address	
	Tel No.	
	Fax No.	
	e-mail	
11.2(13)	The *works* are	**Installation of CCTV Surveillance System at Hendrina Power Station**
11.2(14)	The following matters will be included in the Risk Register	**1. PSR Authorisations concerning Permit to Work.** **2. Inability to meet contract requirements during commissioning.** **3. Lapsing of the contract whilst completion has not be achieved.** **4. Any other matters posing a risk to the contract will be discussed amongst the parties and agreed upon before inserted on the Risk Register.**
11.2(15)	The *boundaries of the site* are	**Hendrina Power Station (only allocated sections of the works)**
11.2(16)	The Site Information is in	**Part 4: Site Information**
11.2(19)	The Works Information is in	**Part 3: Scope of Work and all documents and drawings to which it makes reference.**
12.2	The *law of the contract* is the law of	**the Republic of South Africa**
13.1	The *language of this contract* is	**English**
13.3	The *period for reply* is	**3 working days**
2	**The *Contractor's* main responsibilities**	**Data required by this section of the core clauses is provided by the *Contractor* in Part 2 and terms in italics used in this section are identified elsewhere in this Contract Data.**
3	**Time**	
11.2(3)	The *completion date* for the whole of the *works* is	**30 December 2024**
11.2(9)	The *key date*s and the *condition*s to be met are:	***Condition* to be met** — ***key date***
		1 **Submission of the** — **One week**

			Safety File	**after the kick off meeting**
		2	**Submission of the program**	**4 working days after the kick off meeting**
		3	**Submission of the FRI that aligns with the program**	**4 working days after the kick off meeting**
30.1	The *access dates* are:	**Part of the Site**		**Date**
		1	**Site Access After Safety**	**Site Access After Safety**
31.1	The *Contractor* is to submit a first programme for acceptance within	**4 working days after the kick off**		
31.2	The *starting date* is	**1 December 2023**		
32.2	The *Contractor* submits revised programmes at intervals no longer than	**1 weeks.**		
35.1	The *Employer* is not willing to take over the *works* before the Completion Date.	**After completion of each section agreed upon**		
4	**Testing and Defects**			
42.2	The *defects date* is	**52 weeks after Completion of the whole of the *works*.**		
43.2	The *defect correction period* is	**Within 2 working days upon notification for general defects.**		
	except that the *defect correction period* for	**Within 1 working day after notification for urgent matters related to safety, production, and/or environmental conditions.**		
	and the *defect correction period* for			
5	**Payment**			
50.1	The *assessment interval* is	**4 weeks or 30 days upon tax invoice submission**		
51.1	The *currency of this contract* is the	**South African Rand.**		
51.2	The period within which payments are made is	**On completion of activities as assessed and agreed upon the assessment date as per task order/ activity schedule.**		
51.4	The *interest rate* is	**the publicly quoted prime rate of interest (calculated on a 365 day year) charged from time to time by the Standard Bank of South Africa Limited (as certified, in the event of any dispute, by any manager of such bank, whose appointment it shall not be necessary to prove) for amounts due in Rands and**		

		(ii) the LIBOR rate applicable at the time for amounts due in other currencies. LIBOR is the 6 month London Interbank Offered Rate quoted under the caption "Money Rates" in The Wall Street Journal for the applicable currency or if no rate is quoted for the currency in question then the rate for United States Dollars, and if no such rate appears in The Wall Street Journal then the rate as quoted by the Reuters Monitor Money Rates Service (or such service as may replace the Reuters Monitor Money Rates Service) on the due date for the payment in question, adjusted *mutatis mutandis* every 6 months thereafter and as certified, in the event of any dispute, by any manager employed in the foreign exchange department of The Standard Bank of South Africa Limited, whose appointment it shall not be necessary to prove.
6	**Compensation events**	
60.1(13)	The place where weather is to be recorded is:	**Hendrina Power station Control Room**
	The *weather measurements* 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** **the number of days with snow lying at 09:00 hours South African Time** **and these measurements:**
	The *weather measurements* are supplied by	**Refer to part 4 C4 of site information**
	The *weather data* are the records of past *weather measurements* for each calendar month which were recorded at:	**Hendrina Power Station**
	and which are available from:	**the South African Weather Bureau and included in Annexure A to this Contract Data provided by the *Employer***
60.1(13)	Assumed values for the ten year return *weather data* for each *weather measurement* for each calendar month are:	**As stated in Annexure A to this Contract Data provided by the *Employer*.**
7	**Title**	**There is no reference to Contract Data in this section of the core clauses and terms in italics used in this section are identified elsewhere in this Contract Data.**
8	**Risks and insurance**	
80.1	These are additional *Employer*'s risks	**Are as referenced by the Risk Register**

9	**Termination**	**There is no reference to Contract Data in this section of the core clauses and terms in italics used in this section are identified elsewhere in this Contract Data.**
10	**Data for main Option clause**	
A	**Priced contract with activity schedule**	**There is no reference to Contract Data in this Option and terms in italics are identified elsewhere in this Contract Data.**
11	**Data for Option W1**	
W1.2(3)	The *Adjudicator nominating body* is:	**the Chairman of ICE-SA a joint Division of the South African Institution of Civil Engineering and the London Institution of Civil Engineers. (See www.ice-sa.org.za) or its successor body.**
W1.4(2)	The *tribunal* is:	**arbitration.**
W1.4(5)	The *arbitration procedure* is	**the latest edition of Rules for the Conduct of Arbitrations published by The Association of Arbitrators (Southern Africa) or its successor body.**
	The place where arbitration is to be held is	**South Africa**
	The person or organisation who will choose an arbitrator - if the Parties cannot agree a choice or - if the arbitration procedure does not state who selects an arbitrator, is	**the Chairman for the time being or his nominee of the Association of Arbitrators (Southern Africa) or its successor body.**
12	**Data for secondary Option clauses**	
X2	**Changes in the law**	**There is no reference to Contract Data in this Option and terms in italics are identified elsewhere in this Contract Data.**
X5 & X7	**Sectional Completion and delay damages used together**	
X7.1 X5.1	Delay damages for late Completion of the *section*s of the *works* are:	

section	**Description**	**Amount per day**
Detailed Design approval	**30 December 2023**	**1.5% of the activity value per day**
Completion of Main Entrance	**30 January 2023**	**1.5% of the activity value per day**
Remainder of the *works*		

The total delay damages payable by the *Contractor* does not exceed:	**20% of the total contract value**

X16	**Retention**	
X16.1	The *retention free amount* is	**R0.**
	The *retention percentage* is	**10% or (The Contractor to issue a 10% Retention Bond)**
X18	**Limitation of liability**	
X18.1	The *Contractor*'s liability to the *Employer* for indirect or consequential loss is limited to:	**R0.0 (zero Rand)**
X18.2	For any one event, the *Contractor*'s liability to the *Employer* for loss of or damage to the *Employer*'s property is limited to:	**the amount of the deductibles relevant to the event**
X18.3	The *Contractor*'s liability for Defects due to his design which are not listed on the Defects Certificate is limited to	**The greater of** • **the total of the Prices at the Contract Date and** • **the amounts excluded and unrecoverable from the *Employer*'s assets policy for correcting the Defect (other than the resulting physical damage which is not excluded) plus the applicable deductible as at contract date.**
X18.4	The *Contractor*'s total liability to the *Employer* for all matters arising under or in connection with this contract, other than excluded matters, is limited to:	**the total of the Prices other than for the additional excluded matters.** **The *Contractor's* total liability for the additional excluded matters is not limited.** **The additional excluded matters are amounts for which the *Contractor* is liable under this contract for** • **Defects due to his design which arise before the Defects Certificate is issued,** • **Defects due to manufacture and fabrication outside the Site,** • **loss of or damage to property (other than the *works*, Plant and Materials),** • **death of or injury to a person and** • **infringement of an intellectual property right.**
X18.5	The *end of liability date* is	**(i) 3 years after the *defects date* for latent Defects and** **(ii) the date on which the liability in question prescribes in accordance with the Prescription Act No. 68 of 1969 (as amended or in terms of any replacement legislation) for any other matter.** **A latent Defect is a Defect which would not have been discovered on reasonable inspection by the *Employer* or the *Supervisor* before the *defects date*, without requiring any**

		inspection not ordinarily carried out by the *Employer* or the *Supervisor* during that period. If the *Employer* or the *Supervisor* do undertake any inspection over and above the reasonable inspection, this does not place a greater responsibility on the *Employer* or the *Supervisor* to have discovered the Defect.
Z	**The *Additional conditions of contract* are**	**Z1 to Z15 always apply.**

Z1 Cession delegation and assignment

Z1.1 The *Contractor* does not cede, delegate or assign any of its rights or obligations to any person without the written consent of the *Employer.*

Z1.2 Notwithstanding the above, the *Employer* may on written notice to the *Contractor* cede and delegate its rights and obligations under this contract to any of its subsidiaries or any of its present divisions or operations which may be converted into separate legal entities as a result of the restructuring of the Electricity Supply Industry.

Z2 Joint ventures

Z2.1 If the *Contractor* constitutes a joint venture, consortium or other unincorporated grouping of two or more persons or organisations then these persons or organisations are deemed to be jointly and severally liable to the *Employer* for the performance of this contract.

Z2.2 Unless already notified to the *Employer*, the persons or organisations notify the *Project Manager* within two weeks of the Contract Date of the key person who has the authority to bind the *Contractor* on their behalf.

Z2.3 The *Contractor* does not alter the composition of the joint venture, consortium or other unincorporated grouping of two or more persons without the consent of the *Employer* having been given to the *Contractor* in writing.

Z3 Change of Broad Based Black Economic Empowerment (B-BBEE) status

Z3.1 Where a change in the *Contractor's* legal status, ownership or any other change to his business composition or business dealings results in a change to the *Contractor*'s B-BBEE status, the *Contractor* notifies the *Employer* within seven days of the change.

Z3.2 The *Contractor* is required to submit an updated verification certificate and necessary supporting documentation confirming the change in his B-BBEE status to the *Project Manager* within thirty days of the notification or as otherwise instructed by the *Project Manager*.

Z3.3 Where, as a result, the *Contractor's* B-BBEE status has decreased since the Contract Date the *Employer* may either re-negotiate this contract or alternatively, terminate the *Contractor*'s obligation to Provide the Works.

Z3.4 Failure by the *Contractor* to notify the *Employer* of a change in its B-BBEE status may constitute a reason for termination. If the *Employer* terminates in terms of this clause, the procedures on termination are P1, P2 and P3 as stated in clause 92, and the amount due is A1 and A3 as stated in clause 93.

Z4 Confidentiality

Z4.1 The *Contractor* does not disclose or make any information arising from or in connection with this contract available to Others. This undertaking does not, however, apply to information which at the time of disclosure or thereafter, without default on the part of the *Contractor*, enters the public domain or to information which was already in the possession of the *Contractor* at the time of disclosure (evidenced by written records in existence at that time). Should the *Contractor* disclose information to Others in terms of clause 25.1, the *Contractor* ensures that the provisions of this clause are complied with by the recipient.

Z4.2 If the *Contractor* is uncertain about whether any such information is confidential, it is to be regarded as such until notified otherwise by the *Project Manager*.

Z4.3 In the event that the *Contractor* is, at any time, required by law to disclose any such information which is required to be kept confidential, the *Contractor*, to the extent permitted by law prior to disclosure, notifies the *Employer* so that an appropriate protection order and/or any other action can be taken if possible, prior to any disclosure. In the event that such protective order is not, or cannot, be obtained, then the *Contractor* may disclose that portion of the information which it is required to be disclosed by law and uses reasonable efforts to obtain assurances that confidential treatment will be afforded to the information so disclosed.

Z4.4 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*.

Z4.5 The *Contractor* ensures that all his subcontractors abide by the undertakings in this clause.

Z5 Waiver and estoppel: Add to core clause 12.3:

Z5.1 Any extension, concession, waiver or relaxation of any action stated in this contract by the Parties*,* the *Project Manager*, the *Supervisor*, or the *Adjudicator* does not constitute a waiver of rights, and does not give rise to an estoppel unless the Parties agree otherwise and confirm such agreement in writing.

Z6 Health, safety and the environment: Add to core clause 27.4

Z6.1 The *Contractor* undertakes to take all reasonable precautions to maintain the health and safety of persons in and about the execution of the *works*. Without limitation the *Contractor*:

- accepts that the *Employer* may appoint him as the “Principal Contractor” (as defined and provided for under the Construction Regulations 2014 (promulgated under the Occupational Health & Safety Act 85 of 1993) (“the Construction Regulations”) for the Site;
- warrants that the total of the Prices as at the Contract Date includes a sufficient amount for proper compliance with the Construction Regulations, all applicable health & safety laws and regulations and the health and safety rules, guidelines and procedures provided for in this contract and generally for the proper maintenance of health & safety in and about the execution of *works*; and
- undertakes, in and about the execution of the *works*, to comply with the Construction Regulations and with all applicable health & safety laws and regulations and rules, guidelines and procedures otherwise provided for under this contract and ensures that his Subcontractors, employees and others under the *Contractor’s* direction and control, likewise observe and comply with the foregoing.

Z6.2 The *Contractor*, in and about the execution of the *works*, complies with all applicable environmental laws and regulations and rules, guidelines and procedures otherwise provided for under this contract and ensures that his Subcontractors, employees and others under the *Contractor’s* direction and control, likewise observe and comply with the foregoing.

Z7 Provision of a Tax Invoice and interest. Add to core clause 51

Z7.1 Within one week of receiving a payment certificate from the *Project Manager* in terms of core clause 51.1, the *Contractor* provides the *Employer* with a tax invoice in accordance with the *Employer*'s procedures stated in the Works Information, showing the amount due for payment equal to that stated in the payment certificate.

Z7.2 If the *Contractor* does not provide a tax invoice in the form and by the time required by this contract, the time by when the *Employer* is to make a payment is extended by a period equal in time to the delayed submission of the correct tax invoice. Interest due by the *Employer* in terms of core clause 51.2 is then calculated from the delayed date by when payment is to be made.

Z7.3 The *Contractor* (if registered in South Africa in terms of the companies Act) is required to comply with the requirements of the Value Added Tax Act, no 89 of 1991 (as amended) and to include the *Employer*'s VAT number 4740101508 on each invoice he submits for payment.

Z8 Notifying compensation events

Z8.1 Delete from the last sentence in core clause 61.3, "unless the *Project Manager* should have notified the event to the *Contractor* but did not".

Z9 *Employer's* limitation of liability

Z9.1 The *Employer's* liability to the *Contractor* for the *Contractor's* indirect or consequential loss is limited to R0.00 (zero Rand)

Z9.2 The *Contractor*'s entitlement under the indemnity in 83.1 is provided for in 60.1(14) and the *Employer*'s liability under the indemnity is limited.

Z10 Termination: Add to core clause 91.1, at the second main bullet point, fourth sub-bullet point, after the words "against it":

Z10.1 or had a business rescue order granted against it.

Z11 Addition to secondary Option X7 Delay damages (if applicable in this contract)

Z11.1 If the amount due for the *Contractor*'s payment of delay damages reaches the limits stated in this Contract Data for Option X7 or Options X5 and X7 used together, the *Employer* may terminate the *Contractor*'s obligation to Provide the Works using the same procedures and payment on termination as those applied for reasons R1 to R15 or R18 stated in the Termination Table.

Z12 Ethics

For the purposes of this Z-clause, the following definitions apply:

Affected Party means, as the context requires, any party, irrespective of whether it is the *Contractor* or a third party, such party's employees, agents, or Subcontractors or Subcontractor's employees, or any one or more of all of these parties' relatives or friends,

Coercive Action means to harm or threaten to harm, directly or indirectly, an Affected Party or the property of an Affected Party, or to otherwise influence or attempt to influence an Affected Party to act unlawfully or illegally,

Collusive Action means where two or more parties co-operate to achieve an unlawful or illegal purpose, including to influence an Affected Party to act unlawfully or illegally,

Committing Party means, as the context requires, the *Contractor*, or any member thereof in the case of a joint venture, or its employees, agents, or Subcontractor or the Subcontractor's employees,

Corrupt Action means the offering, giving, taking, or soliciting, directly or indirectly, of a good or service to unlawfully or illegally influence the actions of an Affected Party,

Fraudulent Action means any unlawfully or illegally intentional act or omission that misleads, or attempts to mislead, an Affected Party, in order to obtain a financial or other benefit or to avoid an obligation or incurring an obligation,

Obstructive Action means a Committing Party unlawfully or illegally destroying, falsifying, altering or concealing information or making false statements to materially impede an investigation into allegations of Prohibited Action, and

Prohibited Action means any one or more of a Coercive Action, Collusive Action Corrupt Action, Fraudulent Action or Obstructive Action.

Z12.1 A Committing Party may not take any Prohibited Action during the course of the procurement of this contract or in execution thereof.

Z12.2 The *Employer* may terminate the *Contractor*'s obligation to Provide the Services if a Committing Party has taken such Prohibited Action and the *Contractor* did not take timely and appropriate action to prevent or remedy the situation, without limiting any other rights or remedies the *Employer* has. It is not required that the Committing Party had to have been found guilty, in court or in any other similar process, of such Prohibited Action before the *Employer* can terminate the *Contractor*'s obligation to Provide the Services for this reason.

Z12.3 If the *Employer* terminates the *Contractor*'s obligation to Provide the Services for this reason, the amounts due on termination are those intended in core clauses 92.1 and 92.2.

Z12.4 A Committing Party co-operates fully with any investigation pursuant to alleged Prohibited Action. Where the *Employer* does not have a contractual bond with the Committing Party, the *Contractor* ensures that the Committing Party co-operates fully with an investigation.

Z13 Insurance

Z 13.1 Replace core clause 84 with the following:

Insurance cover **84**

84.1 When requested by a Party, the other Party provides certificates from his insurer or broker stating that the insurances required by this contract are in force.

84.2 The *Contractor* provides the insurances stated in the Insurance Table A.

84.3 The insurances provide cover for events which are at the *Contractor*'s risk from the *starting date* until the earlier of Completion and the date of the termination certificate.

INSURANCE TABLE A

Insurance against	Minimum amount of cover or minim limit of indemnity
Loss of or damage to the *works*, Plant and Materials	The replacement cost where not covered by the *Employer*'s insuranc

	The *Employer*'s policy deductible, as at Contract Date, where covered by the *Employer*'s insurance
Loss of or damage to Equipment	The replacement cost
Liability for loss of or damage to property (except the *works*, Plant and Materials and Equipment) and liability for bodily injury to or death of a person (not an employee of the *Contractor*) caused by activity in connection with this contract	Loss of or damage to property *Employer*'s property The replacement cost where not covered by the *Employer*'s insurance The *Employer*'s policy deductible, as at Contract Date, where covered by the *Employer*'s insurance Other property The replacement cost Bodily injury to or death of a person The amount required by applicable law
Liability for 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	The amount required by the applicable law

Z 13.2 **Replace core clause 87 with the following:**
The *Employer* provides the insurances stated in the Insurance Table B.

INSURANCE TABLE B

Insurance against or name of policy	**Minimum amount of cover or minimum l of indemnity**
Assets All Risk	Per the insurance policy document
Contract Works insurance	Per the insurance policy document
Environmental Liability	Per the insurance policy document
General and Public Liability	Per the insurance policy document
Transportation (Marine)	Per the insurance policy document
Motor Fleet and Mobile Plant	Per the insurance policy document
Terrorism	Per the insurance policy document
Cyber Liability	Per the insurance policy document
Nuclear Material Damage and Business Interruption	Per the insurance policy document
Nuclear Material Damage Terrorism	Per the insurance policy document

Z14 Nuclear Liability

Z14.1 The *Employer* is the operator of the Koeberg Nuclear Power Station (KNPS), a nuclear installation, as designated by the National Nuclear Regulator of the Republic of South Africa, and is the holder of a nuclear licence in respect of the KNPS.

Z14.2 The *Employer* is solely responsible for and indemnifies the *Contractor* or any other person against any and all liabilities which the *Contractor* or any person may incur arising out of or resulting from nuclear damage, as defined in Act 47 of 1999, save to the extent that any liabilities are incurred due to the unlawful intent of the *Contractor* or any other person or the presence of the *Contractor* or that person or any property of the *Contractor* or such person at or in the KNPS or on the KNPS site, without the permission of the *Employer* or of a person acting on behalf of the *Employer*.

Z14.3 Subject to clause Z14.4 below, the *Employer* waives all rights of recourse, arising from the aforesaid, save to the extent that any claims arise or liability is incurred due or attributable to the unlawful intent of the *Contractor* or any other person, or the presence of the *Contractor* or that person or any property of the *Contractor* or such person at or in the KNPS or on the KNPS site, without the permission of the *Employer* or of a person acting on behalf of the *Employer*.

Z14.4 The *Employer* does not waive its rights provided for in section 30 (7) of Act 47 of 1999, or any replacement section dealing with the same subject matter.

Z14.5 The protection afforded by the provisions hereof shall be in effect until the KNPS is decommissioned.

Z15 Asbestos

For the purposes of this Z-clause, the following definitions apply:

AAIA means approved asbestos inspection authority.

ACM means asbestos containing materials.

AL means action level, i.e. a level of 50% of the OEL, i.e. 0.1 regulated asbestos fibres per ml of air measured over a 4 hour period. The value at which proactive actions is required in order to control asbestos exposure to prevent exceeding the OEL.

Ambient Air means breathable air in area of work with specific reference to breathing zone, which is defined to be a virtual area within a radius of approximately 30cm from the nose inlet.

Compliance Monitoring means compliance sampling used to assess whether or not the personal exposure of workers to regulated asbestos fibres is in compliance with the Standard's requirements for safe processing, handling, storing, disposal and phase-out of asbestos and asbestos containing material, equipment and articles.

OEL means occupational exposure limit.

Parallel Measurements means measurements performed in parallel, yet separately, to existing measurements to verify validity of results.

Safe Levels means airborne asbestos exposure levels conforming to the Standard's requirements for safe processing, handling, storing, disposal and phase-out of asbestos and asbestos containing material, equipment and articles.

Standard means the *Employer*'s Asbestos Standard 32-303: Requirements for Safe Processing, Handling, Storing, Disposal and Phase-out of Asbestos and Asbestos Containing Material, Equipment and Articles.

SANAS means the South African National Accreditation System.

TWA means the average exposure, within a given workplace, to airborne asbestos fibres, normalised to the baseline of a 4 hour continuous period, also applicable to short term exposures, i.e. 10-minute TWA.

Z15.1 The *Employer* ensures that the Ambient Air in the area where the *Contractor* will Provide the Services conforms to the acceptable prescribed South African standard for asbestos, as per the regulations published in GNR 155 of 10 February 2002, under the Occupational Health and Safety Act, 1993 (Act 85 of 1993) ("Asbestos Regulations"). The OEL for asbestos is 0.2 regulated asbestos fibres per millilitre of air as a 4-hour TWA, averaged over any continuous period of four hours, and the short term exposure limit of 0.6 regulated asbestos fibres per millilitre of air as a 10-minute TWA, averaged over any 10 minutes, measured in accordance with HSG248 and monitored according to HSG173 and OESSM.

Z15.2 Upon written request by the *Contractor*, the *Employer* certifies that these conditions prevail. All measurements and reporting are effected by an independent, competent, and certified occupational hygiene inspection body, i.e. a SANAS accredited and Department of Employment and Labour approved AAIA. The *Contractor* may perform Parallel Measurements and related control measures at the *Contractor*'s expense. For the purposes of compliance the results generated from Parallel Measurements are evaluated only against South African statutory limits as detailed in clause Z15.1. Control measures conform to the requirements stipulated in the AAIA-approved asbestos work plan.

Z15.3 The *Employer* manages asbestos and ACM according to the Standard.

Z15.4 In the event that any asbestos is identified while Providing the Services, a risk assessment is conducted and if so required, with reference to possible exposure to an airborne concentration of above the AL for asbestos, immediate control measures are implemented and relevant air monitoring conducted in order to declare the area safe.

Z15.5 The *Contractor*'s personnel are entitled to stop working and leave the contaminated area forthwith until such time that the area of concern is declared safe by either Compliance Monitoring or an AAIA approved control measure intervention, for example, per the emergency asbestos work plan, if applicable.

Z15.6 The *Contractor* continues to Provide the Services, without additional control measures presented, on presentation of Safe Levels. The contractually agreed dates to Provide the Services, including the Completion Date, are adjusted accordingly. The contractually agreed dates are extended by the notification periods required by regulations 3 and 21 of the Asbestos Regulations, 2001.

Z15.7 Any removal and disposal of asbestos, asbestos containing materials and waste, is done by a registered asbestos contractor, instructed by the *Employer* at the *Employer*'s expense, and conducted in line with South African legislation.

Annexure A: One-in-ten-year-return *weather data* obtained from SA Weather Bureau for [weather station]

If any one of these *weather measurements* recorded within a calendar month, before the Completion Date for the whole of the *works* and at the place stated in this Contract Data is shown to be more adverse than the amount stated below then the *Contractor* may notify a compensation event.

	Weather measurement				
Month	Cumulative rainfall (mm)	Number of days with rain more than 10mm	Number of days with min air temp **<** 0 deg.C	Number of days with snow lying at 08:00 CAT	[Other measurements if applicable]
January	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	
February	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	
March	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	
April	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	
May	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	
June	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	
July	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	
August	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	
September	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	
October	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	

November	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	
December	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	Data obtained from SA Weather Bureau	

Only the difference between the more adverse recorded weather and the equivalent measurement given above is taken into account in assessing a compensation event.

C1.2 Contract Data

Part two - Data provided by the *Contractor*

)Whenever a cell is shaded in the left hand column it denotes this data is optional. If not required select and delete the whole row, otherwise insert the required Data.]

Notes to a tendering contractor:

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

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

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

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

		CV's (and further key persons data including CVs) are appended to Tender Schedule entitled .
11.2(3)	The *completion date* for the whole of the *works* is	
11.2(14)	The following matters will be included in the Risk Register	
11.2(19)	The Works Information for the *Contractor*'s design is in:	
31.1	The programme identified in the Contract Data is	
A	**Priced contract with activity schedule**	
11.2(20) 11.2(30)	The *activity schedule* is in The tendered total of the Prices is	**(in figures)** **(in words), excluding VAT**
	Data for Schedules of Cost Components	*Note "SCC" means Schedule of Cost Components starting on page 60, and "SSCC" means Shorter Schedule of Cost Components starting on page 63 of ECC3 (April 2013).*
A	**Priced contract with activity schedule**	**Data for the Shorter Schedule of Cost Components**

Pro forma Retention Money Guarantee (may be used when Option X16 applies)

(to be reproduced exactly as shown below on the letterhead of the Bank providing the Guarantee)

Eskom Holdings SOC Limited
Megawatt Park
Maxwell Drive
Sandton
Johannesburg Date:

Dear Sirs

Reference No. **[●]** *[Drafting Note: Bank reference number to be inserted]*

Retention Money Guarantee: *[Drafting Note: Name of Contractor to be inserted]*

Project [ ] : Contract Reference: *[Drafting Note: Contractor contract reference number to be inserted]*

1. In this Guarantee the following words and expressions shall have the following meanings:-

1.1 "Bank" - means [●], [●] Branch, (Registration No. [●]); [Drafting Note: Name of Bank to be inserted]

1.2 "Bank's Address" - means [●]; [Drafting Note: Bank's physical address to be inserted]

1.3 "Contract" – means the written agreement relating to the Project, entered into between Eskom and the Contractor, on or about the [●] day of [●] 200[●] (Contract Reference No. ……. as amended, varied, restated, novated or substituted from time to time; [Drafting Note: Signature Date and Contract reference number to be inserted]

1.4 "Contractor" – means [●] a company registered in accordance with the laws of [●] under Registration Number [●]. [Drafting Note: Name and details of Contractor to be inserted]

1.5 "Eskom" - means Eskom Holdings SOC Limited, a company registered in accordance with the laws of the Republic of South Africa under Registration Number 2002/015527/30

1.6 "Expiry Date" - means the date on which the Defects Certificate is issued in terms of the Contract.

1.7 "Guaranteed Sum" - means the sum of R [●] ([●] Rand); [Drafting Note: Insert amount of Retention Money Guarantee.].

1.8 "Project" - means the……..

2. At the instance of the Contractor, we the undersigned _____ and _____, in our respective capacities as _____ and _____ of the Bank, and duly authorized thereto, confirm that we hold the Guaranteed Sum at the disposal of Eskom, as security for the proper performance by the Contractor of all of its obligations in terms of and arising from the Contract and hereby undertake to pay to Eskom, on written demand from Eskom received prior to the Expiry Date, any sum or sums not exceeding in total the Guaranteed Sum.

3. A demand for payment under this guarantee shall be made in writing at the Bank's address and shall:

3.1 be signed on behalf of Eskom by a director of Eskom or his authorised delegate.

3.2 state the amount claimed ("the Demand Amount');

3.3 state that the Contractor has failed to carry out his obligation(s) to rectify certain defect(s) for which he is responsible under the Contract (and the nature of such defect(s)) alternatively that the Demand Amount

is payable to Eskom in the circumstances contemplated in the Contract.

4. Notwithstanding the reference herein to the Contract the liability of the Bank in terms hereof is as principal and not as surety and the Bank's obligation/s to make payment:

4.1 is and shall be absolute provided demand is made in terms of this bond in all circumstances; and

4.2 is not, and shall not be construed to be, accessory or collateral on any basis whatsoever.

5. The Bank's obligations in terms of this Guarantee:

5.1 shall be restricted to the payment of money only and shall be limited to the maximum of the Guaranteed Sum; and

5.2 shall not be discharged and compliance with any demand for payment received by the Bank in terms hereof shall not be delayed by the fact that a dispute may exist between Eskom and the Contractor.

6. Eskom shall be entitled to arrange its affairs with the Contractor in any manner which it sees fit, without advising us and without affecting our liability under this Guarantee. This includes, without limitation, any extensions, indulgences, release or compromise granted to the Contractor or any variation under or to the Contract.

7. Should Eskom cede its rights against the Contractor to a third party where such cession is permitted under the Contract, then Eskom shall be entitled to cede to such third party the rights of Eskom under this Guarantee on written notification to the Bank of such cession.

8. This Guarantee:

8.1 shall expire on the Expiry Date until which time it is irrevocable;

8.2 is, save as provided for in **Error! Reference source not found.** above, personal to Eskom and is neither negotiable nor transferable;

8.3 shall be returned to the Bank upon the earlier of payment of the full Guaranteed Sum or expiry hereof;

8.4 shall be regarded as a liquid document for the purpose of obtaining a court order; and

8.5 shall be governed by and construed in accordance with the law of the Republic of South Africa and shall be subject to the jurisdiction of the Courts of the Republic of South Africa.

8.6 Any claim which arises or demand for payment received after expiry date will be invalid and unenforceable.

9. The Bank chooses domicilium citandi et executandi for all purposes in connection with this Guarantee at the Bank's Address.

Signed at _____ Date _____ Bank's seal or stamp

For and behalf of the Bank

Bank Signatory: _____ Bank Signatory: _____

Witness: _____ Witness: _____

PART 2: PRICING DATA
ECC3 Option A

Document reference	Title	No of pages
C2.1	Pricing assumptions: Option A	2
C2.2	The *activity schedule*	1

C2.1 Pricing assumptions: Option A

How work is priced and assessed for payment

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

Identified and defined terms 11 11.2

(20) The Activity Schedule is the *activity schedule* unless later changed in accordance with this contract.

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

- each group of completed activities and
- each completed activity which is not in a group.

A completed activity is one which is without Defects which would either delay or be covered by immediately following work.

(30) The Prices are the lump sum prices for each of the activities on the Activity Schedule unless later changed in accordance with this contract.

This confirms that Option A is a lump sum form of contract where the work is broken down into activities, each of which is priced by the tendering contractor as a lump sum. Only completed activities are assessed for payment at each assessment date; no part payment is made if the activity is not completed by the assessment date.

Function of the Activity Schedule

Clause 54.1 in Option A states: "Information in the Activity Schedule is not Works Information or Site Information". This confirms that specifications and descriptions of the work or any constraints on how it is to be done are not included in the Activity Schedule but in the Works Information. This is further confirmed by Clause 20.1 which states, "The *Contractor* Provides the Works in accordance with the Works Information". Hence the *Contractor* does **not** Provide the Works in accordance with the Activity Schedule. The Activity Schedule is only a pricing document.

Link to the programme

Clause 31.4 states that "The *Contractor* provides information which shows how each activity on the Activity Schedule relates to the operations on each programme which he submits for acceptance". Ideally the tendering contractor will develop a high level programme first then resource each activity and thus arrive at the lump sum price for that activity both of which can be entered into the *activity schedule*.

Preparing the *activity schedule*

Generally it is the tendering contractor who prepares the *activity schedule* by breaking down the work described within the Works Information into suitable activities which can be well defined, shown on a programme and priced as a lump sum.

The *Employer*, in his Instructions to Tenderers or in a Tender Schedule, may have listed some items that he requires the *Contractor* to include in his *activity schedule* and be priced accordingly.

It is assumed that in preparing his *activity schedule* the *Contractor:*

- Has taken account of the guidance given in the ECC3 Guidance Notes pages 19 and 20;
- Understands the function of the Activity Schedule and how work is priced and paid for;
- Is aware of the need to link the Activity Schedule to activities shown on his programme;
- Has listed and priced activities in the *activity schedule* which are inclusive of everything necessary and incidental to Providing the Works in accordance with the Works Information, as it was at the time of tender, as well as correct any Defects not caused by an *Employer's* risk;
- Has priced work he decides not to show as a separate activity within the Prices of other listed

activities in order to fulfil the obligation to complete the *works* for the tendered total of the Prices.

- Understands there is no adjustment to the lump sum Activity Schedule price if the amount, or quantity, of work within that activity later turns out to be different to that which the *Contractor* estimated at time of tender. The only basis for a change to the Prices is as a result of a compensation event.

An activity schedule could have the following format:

Item No.	**Programme Reference**	**Activity description**	**Price**

C2.2 the *activity schedule*

Use this page as a cover page to the *Contractor*'s *activity schedule*.

PART 3: SCOPE OF WORK

Document reference	Title	No of pages
	This cover page	1
C3.1	*Employer*'s Works Information	
C3.2	*Contractor*'s Works Information	
	Total number of pages	

C3.1: EMPLOYER'S WORKS INFORMATION

Contents

1 Description of the *works*

1.1 Executive overview

The aim of the project is to install CCTV Surveillance system with intruder detection that will enable to monitor and enhance the security at Hendrina Power Station. The appointed Contractor will be required to execute the system installation and his work will include; complete design, provision of all required materials, installation and commissioning including decommissioning of the existing system, as well as address defects identified. All CCTV Surveillance cameras will be monitored from security control room 24/7 day and night on all areas that are monitored by the installed cameras. The analogy of the objective of the project is shown in figure 1.

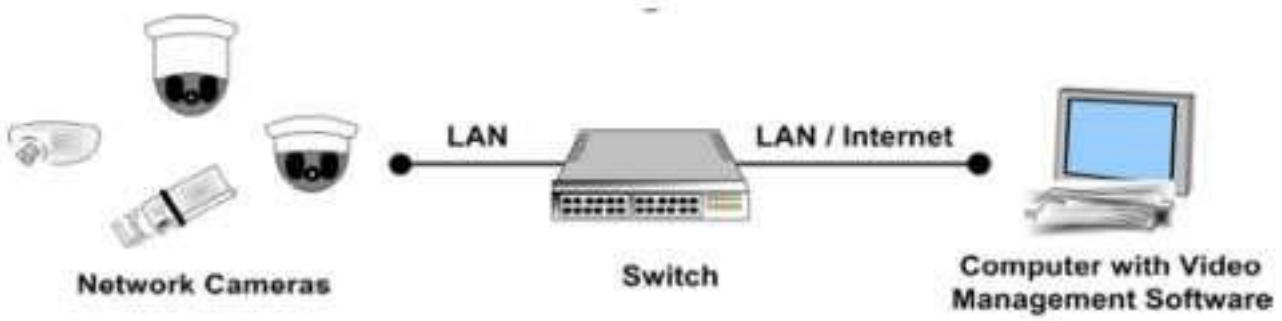

Figure 1: CCTV Surveillance system

1.2 *Employer*'s objectives and purpose of the *works*

The use of CCTV surveillance systems is to enhance the surveillance in Hendrina Power Station due to characteristics such as digital transmission of video, as well as digital storage of video for security purposes. A CCTV surveillance system provides a means to store and transmit visual footage of incidents within the site which can then be reviewed and analysed in detail.

The CCTV installations will be primarily intended for verification purposes, i.e. the visuals should be of such a quality that an observer can, with a high degree of certainty, determine whether there are intruders, the number of intruders, their actions and any equipment they may be carrying such as saws, guns, plate recognition for vehicles, facial recognition features, etc.

Should an intrusion incident occur, the intruder detection system shall be triggered by means of intruder detection units (typically video analytics on the perimeter cameras). The alarms and visuals shall be stored on site as well as transmitted to the dedicated security alarm control room in the main security building where the security personnel can assess the situation and then take the necessary responsive actions. The operators in the security control room shall have full control over the camera units. This will enable the operator to obtain visuals of an intruder.

The communication link between the site equipment (network cameras) and the security control room shall be by means of a dedicated and secure communication medium between the sites and the security control room and take place over Eskom's telecommunications network. The network cameras may achieve digital transmission of video by Cat ethernet cable to the network switches which will be linked by means of fibre.

1.3 Interpretation and terminology

Definition	Description
Critical Asset	Facilities, systems, and equipment which, if destroyed, degraded, or otherwise rendered unavailable, would affect the reliability or operability of the electricity supply network.
Critical cyber assets	Cyber assets essential to the reliable operation of critical assets.
Cyber Asset	Programmable electronic devices and communication networks including hardware, software, and data.
Cyber Security	Cyber security is the collection of tools, policies, security concepts, security safeguards, guidelines, risk management approaches, actions, training, best practices, assurance and technologies that can be used to protect the cyber environment and organization and user's assets. Organization and user's assets include connected computing devices, personnel, infrastructure, applications, services, telecommunications systems, and the totality of transmitted and/or stored information in the cyber environment. Cyber security strives to ensure the attainment and maintenance of the security properties of the organization and user's assets against relevant security risks in the cyber environment. The general security objectives comprise the following: Availability Integrity, which may include authenticity and non-repudiation Confidentiality
Fail Safe	A device or practice that in the event of a specific type of failure, responds or results in a way that will cause no harm, or at least minimizes harm, to other devices or to personnel
Fail Secure	A device which, if (or when) it fails, does so in a way that will cause no harm or at least a minimum of harm to other devices or danger to personnel, and doesn't cause the system to be insecure
Gooseneck	Pedestal used to install card readers or intercoms at drive-up and pedestrian access points
Access Control	In physical security, refers to the practice of restricting entrance to, exit from, and within a property, building or designated area to authorized persons, vehicles, tools, equipment and materials. Access control can be achieved through manual or technological means, or in combination. The principles of access control require the integration of hardware (physical barrier devices), software, people and procedures.
Access Control System	Access Control Systems are designed to determine who and what are allowed to enter or exit, and when they are allowed to enter and exit. These systems will normally keep a record of authorised entry and must also identify attempts of unauthorised access or egress. They also provide real-time data on persons/machinery on the premises to assist responders in the event of an emergency.
Application System	An Application System is a computer program designed to solve a particular business problem or to be used for a particular user-defined requirement. It could be in-house developed or bought and customized, configured for Eskom e.g. SAP, Maximo.
Basic Design	Describes the stakeholder needs (with a process focus), to be delivered by the proposed business solution. Defines the business solution requirements in terms of narratives, information flow, business rules, people, application systems and the required governance elements.
Conceptual Design	High level statements of the business need, aligned to the organisational strategy, with a focus on the high-level processes, linking it to the business objectives and the process objectives.

Functional Responsibility	Process owner
General Access	Security permissions which allow access to Eskom general areas.
Group Security	Formulates security policy and strategy and establishes security governance mechanisms.
Informative Reference	Refers to documents that are used as additional information or useful information that relates to the PCM.
Measure	A unit of information that provides meaningful insight into an activity or event. It may be an aggregate or summation.
Normative Reference	Normative references are references that are indispensable for the application of this document, i.e., documents to be used together with this document. This refers to the Eskom Policies, Procedures, Standards and Guidelines, or legislation that establishes the governance over the process and to which users of the PCM must comply.
Record	A Record is defined as data generated as a result of business activities. A class of records can be added to a Records register. Content based records cannot be amended, as this would invalidate their content. The information is historical and it includes documents stating results of activities performed (examples: archived e-mail, previous versions of controlled documents, minutes of meeting, Correspondence, Data files, Drawings, Lists, Checklists, Logs, Meeting documents, Registers, Reports, Source code and Statements).
Risk	A Risk is defined as an event, hazard, variance, or an opportunity, which could influence the achievement of Eskom's strategic, operational and compliance objectives, for example noncompliance with legislation, fraud, natural disasters or competition. Risk is a measure of uncertainty. The chance of something happening that will have an impact on objectives. In the business process, the uncertainty is about the achievement of objectives.
Security Operations	Provide security services to the organization.
Security Solution	A security solution is the appropriate solution, method, technique or skill to address a security gap / deficiency or satisfy a need or objective. A security solution could include a physical, logical, technical system, application, barrier, procedure, guard force, monitoring, response, executive protection programme.
Security Technical System	A security technical system relates to a specific field or subject in Security Management and it consists of a combination of interrelated interacting artefacts and components designed to work as a coherent entity to limit, prevent or eliminate the exposure to a security threat.
Specific Access	Refers to security permissions which allow access to any Eskom areas above general areas, requiring additional authorization.
Television (CCTV)	Is a TV system in which signals are not publicly distributed but are monitored, primarily for surveillance and security purposes.
CCTV camera	The unit that contains an imaging device that produces a video signal from an optical image.
CCTV equipment	The unit that contains a CCTV camera, lens and ancillary equipment.
CCTV control unit	The equipment used to control and monitor the operational functions of a CCTV system.
Contractor	service provider, consultant or supplier that has been deemed successful (via a tender process) to provide the required service
Controlled disclosure	controlled disclosure to external parties (either enforced by law, or discretionary).

Network Video Recorder (NVR)	A Digital Video Recorder which is connected to a network rather than directly to cameras.
Nuisance Alarm	Alarm generated when a detection system triggers for something other than an intruder (e.g. a bird sets off an alarm). Note: The term 'nuisance alarm' is used rather than the more common 'false alarm'. This is because 'false' implies that the sensor is broken whereas 'nuisance' indicates that the sensor did detect something (e.g. a bird), but not the thing that it is installed to detect (human intruder).
Power-over-Ethernet (PoE)	Is a technology that lets network cables carry electrical power.
Operational Technology (OT)	OT is the technology that is used to operate, monitor and control the power system (As opposed to Information Technology (IT) which is the infrastructure used for corporate services). For further clarification see Eskom Standard 240-55683502
Video Analytics	An electronic method of automatically analysing video images to detect specific types of events (more advanced than Video Motion Detection).
Video Management System (VSM)	Software used to connect to multiple DVRs or NVRs and view the footage from the attached cameras.
Video Motion Detection	An electronic method of detecting a change in the field of view of a camera.
Surveillance	Observation or inspection of persons or premises for security purposes through alarm systems, CCTV systems, or other monitoring methods.
Uninterrupted Power Supply (UPS)	A device that provides battery backup in the event that the primary power source to an electrical system is interrupted, fails or falls below a level of power which is required for the operation of the electrical system in question. The UPS system may provide backup power for a period of minutes or several hours.

The following abbreviations are used in this Works Information:

Abbreviation & Acronyms	Description
C&I	Control and Instrumentation
CCCC	Central Change Control Committee
EC	Engineering Change
ECM	Engineering Change Management
IAC	Integrated Access Control
NKP	National Key Point
PCM	Process Control Manual
OEM	Original Equipment Manufacturer
RACI	Responsibility, Accountability, Consult and Inform
RFID	Radio Frequency Identification
ROC	Required Operational Capability
SANS	South African National Standards
SHE	Safety, Health & Environmental
SRD	Stakeholders Requirements Definition

VPN	Virtual Private Network
QIP	Quality Inspection Plan
CCTV	Closed Circuit Television (TV)
HMI	Human Machine Interface
IP	Internet Protocol
OBL	Outside battery limits
PoE	Power over Ethernet
UPS	Uninterruptable Power Supply
NVR	Network Video Recorder
ECM	Engineering Change Management
EAL	Eskom Academy of Learning
VCR	Video Cassette Recorder.
HVAC	Heating, ventilation, and air conditioning.

2 Management and start up.

2.1 Management meetings

Regular meetings of a general nature may be convened and chaired by the *Project Manager* as follows:

Title and purpose	Approximate time & interval	Location	Attendance by:
Risk register and compensation events		Projects Boardroom or Ms Teams	*Employer*, *Contractor and Supervisor*
Overall contract progress and feedback	Weekly	Projects Boardroom or Ms Teams	*Employer*, *Contractor and Supervisor*
Kick off Meeting	Once off, after contract start date	Projects Boardroom or Ms Teams	*Employer*, *Contractor and Supervisor*

Meetings of a specialist nature may be convened as specified elsewhere in this Works Information or if not so specified by persons and at times and locations to suit the Parties, the nature and the progress of the *works*. Records of these meetings shall be submitted to the *Project Manager* by the person convening the meeting within five days of the meeting.

All meetings shall be recorded using minutes or a register prepared and circulated by the person who convened the meeting. Such minutes or register shall not be used for the purpose of confirming actions or instructions under the contract as these shall be done separately by the person identified in the *conditions of contract* to carry out such actions or instructions.

3 Documentation control

3.1 General

- The *Contractor* is informed that documentation control is a crucial element in the project and the sign-off of the project and various stages will depend on the available, submitted and approved documentation in the possession of the *Project Manager* so signed off by the *Project Manager*, Engineering representative and *Documentation Centre Configuration Manager* of Hendrina Power station. Documentation not complying with the set standards and requirements of the Eskom Hendrina Power Station's Configuration management guidelines, procedures will not be accepted and will constitute non-payment and breach of contract.
- The *Contractor's* document system complies with ISO 9001 requirements and is comprehensive in management and control of the documentation for each of the units based on a master document. The documentation requirements cover the various engineering stages, from the design stage through fabrication, installation, testing, commissioning, operating, maintenance and training stage of the project. Not only must these documents be comprehensive and complete but must comply with strict document control and revision procedures.
- The *Contractor* provides the configuration management (CM) plan, at tender, that will be implemented in line with the ISO 10007 Guidelines for Configuration Management. The CM plan should reflect where Configuration Management is in the project Structure, a technical document and record management procedure as well as the Change management procedure the *Contractor* will be using.

- The *Contractor* plans the supply of the documentation during the various project stages and provides the documents in accordance with the key scheduled project milestone dates.
- All the drawings issued by the *Employer* for this contract is copyright protected and are not to be copied by the *Contractor* or shared with any third party without the *suppliers* consent.
- The *Contractor* submits all documentation on a formal transmittal form in triplicate to the *Project Manager.* All manuals, guidelines, procedures, general documents and formal engineering documentation shall be presented in British English.

The following general assumptions are made:

- The *Contractor* will be able to understand the historic documentation and provide a solution to the proposed changes required to the plant
- The *Contractor* understands that this is a live plant that will be running and that the works needs to be planned to ensure that the plant switchover is smooth and without incident as this could result in environmental excursions, production loss and injury.
- The *Contractor* understands the dynamics of control system to the extent that the software will not pose a threat to the operations and safety of the site and operating staff alike.

3.2 Documentation Control and Management

- A comprehensive documentation management system is provided. All documentation is maintained and updated until *Completion*. Any change is propagated automatically to all related documentation. All documentation forms an integral part of the documentation system.
- The KKS plant position codes are identified in the documentation. KKS codes, down to third level, are to be used. The *Contractor* includes the *Project Manager* accepted drawing head on all drawings

submitted to the *Project Manager*. The format of all documents is submitted to the *Project Manager* for acceptance.

- Automatic prevention of duplication of numbering or ambiguity is built into the system.

3.3 Process for Documentation Submission

- The layout and format of all documentation deliverables must be in accordance with the Gx Projects Documentation Deliverable Requirements Specification (240-65459834) and Engineering Drawing Standard (240-86973501). All documentation submitted must be accompanied by the completed transmittal with the following fields as a minimum: (Refer to 240-71448626 - Project Plant Specific Technical Documentation Transmittal Template.)

i. Name of the Package and system
ii. Name of Contractor
iii. Transmittal Number
iv. Contractor Details
v. Date of Submission
vi. Description of Document
vii. Document Number
viii. Document revision
ix. Document type
x. Document media type
xi. Number of copies
xii. Purpose of submission
xiii. Document PBS
xiv. Signed by and date

- For review purpose, all documentation is submitted, by the *Contractor*, in native electronic format and PDF format as described in Gx Projects Documentation Deliverable Requirements Specification (240-65459834), and all drawings as prescribed in the Engineering Drawing Standard – Common Requirements (240-86973501), Final documentation is submitted in both electronic and hard copies to the Project and Hendrina Power station Documentation.
- The *Contractor* is to supply four (4) hard copies and two (2) electronic copies of all drawings, specifications, operating manuals and instructions that are required to maintain and operate the assembly prior to commissioning of the plant.
    - Submission of documentation deliverables must be in accordance to the task completion or no later than 14 calendar days after completion of task.
- The Contractor submits all documentation to the Project Manager and/or the Configuration Manager:

i. Electronic copies shall be submitted to the *Project Manager*. The email subject as a minimum has the following: ***(Station_Project Name_Discipline_Subject)***. The project's Document Controller is copied on submission. Electronic copies that are too large for email is delivered on CD/DVD, large file transfer protocol and/or hard drives to the Project Documentation Centre.
ii. All the submission by the *Contractor* must be accompanied by the Transmittal note.
iii. By acknowledging receipt, the *Contractor* signs and sends the transmittal note back to the *Employer* within 2 working days.

3.4 CAD Systems

- The *Employer* uses an Intergraph Micro Station as the CAD system. All drawings supplied under this contract will be in the required Micro Station CAD format Acceptance is obtained from the *Project Manager* for the format, content, layout and quality of all drawings supplied as part of the *Works* and is included in the documentation synopsis.
- The *Contractor* shall supply all drawings in the required format which is Microstation version 7SE/8i, according to the specified drawing format and standards 36-945, 36-945, 36-946. Accompanying the new drawings will be the item list with full component descriptions. Drawings not complying with the Standards will not be accepted by the *Employer*. The *Contractor* should factor the cost of creating the drawings in the in the required format as part of the quotation submitted for tender approval.
- The *Contractor* shall contact the *Supplier's Project Manager* or drawing office *Configuration* manager in writing for other related information or clarity on drawings related matters.
- At the completion of the last stage of the *Works*, the *Contractor* supplies a copy of uncompressed data files reflecting all latest revisions of all drawings. Any programme software licenses and agreement for software packages that are used for the *Works* form part of the *Works* and are handed to the *Project Manager*.

- After completion of the drawings all shall be submitted to the *Project Manager* for approval by the *Engineer* during this time request shall be made for:
    1. Verification of the application of the drawing standard and format.
    2. Allocation of drawing numbers.
    3. Allocation of KKS codes.

- The *Supplier* approves/signs all blocks in the title blocks except for "KKS APP" block. The *supplier* will sign the following blocks prior to final submission after approval of all the concerned parties:

  AUTH BY: by the *Supplier s Engineer*

  CHCKD BY: by the *Supplier Engineer / Technician*

  APPROVED BY: by the Supplier Senior / Site Manager
  The *Contractor* shall ensure that the final Drawings are officially approved, signed and handed-over to the *Project Manager* in the correct size accompanied by an editable soft copy in DNG on a CD. The *Project Manager* shall ensure that the all documental data is handed over the design and specifications department.

3.5 Cabling Documentation

- The *Contractor* provides the cabling documentation for the control and power cables for the monitoring and protection systems. The *Contractor* provides the cable schedules inclusive of origin, target, type and size specification for all new cables required for the *Works*. The *Employer* assists with the assignment of cable numbers for all cables installed.
- The *Contractor* provides a cable management system for duration of the *Works*, for acceptance by the *Project Manager.*
- The *Contractor* provides the termination schedules for all cables that form part of the *Works*. The *Contractor* transfers all cable schedule information in electronic format (MS Office). A printout of the cable information contained on the disk serves as the official documentation.
- The cable information supplied by the *Contractor* should also include all the relevant information regarding the cables that are decommissioned as part of the *Works.*

3.6 Documentation Review and Turn-around

- All document review periods are as the reply period in the Contract data. Design review, as per design review procedure (240-53113685), response period will be 2 weeks.
- All correspondences are recorded in a formal letter with the letter head and must have correspondence number as agreed with the *Project Manager* A register of all correspondences is kept by both the *Project Manager* and *Contractor*. The *Contractor* submits a report of the updated register to the *Project Manager* on a monthly basis. The correspondence register must contain the following information as a minimum:
    i. Correspondence number
    ii. Date of issue
    iii. Description of the correspondence
    iv. Reference numbers to previous correspondences
    v. Package specific email address need to be created and referenced to.

3.7 Data

- The *Contractor* supplies descriptive data including but not limited to equipment list, price schedules, and speciality item lists in Ms Excel compatible to the *Employer's* latest version. Compliance to this requirement does not constitute compensation event. The aforementioned lists contain the following fields for each item as a minimum:
    i. Functional location
    ii. Tag ID (consistent with *Employers* specifications)
    iii. Description
    iv. Associated drawing and document names (that contain references to this item)
    v. Approval status

4 Health and safety risk management

4.1.1 General

- The *Contractor* shall comply with the health, safety and environmental requirements contained in HSPHO 058 "S*afety, health and environmental specifications for principal contractors"*.
- The *Contractor* shall comply with any other SHE requirements not stated in HSPHO 058, but required by the *Employer or* the law of the South Africa.
- The *Contractor* complies with the Occupational Health and Safety Act no 85 of 1993 and its regulations, Eskom SHE Policy, Standards, Procedures, Guidelines, Specifications and Regulations.
- The *Contractor* is at all times responsible for the supervision of his employees, agents and Sub-Contractors and takes full responsibility and accountability for ensuring that they are competent, compliant and aware of the legal requirements and other requirements and execute the *works* accordingly.
- The *Contractor* ensures that all statutory appointments and appointments required by any Eskom Regulations are made in writing and that all appointees fully understand their responsibilities and are trained and competent to execute their duties.
- The *Employer*, or any person appointed by the *Employer*, may, at any stage during the term of the contract:
    a. Conduct health and safety audits by a competent person regarding all aspects of compliance with the SHEQ Requirements, at any off-site place of work, or the site establishment of the *Contractor*
    b. Refuse any employee, Sub-Contractor or agent of the *Contractor* access to the premises if such a person has been found to commit an unsafe act or any unsafe working practice or is found not to be competent or authorised

c. Issue the *Contractor* with a stop order, should the *Employer* become aware of any unsafe working procedure or condition or any non-compliance.

- The *Contractor* immediately reports any incidents, disabling injury, near miss, first aid incident as well as any threat to health and safety of which it becomes aware at the *works* or on the Site to the *Project Manager*.
- The *Contractor* agrees that the *Employer* is relieved of any and all of its responsibilities and liabilities in terms of the Occupational Health and Safety Act no 85 of 1993 in respect of any acts or omissions of the *Contractor*, and the *Contractor's* employees, agents or Sub-Contractors, to the extent permitted by the Occupational Health and Safety Act no 85 of 199

4.1.2 Eskom policies, standards, procedures, specifications & other statutory & regulatory requirements

- The following policies, standards, procedures, specifications and requirements shall apply:

Table: List of applicable Eskom standards, procedures and specifications

Document Number	Document Title
36-1059	Standard numbering and date system
36-681	Generation plant safety regulations
474-186	Lighting and small power installation
ESKARAAG 4	Operating regulations for high-voltage systems
GGS 0315	Standard drawing practice
GGS 0386	Requirements for control and power cables for power stations
GGS 0445	Drawing number system
HSPHO 020	Access control – protective services
HSPHO 058	Safety, health and environmental specifications for principal contractors
HSPPA006	Quality requirements for quality related items
HSPPIN 003	Waste management procedure
HSPPIN 005	Environmental policy
HSPPIN 032	Environmental emergency preparedness and spillages
HSSSPA001	Label specification

4.1.3 Safety of workers

- The *Contractor* ensures the safety of all persons working in the Site.
- Any hot work, including welding, will be applied for in accordance with the permit to work system. No welding will be allowed on site unless permission is granted in writing by the *Project Manager*.
- All welding, flame cutting and grinding work is properly screened to protect persons from arc flash or eye injuries. Fire blankets are fitted over the scaffolding planks and platforms. Precautions are taken to prevent any objects, welding or grinding splatter from falling
- A Master Permit to Work is used on declared major outages. Permit changes are made during the dead time.

4.1.4 Fire protection

- The *Contractor* ensures that adequate fire fighting apparatus is provided at all his work sites, and that his staff is trained in the use of the apparatus.
- The *Contractor* takes precautions to prevent any occurrence of fires or explosions while carrying out any work near flammable gas and liquid systems. Any tampering with the *Employer's* fire equipment is strictly forbidden.
- All exit doors, fire escape routes, walkways, stairways, stair landings and access to electrical distribution boards must be kept free of obstruction and not be used for work or storage at any time. Fire fighting equipment must remain accessible at all times.
- In case of a fire, report the location and extent of the fire to the Electrical Operating Desk at 086 123 7566, 082 677 5295 or extension 5555 if phoning from an internal landline.
- Take action to safeguard the area to prevent injury and spreading of the fire.

4.1.5 First aid

- The *Contractor* provides a first aid service to his employees and Sub-Contractors. In the case where these prove to be inadequate, like in the event of a serious injury, the *Employer's* Medical Centre and facilities will be available.
- Outside the *Employer's* office hours, the *Employer's* First Aid services are only available for serious injuries and life threatening situations.

- The *Employer* recovers the costs incurred, in the use of the above *Employer's* facilities, from the *Contractor*.

4.1.6 Hazardous substances

- The *Contractor* manages hazardous substances in accordance with the requirements of the Occupational Health and Safety Act no 85 of 1993 and the NEMWA Act. The *Contractor* declares all hazardous chemical substances brought to Site.

4.1.7 Plant safety regulations

- The *Employer*, on request from the *Contractor*, isolates required plant from all sources of danger as described in the Plant Safety Regulations.
- The *Project Manager*, on request, makes available a copy of the latest revision of the Plant Safety Regulations to the *Contractor*.
- The *Contractor* complies with all rules and regulations applicable to plant safety and completes the Workman's Register prior to working on the plant.
- The *Contractor* declares any grinding and welding to be carried out on the workers register.
- At every permit change, the *Contractor* withdraws himself/herself/his staff for that period of permit suspension/revocation and thereafter only proceeds with the *works* after signing onto the new permit.
- The *Contractor* ensures that he/she/all Sub-Contractors/personnel/staff/his visitors are medically, physically and psychologically fit to enter Hendrina Power Station and especially any confined space.
- The *Contractor* is prohibited from entering Radiation Areas.
- The responsibility is on the *Contractor* to ensure that the correct confined space requirements and tests have been met and done by the *Employer* prior to entry into any confined space or hazardous plant areas.
- The *Contractor* ensures that all personnel are competent to carry out the *works*.
- The *Contractor* provides proof of competency for technical and safety aspects and must be available as and when required on site.

5 Environmental constraints and management

- The *Contractor* ensures that all goods, services or *works* supplied in terms of the Contract comply with all applicable environmental legislation.
- The *Contractor* is responsible to keep the work area clean of any rubble. All waste introduced and/or produced on the *Employer's* premises by the *Contractor* for this contract is handled in accordance with the minimum requirements for the Handling and Disposal of Hazardous Waste in terms of Government Legislation as proclaimed by the Department of Water Affairs and Forestry Act 1994 and the Hendrina waste management procedure HSPPIN 003 *"Waste management procedure"*.

6 Quality assurance requirements

6.1 General

- The Contractor complies with all the Employer's Quality requirements and policies.
- On completion of the works, the Quality Inspection Plan will be signed off by the Employer. It shows all hold points and witness points for all critical activities.
- Quality Inspection Plans are signed before assessments are made. For non-compliance, Early Warnings shall be issued with Risk Reduction meetings and in case of continuance; a notification of default shall be issued.
- If the Contractor fails to comply after two notifications of default have been issued, the Employer may terminate the contract.

- The *Contractor* conforms to the following Quality Management requirements:
    a. The quality requirements are as per ISO 9001:2008 and Hendrina Power Station Procedure HSPPA 006 "Q*uality requirements for quality related items"*.
    b. Quality Inspection Plans shall be in the format of FESK 231 "Q*uality inspection plan form"*.

- Documents submitted for review and acceptance by the *Project Manager* 4 days after the Contract Date and prior to the commencement of work are referred to in HSPPA 006.
- The *Contractor* submits a full detailed Contract Quality Plan for acceptance within 4 days of the Contract Date.
- No site work and designs are allowed unless the *Employer* accepts the QCP and QIP's.
- Apart from any statutory data packages required, the *Contractor* also compiles a data package (books) of the relevant drawings, test certificates etc. for each section of work which must be reviewed and signed off by the Supervisor at erection check phase prior to the commencement of the commissioning phase.
- The *Contractor* is responsible for defining the level of QA/QC or inspection to be imposed on his Sub-Contractors and suppliers of material. This level should be based on criticality of equipment and be submitted to the *Project Manager* for acceptance in the form of a QCP or ITP.
- Copy of all work instructions and procedures when requested by the *Project Manager*

- The supplier of the system shall indicate the classification of the system in accordance with Global Accepted Security Standards of SANS 2220-5. The new installation will interface with any existing security alarm system if required.
  Based on the design inputs from stakeholder requirements, NKP requirements, and mostly the Specification for CCTV surveillance system with intruder detection for Eskom Sites the CCTV surveillance system was designed. The process will be through the relevant stakeholders and the contractor which will be appointed for the installation. Contractor(s)s shall be provided with Eskom information required for the design of the system. The contractor(s) shall not disclose any particulars of the project including this specification or the CCTV surveillance system to any other party or authority without written consent from Eskom.

6.2 Normative

[1] IEC 60255-1, Measuring relays and protection equipment – Part 1: Common requirements
[2] IEC 60721-3-3, Classification of groups of environmental parameters and their severities – Stationary use at weather protected locations
[3] SABS-0222-5-2:1999- CCTV Installation guide
[4] SANS 10222-5-1-1:2007- Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: Operational requirements
[5] SANS 10222-5-1-2:2007- Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: System design requirements
[6] SANS 10222-5-1-3:2007- Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: Installation, planning and implementation requirements
[7] SANS 10222-5-1-4: 2003- Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: Testing, commissioning, and hand-over requirements.
[8] SANS 10222-5-1-5: 2003- Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: Maintenance requirements
[9] ISO 9001 Quality Management Systems
[10] SANS 10222-5-2, Electrical security installations Part 5-2: CCTV installations – Application guidelines. [11] SABS-0222-5-2:1999- CCTV Installation guide

[12] SANS 10222-5-1-1:2007- Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: Operational requirements
[13] SANS 10222-5-1-2:2007- Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: System design requirements
[14] SANS 10222-5-1-3:2007- Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: Installation, planning and implementation requirements
[15] SANS 10222-5-1-4: 2003- Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: Testing, commissioning, and hand-over requirements.
[16] SANS 10222-5-1-5: 2003- Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: Maintenance requirements
[17] SANS 10222-5-1-1, Part 5-1-1: CCTV installations — CCTV surveillance systems for use in security applications — Operational requirements
[18] 240-55410927, Cyber security standard for Operational Technology
[19] 240-55683502 Definition of operational technology (OT) and OT / IT collaboration accountabilities
[20] 240-64636794, Standard for Wiring and Cable Marking in Substations
[21] 240-70413291, Specification for Electrical Terminal Blocks
[22] 240-86738968 - Standard for Security Alarm Systems for Protection of Eskom Installations and its
Subsidiaries
[23] 240-91190304: SPECIFICATION FOR CCTV SURVEILLANCE WITH INTRUDER DETECTION
[24] 23748234-01: Earthing and Lightning Protection Standard
[25] 240-93576498: KKS Coding Standard

2.4.2 Informative

[12] 32-86: Integrated Risk Management Policy
[13] 32-84: Security Risk Management Policy
[14] 23-727: Safety, Health, Environment and Quality Policy
[15] 240-58450122: Eskom Firearm and Ammunition Control Procedure

7 Programming constraints

- Within one week of the start date the Employer and Contractor will attend the site kick off meeting. All technical detail will be clarified before the commencement of work in the works information. The Employer will be responsible to ensure no work is performed unless justified by safety.
- The Contractor will provide the Project Manager with a programme for the Employer's approval within five working days of the start date.
- Programme revisions. The Contractor submits a revised programme for the Employer's approval five calendar days prior to site possession dates of each unit.

8 *Contractor*'s management, supervision and key people

- The following additional key persons are provided:
    a. Authorised Person that is qualified in terms of the *Employer's* Plant Safety Regulations. Qualification is obtained through a training course, written exam and a verbal exam by a panel of experts. This person will be responsible to take permits in areas where plant isolations are required.
    b. Supervisor
    c. First-aider
    d. Safety Officer
    e. Quality Controller
- The *Contractor* must submit an organogram as well as a list of people on and off site to the *Project Manager*.
- The *Contractor* will provide the *Project Manager* with a list of management, supervision and key personnel assigned to the project for the *Employer's* approval within five working days of the *start date.*

9 Invoicing and payment

- The *Contractor* submits an invoice to the *Employer's* finance department after an assessment of completed work has been approved by the *Project Manager*.
- The *Contractor* submits an invoicing forecast programme as part of programme of works
- The programme of works is to include cost column for each task on the Gantt chart programme.

The *Contractor* shall address the tax invoice to

Hendrina Power Station
Accounts Payable
Private Bag x1003
Pullenshope
1096

and include on each invoice the following information:

- Name and address of the *Contractor* and the *Service Manager;*
- The contract number and title;
- *Contractor*'s VAT registration number;
- The *Employer*'s VAT registration number: 4740101508;
- Description of service provided for each item invoiced based on the Price List;
- Total amount invoiced excluding VAT, the VAT and the invoiced amount including VAT;

Add procedures for invoice submission and payment (e. g. electronic payment instructions)

10 Insurance provided by the *Employer*

- Take action to safeguard the area to prevent injury and spreading of the fire As per ECC Core Clause 87.1

11 Contract change management

- All official communication between the Contractor and the Employer shall be in the form of an appropriate NEC form and/or letter.
- Any additional changes are added as addendum documentation to the contract and signed off by both Parties

12 Provision of bonds and guarantees

The form in which a bond or guarantee required by the *conditions of contract* (if any) is to be provided by the *Contractor* is given in Part 1 Agreements and Contract Data, document C1.3, Sureties.

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.

13 Records of Defined Cost, payments & assessments of compensation events to be kept by the *Contractor*

- The *Contractor* provides Daily diaries of planned work versus work completed to the Project Manager, the following information is required from the site diary:
    a. Task based risk assessments and tool box talks,
    b. Signed time sheets,
    c. Weather conditions,
    d. Site conditions, Locations where work was being undertaken together with resources being utilised,
    e. Any delays noted (for whatever reason), any notification by people employed by the Contractor regarding difficulties encountered.
    f. Complaints by third parties,
    g. Any work done by Others at the site.
- No standing time claims will be entertained without the relevant proof of presence and activity in the form of a time sheet.
- Proof of expenses must be provided to the Employer as a hard copy as well as a soft copy.
- Equipment is guaranteed for a period of twelve (12) months from date of delivery with a maximum period of eighteen (18) months from date of delivery to site. The warranties and guarantees expressly provided in this contract shall be in lieu of and to the exclusion of any other warranties, conditions or guarantees whether written, oral, implied or statutory except to the extend that such exclusion is prohibited by law

14 Training workshops and technology transfer

Describe type and frequency of on job training workshops, as well as any obligation for technology transfer being included as part of the contract on Completion of the *works*.

15 Engineering and the *Contractor*'s design

The Contractor designs, supplies, delivers, construct, tests, commissions and hands-over all aspects as mentioned in this document and supporting for the fulfilment of the Works.

The engineering change focuses on the installation of CCTV surveillance with intruder detection at the main access points to Hendrina Power Station. The Contractor will be required to execute the system upgrade and his work will include, complete design, provision of all required materials, installation and commissioning including the decommissioning of the existing system, as well as to address defects identified during the process.

15.1 Background

The objective of CCTV is to enhance safety by employing an additional, cost effective, visual intelligence medium to assist security personnel in making security-based decisions. The visual environment created by CCTV will possibly scare off potential intruders, as well as guide security personnel, thus reducing the risk of danger to human life and assets. CCTV surveillance with intruder detection forms part of the overall security system installation which is still ongoing and incorporates security alarm systems and Integrated access control system.

The CCTV surveillance cameras system at Hendrina Power station is composed of Units 1-10 cameras and Security main Gate cameras. The cabinet for Units 1-5 cameras is located at 1-5 control room and for Units 6-10 cabinet is located at 6-10 control room. During the plant inspection it was found that ZERO cameras are working and each UNITS had at most 5 cameras instead of 10 as per design. Lastly it was also found that the cabinet are no longer functioning or working i.e. the malfunctioning of the main server, Network Video Recorder (NVR) and Client PC.

The scope of this project entails the implementation of a security system that must ensure an increased standard of safety for personnel and equipment defined for this project. The success of this project will depend on the installation of new equipment to limit access and log events as they occur. To successfully achieve this outcome, the following must be done:

- Enhance safety and security at Hendrina Power Station.
- Improve integrity and accuracy of CCTV data/ information as per Eskom defined standard.
- Reduce opportunities for crimes to be committed e.g. theft, fraud and trespassing.
- Ensure compliance to legal and regulatory requirements applicable to physical security.
- Ensure confidentiality of obtained personal information is maintained across Eskom.

Based on the recommendations from Group Security and requirements from Hendrina Site the relevant design requirements were developed, design specifications were also developed from stakeholder requirements, NKP requirements, and mostly the Specification for Integrated Access Control System (IACS) for

***15.2 Employer*'s design**

- The Contractor shall design and submit the design for approval before execution takes places

15 Parts of the *works* which the *Contractor* is to design

15.1 Functional Requirements

The use of CCTV surveillance systems is to enhance the surveillance in Hendrina Power Station due to characteristics such as digital transmission of video, as well as digital storage of video for security purposes. A CCTV surveillance system provides a means to store and transmit visual footage of incidents within the site which can then be reviewed and analysed in detail.

The CCTV installations will be primarily intended for verification purposes, i.e. the visuals should be of such a quality that an observer can, with a high degree of certainty, determine whether there are intruders, the number of intruders, their actions and any equipment they may be carrying such as saws, guns, plate recognition for vehicles, facial recognition features, etc.

Should an intrusion incident occur, the intruder detection system shall be triggered by means of intruder detection units (typically video analytics on the perimeter cameras). The alarms and visuals shall be stored on site as well as transmitted to the dedicated security alarm control room in the main security building where the security personnel can assess the situation and then take the necessary responsive actions. The operators in the security control room shall have full control over the camera units. This will enable the operator to obtain visuals of an intruder. The communication link between the site equipment (network cameras) and the security control room shall be by means of a dedicated and secure communication medium between the sites and the security control room and take place over Eskom's telecommunications network. The network cameras may achieve digital transmission of video by Cat ethernet cable to the network switches which will be linked by means of fibre. Communication media includes fibre (2Mbps bandwidth).

The system is required to have capability to:

- Cameras must be positioned in such a way that there are no blind spots; if there are, there is an alternate detection system in order to capture any movement within the blind spot.
- Locally as well as remotely access the system. The master server will be able to add and remove personnel from the list of access, and to view history.
- Automatically suspend access after a predetermined time or emergency conditions. Enable easy access (manual operation) in the case of an emergency.
- Control access via access cards and biometrics in a redundant format as per location, and the ability to perform random spot checks. Incorporate thermal scanners to monitor temperature of employees entering or exiting the station as per covid-19 regulations.
- Allow reprogramming of access attributes, by security personnel if necessary. There shall be time synchronization between field devices and server network such that transaction records are automatically uploaded from each reader to the relevant database.
- HVAC system must be installed to ensure sufficient cooling in the server room and prevent overheating of the system.
- 75-inch wall screens will be made available for the monitoring of the secured areas. There will be security personnel in the access-controlled control room in place for operating and monitoring the system.
- The alarm system must be triggered by either of the following which could indicate an unauthorised access:
    - Attempt to disarm system by unauthorised user.
    - Control centre issuing an alarm instruction due to unauthorised access
    - Cameras detecting violation.

- Each violation must be reported to the control centre and notified to the security controller.
- The security controller shall be able to address the unauthorised person using the Public Address System.

- The alarm video display must also show clear and unambiguous indication of origin of alarm (a visible text on the bottom of image). The site camera (camera number and site description) should be clear e.g Camera 3, PROBUY BUILDING. The security controller must be able to confirm the arrival of the responders on site following an alarm event.

15.2 Performance Requirements

- Full system redundancy. This will allow local systems to function independently of one another in the event of system failure or loss of power. Thus, a redundant system on all hardware/software dependent systems will ensure 100% up time.
- Monitoring of system health to determine for example, if hardware is still within life cycle and undamaged, and to indicate when a system redundancy is compromised.
- Manual override/bypass for cases of emergency or system failure.
- Must be user friendly to operators and personnel entering/leaving the station.
- The system must be designed to allow for future expansion of the CCTV system and interfacing of other security/monitoring equipment.
- Servers will have a capacity to store data for a minimum of 5 years.
- Redundancy measures will be used to ensure that the data is not lost. This includes redundant servers, power supplies and UPS.

15.3 Design Assumptions

A simple IP-based CCTV system, such as the one seen in the Figure 2, consists of a network camera, a network switch, and a PC for viewing, storing, and analysing data and managing the CCTV system. IP-based CCTV systems are designed to provide the ability to monitor, record, and stream video over a network to computers or other equipment. The system can use existing local area networks (LANs), wide area networks (WANs), and/or wireless LANs (WLANs) to save on installation costs. Power over Ethernet (PoE) technology is the preferred option within an IP-based system to increase savings and reliability. PoE enables various networked devices to receive power and data through one standard cable. The IP-based system will communicate to the NVR using WI-FI or Fibre optic cable, this communication connection must have redundancy for trip handling purposes

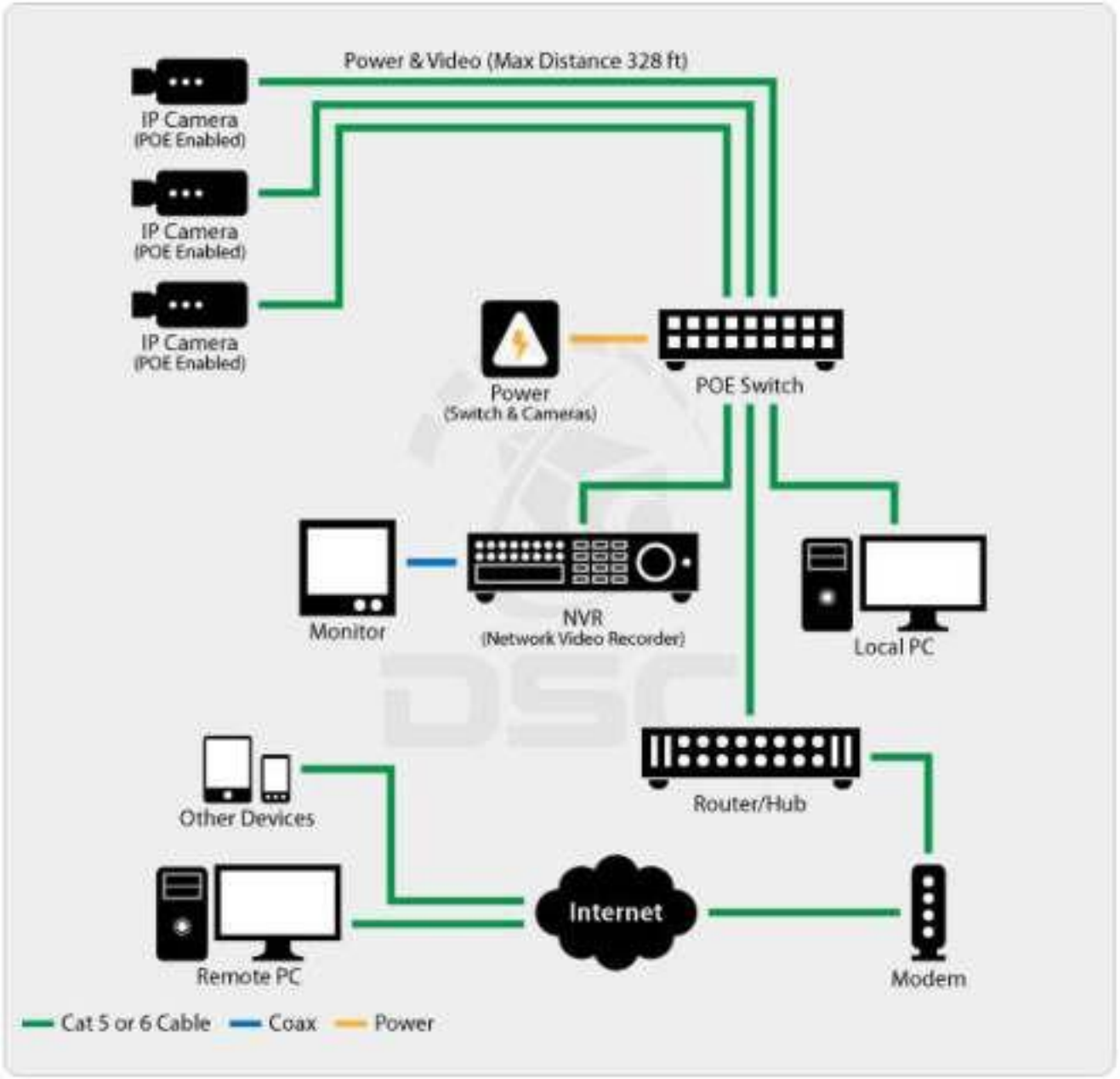

Figure 2: IP-based CCTV system

Five essential components of the system:

1. Camera
2. Monitoring Station
3. Cables & Routers
4. Video Recorders
5. Data Storage

Types of Cameras:

Main Entrance (PTZ Camera)	**Narrow lane (Bullet Camera)**	**Low light area (Infrared Camera)**	**Rooms (Dome Camera)**
PTZ (Pan-Tilt-Zoom) Cameras are ideal for entrances where you could pan across the street to focus on passing vehicles etc. To	Bullet Cameras have a long range and are great for outdoors, large backyards,	Infrared Cameras are meant for places with low-light conditions like	Dome Cameras can be used indoors as well as outdoors and generally provide a 360° view of a

be ideally used on perimeter fence as they can detect and track the movement of intruder.	parking lots and narrow lanes etc.	a basement garage or for night viewing.	room.

Table below depicts the estimated quantity and type of cameras required for each specific area covered in the station, a thorough

Area of focus	Estimated Number of Cameras	Type of camera
Unit 1 Entrance	**2**	Static
Light tower	**2**	Static & PTZ
North Top Building	**1**	Static
Railway track	**2**	PTZ
Cooling tower 4	**1**	PTZ
Pump house	**1**	
Smoke stack	**3**	PTZ
Lighting tower 2 and 3	**2**	Static
Station Perimeter fence	**54**	Static, PTZ & Dome
Coal conveyor 4A	**1**	PTZ
Coal gate	**2**	Static
Coal Conveyor House 9	**1**	Static
South Side Staithes	**3**	Static & PTZ
Njabula hall old canteen	**1**	Dome
Ash booster house	**2**	Static
South Side Tower	**2**	Static & Dome
South entrance Tower	**3**	Static & PTZ
Blue Building	**2**	PTZ
Cable Tunnel Entrance	**1**	PTZ
Unit 1 Cable rack Entrance	**2**	PTZ
Mills Entrance	**2**	PTZ
Caustic Soda Tanks	**1**	PTZ
North Smoke Stack	**1**	Static
FD Fans	**5**	Static
ID Fans	**2**	Static
North Side Inclined Conveyor Belt	**3**	Static & PTZ
South Side Plant Entrance	**6**	Static & PTZ
Welding and Fab Workshop	**1**	PTZ
North Smoke Stack	**1**	Static
Unit 5 and 6 entrance	**1**	PTZ
Cable rack entrance	**2**	PTZ
South Side Inclined Conveyor Belt	**3**	Static
North Main Entrance Gate	**7**	Static, Dome, & PTZ

Area of focus	Estimated Number of Cameras	Type of camera
South Main Entrance Gate	**5**	Static, Dome, & PTZ
Njabulo Stores	**3**	Dome PTZ
Main store warehouse	**35**	Static & PTZ
Area 2 stores	**3**	Static & PTZ
Units 1 to 10	**97**	Static, Dome
Total number of cameras estimated	**266**	

15.4 Design Specifications

IP cameras

The IP cameras installed in the station must be categorized to define the purpose of the camera. Table below lists the 4 CCTV categories.

Purpose	Operational Requirement	Location group
Identification	Detail should be sufficient to enable the identity of an individual to be established beyond reasonable doubt. Camera footage alone should be enough to prosecute in court.	North, South, coal gate, pumphouse, and Old dams cameras
Recognition	A high degree of certainty whether or not an individual shown is the same as someone seen before. Camera footage could aid in prosecution along with other evidence.	North, South, coal gate, and Inside plant cameras
Observation	Be able to observe what a person is doing.	Outside plant cameras
Detection	Sufficient to determine with a high degree of certainty whether or not a person is present	Perimeter Fence Cameras

All works to be done as per South African National Standards

Standard	Description
SABS-0222-5-2:1999	CCTV Installation guide
SANS 10222-5-1-1:2007	Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: Operational requirements
SANS 10222-5-1-2:2007	Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: System design requirements
SANS 10222-5-1-3:2007	Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: Installation, planning and implementation requirements

SANS 10222-5-1-4: 2003	Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: Testing, commissioning, and hand-over requirements.
SANS 10222-5-1-5: 2003	Electrical security installation- CCTV installations-CCTV surveillance systems for use in security applications: Maintenance requirements

Servers and Database

There will be a primary server hosted at the main Security control centre which shall act as a single source for the system. The primary server shall have redundancy with real time synchronisation with the secondary/ back-up server. The system shall comply with Eskom' Cyber Security standard for Operational Technology. The server will be able to handle the deletion and removal of redundant account/profile based on information received from an administrator workstation. Cabinets with minimum IP 65 rating shall be used for servers. The server will have 99.99 % availability. The server will contain a real-time clock circuit synched with a GPS time clock, capable of maintaining and displaying real time (month, day, hour, minute and second). Interface between the server and the peripheral devices (such as readers and reader controllers) by means of a standard communications protocol. The server shall allow entry to the system parameters by password only, and there shall be at least three levels of password to allow three levels of access. The server software shall maintain a real-time sequential record (on the hard disk) of reader events, alarm events and all operator programming events. If so required, these events shall be stored in such a format that it is possible for other operators to sort and analyse them.

Registration and client stations

The Security Manager shall be the owner and main operator of the system responsible to provide any changes and permissions to the system. The CCTV system administrator shall be required to fingerprint in order to login to the registration application. The software installed on the client stations shall cater for the following requirements:

- Screen modification programs.
- Menu modification programs.
- Keyboard modification programs
- Colour modification programs
- Icon menu modification programs
- System monitor programs
- Logbook reset program
- Graphical font modification program
- System message modification program.

Communication Technology

The System shall at minimum cater for Ethernet 10/100/1000 with auto negotiation, the supplier shall also indicate if their equipment supports the following I/O ports:

- RS-232
- RS-485
- Wiegand in/out
- TTL in/out
- Modem (to provide alternative Comms where there is no network infrastructure installed).

The system shall support open communication standards/protocols that will enable it to be integrated to the existing CCTV system backbone infrastructure. At minimum the following standards shall be supported:

- TCP/IP
- HTML
- LonWorks
- BACnet
- OPC
- MODBUS
- ODBC
- Wiegand
- UDP
- DDE
- GIOP
- TSL/SSL
- ICMP
- SOAP

Local Security Control Centre

The security control centre shall be an Eskom manned centre and responsible for responding to alarms from alarm area(s) and managing incidents on site using the CCTV data from alarm areas.

The Security Control Centre shall use approved VMS client software to connect to the Eskom OT Security Server, thereby receiving all alarm signals from the various sites (real time black screen monitoring).
The connection between the Local OT Security Server and the Local Security Control Centre shall be a dedicated link. There shall be enough LAN ports (ethernet ports) for connectivity to field devices by standard IP protocol. The monitoring screens minimum size shall be 19 inches.

Perimeter Detection System

- Alarms shall be generated by a perimeter detection system.
- The perimeter detection be provided by 'advanced video analytics', either built into, or as an addition to, thermal perimeter cameras.
- 'Edge' video analytics to be used over server/NVR based video analytics.
- The perimeter detection system shall create an 'invisible wall' which encapsulates the entire perimeter of the yard, so that there are no areas where an intruder may enter the site undetected.
- There shall be no 'dead spots' in the invisible wall. Where a method of detection has an inherent dead spot, the dead spot of each device shall be covered by another device (e.g. Cameras with overlapping fields of view).
- The perimeter detection method should be divided into zones matching the areas covered by the perimeter cameras. The zone names will be like the area names on site.
- The perimeter detection system must generate an alarm when a human enters the monitored zone. It must be able to detect a person who is walking upright, walking hunched over, crawling, or running.

The system must not trigger for the following:

- Changes in light,

- Movement of trees,
- Small vibrations of the camera pole
- Animals, especially birds (including large birds),
- Vehicles driving past the zone.
- Weather conditions including rain, snow, and dust storms.

The sensitivity of the perimeter detection system must be adjustable to configure the system to meet the conditions at specific zones.

The system must be able to operate in all lighting and weather conditions.

15.4 Technical Specifications

Yard Installation

15.4.1 Poles

- In cases where lighting poles, buildings, or other suitable structures such as smokestack exist on the site in appropriate positions, these may be used to mount the cameras. If no existing structure is available, the cameras shall be mounted on poles.
- Poles shall be steel reinforced 4.5m in height.
- Poles to be installed as per manufacturer instructions to minimize vibration due to wind.
- To prevent theft of cameras, the poles shall not be placed directly next to the fence, and anti-climbing devices shall be installed if they are not installed already.
- The pole shall be earthed via 50 x 3 mm earth tails, the earth tails shall be buried and welded to the base of the fence so as not to be easily visible. The join shall be painted the same colour as the fence to avoid theft of the copper earthing.
- Holes required for the fixing of the sensors and cameras may be drilled on-site and shall be appropriately sealed to prevent water ingress. Drilling can be minimised by using equipment that clamp securely onto the poles.
- Poles shall be galvanized to prevent steel pole rust from rainwater.
- All cables (communication and/or power) shall enter the pole from the bottom, via the inside of the pole to the camera mounted on the top section of the pole. This is to avoid cables on the outside of the pole from environment and people interaction.

15.4.2 Cables

- Choice of cables shall be based on camera manufacturer recommendations. Consideration must be given to possible voltage drops and signal decays/loss.
- Cable routes should be planned to provide the shortest practical distance between equipment locations.
- All camera cables must be labelled or marked for identification purposes.
- No sharp bends in cables are permitted.
- Video cables must not be run closer than 30cm, when run in parallel with AC power cable(s).

- Joints in video cables are not permitted.
- It is recommended a PoE CAT6 cable to be used for communication between cameras and switches.
- Cables that are vulnerable to corrosion or mechanical damage as well as external wiring must be suitably protected or placed in conduit, trucking or cable trays. Cables should be protected based on the environment which they are installed.
- For fibre cable, loss figure should allow for a minimum of three cable repairs during the life of the system. Bending radius should be within the manufacturer's specification

15.4.3 Installation

- The installation of the camera and brackets shall be as indicated in the manufacturer's guidelines.
- Where cameras are vulnerable to environmental damage, dust, or damp, they must be suitably protected by means of outdoor housing.
- PoE Extenders (i.e Network repeaters) shall be required for every 100 m ethernet cable length.
- Where PoE extenders are used, they should be suitably protected in termination enclosures.
- All termination must be in suitable IP65 rated enclosures.
- Brackets used to secure the camera shall be robust and shall minimize vibration.
- Brackets shall be capable of being "lock tight" to reduce the possibility of accidentally moving.
- All brackets shall be "cable managed" so that cable entering the housing is enclosed within the bracket from the support to the housing, allowing no cable to be exposed.
- The cables shall be marked with at least the camera name and number.
- Dome and PTZ cameras shall be mounted with appropriate brackets which prevent the pole from being in the camera's field of view.

15.4.4 Outdoor Cameras

- As far as possible, outdoor cameras shall be positioned "North to South" to avoid sunlight on the lens. In some cases, this is not possible; therefore, all cameras shall have wide dynamic range (WDR) functionality.
- Additionally, outdoor cameras shall have a sun damage resistance characteristic which provides resistance of sensor to thermal damage from sun.
- Camaras to be powered by PoE cable.
- The camera shall be well protected from the elements and vandalism by mounting it within an appropriate housing.
- The camera housing shall have an IP rating of at least 65.
- The camera housing shall be a have a sun visor and be steel constructed.
- The camera housing shall be weather-proof, environmental, corrosion and vandalism resistant as well as UV resistant.
- If necessary, a junction box with a minimum rating of IP 65 may be installed on the camera support pole or on the cable path. The junction box shall be used to protect any

connections and additional equipment necessary for the camera operation. Equipment housed in the junction box should be kept to a minimum as much equipment as possible shall be housed in the equipment room.

- If used, the junction box shall be lockable (lock and key, not a panel key) and alarmed.

15.4.5 PTZ camera

- The PTZ camera shall be positioned in the yard in such a way as to cover most of the critical points.
- PTZ cameras to be installed in the areas mentioned as per table 1.
- The PTZ camera unit shall be installed in one of the following manners:
    - Any elected existing structure such as buildings, lighting poles, etc or,
    - A steel pole attached as per section 5.8.2.1. SANS 1431 grade 300WA or 4360 grade 43A steel shall be used.

The PTZ's zooming capabilities shall be powerful enough to meet the purpose of the PTZ
The PTZ camera shall be remotely controllable by an operator to pan, tilt, zoom, focus, mobilize the iris, switch the camera on/off and place the camera in a pre-set position.

- The PTZ camera shall be controlled by a hardwired cable.
- If there are no perimeter cameras then the PTZ shall be able to see the perimeter by means of thermal imaging or a built in infrared spotlight.
- The PTZ shall have preset positions. When a preset position is chosen by the controller, the PTZ shall immediately go to that position.
- Preset positions shall include zoom level.
  It shall be possible to label the preset positions with a descriptive name.
- The PTZ shall be capable of having at least 10 pre-sets.
- Preset positions at the station will include all hotspot security area(s) and possible intrusion areas such as gates, doors, various points on the perimeter boundary and high-risk assets (trenches, transformers, rolls of cable).
- The PTZ shall have built in analytics and be set to 'patrol' the yard during normal operation.
- When an alarm triggers the PTZ shall zoom into the area where the alarm happened. If a person is detected, the PTZ shall follow the motion of that person.
- The control signals from an operator shall take preference over the patrol and tracking functions.

15.4.6 Indoor Cameras

- The camera field of view includes the entrance to the building as the point of interest.

Where there is more than one entrance, more indoor cameras will be installed.

- Indoor cameras shall have infrared lighting.
- The purpose of the camera will be observation and / or identification in the case of forced entry depending on the site requirements.
- Backlight compensation with wide dynamic is particularly necessary for cameras looking at entrances.

- Indoor cameras may be ceiling or wall mounted depending on the building nature.
- The camera shall be housed in a vandal proof housing with an IP rating of at least 51.
- The camera field of view shall be adjustable via an adjustable bracket or built in manual pan-tilt mechanism.

15.4.7 Network Video Recorder

- A Network Video Recorder (NVR) shall be used to record relevant video footage as well as to allow access to live streaming footage from the security control room.
- The NVR shall be integrated with all alarms from the security system (intruder detection system included) and shall connect to the Video Management System.
- The NVR shall meet all specifications listed in section 5.6.4 – General Physical Requirements, and section 5.6.5 - General Electrical Requirements. Additional requirements are listed below.

15.4.8 NVR Functionality

- In the event of an alarm being triggered (from camera or intrusion detection system) when the system is armed the system shall:
    - Record footage from relevant cameras. Relevant cameras are those with a field of view of the triggered zone.
    - The footage recorded shall be for 5s second before the event triggered, the time of the actual event (however long motion is detected by the camera) and at least a 15 second post event time. This recording shall be at the full resolution of the camera.
    - Send a signal to the Security Control Room, including the zone that was triggered.
    - Send short video clip / series of still pictures from the camera covering the zone where the alarm triggered to the security control room. This shall be at a resolution suitable for the communication medium used. The quality of the footage received at the security control room shall be such that the controller can clearly identify whether the intruder detection was triggered by a human (detection).
    - Allow for the security control room to remotely access the site in order to stream live footage from the system.
    - Allow for the security control room to operate any PTZ cameras installed on site, including using pre-set positions.
    - Allow for the controller to speak over the PA system or play a pre-recorded message on site.
- In the event of movement being detected when the system is not armed, the system shall:
    - Record footage from relevant cameras for 5s second before the event, the time of the actual event (For however long motion is detected by the camera) and at least a 15 second post event time. This recording shall be at the full resolution of the camera.

15.4.9 Compatibility:

- The NVR shall be able to integrate with a wide range of cameras from different manufacturers.
- The NVR shall allow for simultaneous use of different model cameras with different resolutions.

15.4.10 Recording and streaming

- It shall be possible to configure the NVR to record on any motion event or only when an alarm event is generated.
- It shall be possible for simultaneous recording on site and streaming to the security control room.
- All footage shall be time and date stamped
- It shall be possible to search events and recorded footage based on a combination of date, time, event and motion in a specific part of the camera's field of view
- The recording media shall be a removable, hot swappable and lockable.
- All footage shall be kept for a minimum of 30 days. To achieve this, the hard drive size should initially be calculated to be large enough to store 30 hours of continuous recording from all cameras.
- It shall be possible to 'flag' important footage so that it will not be overwritten.
- When the hard drive is full, the NVR shall continue to record by overwriting the oldest recordings first. Flagged footage shall not be overwritten.

15.4.11 Video Compression

- Compression standards such as H. 264, MPEG4 or equivalent may be used for streamed video

15.4.12 Time Sync

- The NVR shall enable the syncing of time between areas, and between cameras as specified in section 5.6.

15.4.13 Video Monitor

- It shall be possible to plug a Video Monitor into the NVR.

15.4.14 Security

- The NVR shall be password protected.
- The NVR shall cater for a minimum of 10 individual users with assigned access rights.
- There shall be a minimum of 2 access levels (e.g operator and administrator profiles) :
    - Operator profile shall provide viewing of footage only, with no ability to delete footage or change settings.
    - Administrator profile shall provide full administrative rights.

15.4.15 Hardware and I/O connections

The NVR shall have input contacts for connecting to alarm signals from the alarm system

It is recommended that NVR have an 'error' output which will output a signal to the alarm system if there is an error with the NVR.

NVR shall have an on/off switch and status LED

15.4.16 System Logging:

The NVR shall keep a time stamped electronic log of the following:

- User who has logged in to make changes.
- Changes made
- System Errors
- Interruption of Camera feeds

15.4.17 Video Management

15.4.17.1 **Location**

The security control shall be manned and be hosted at the dedicated Eskom security control room which will be at the main security building (main gate). The network infrastructure shall adhere to the principles laid out in the following Eskom Documents:

- 240-55410927 - Cyber Security Standard for Operational Technology
- 240-55683502 - Definition of Operational Technology (OT) and OT / IT Collaboration Accountabilities

** Contractor will be provided by this information upon request.

15.4.17.2 Network

- The VMS shall connect to CCTV IP cameras and NVRs via the Eskom OT network.
- The VMS shall be capable of a 'Client-Server' configuration. The server shall be housed at the dedicated server room and the security control room shall connect to the server using client software, over a secure, dedicated link.
- The VMS system shall be able to connect to a minimum of 4000 cameras. it shall be possible to upgrade the system to accommodate these numbers in future.
- The VMS design shall cater for failover and allow for a redundant architecture.
- The VMS system shall allow for at least 5 simultaneous client connections.

15.4.17.3 Features

- The VMS shall be able to connect to a wide range of CCTV NVRs and DVRs.
- Where there are already CCTV components installed, the VMS shall be compatible with the existing install base of CCTV equipment.
- VMS must be able to connect to cameras with a wide range of different resolutions.
- All security control room activities as described in above sections, shall be possible using the VMS system.
- The VMS system shall allow for Access Control and intruder detection system integration.
- The VMS shall be linked to a timeserver to synchronise the time on the VMS system.
- The VMS shall be able to operate as a time server to synchronise the times of downstream systems at remote sites.
- The VMS Shall allow an administrator to make customizable reports on events, system status etc.
- The VMS shall allow the security control room operators to view whether a area/site is armed or disarmed and/or remotely arm or disarm the system at any area/site.

15.4.17.4 Network Security

- The system shall comply with 240-55410927: Cyber Security Standard for Operational Technology which serves to guide the implementation of Cyber Security principles in the OT environment.
- All connections to the Eskom OT networks shall be firewalled as per 240-79669677: Demilitarised Zone (DMZ) Designs For Operational Technology
- The Engineering design shall follow both IT and OT governance processes as per 240-55863502: Definition of OT and OT/IT Collaboration Accountabilities.
- The VMS shall allow for individual, password protected user rights.

15.4.17.5 Video Recording

- The VMS shall support simultaneous recording and streaming of footage.
- The VMS shall enable different client workstations to stream from different cameras simultaneously.
- The VMS shall enable a continuous streaming ‘video wall’. This shall be customizable, allowing for resizable viewing panes.
- The VMS shall support recording and playback of files using H.264, MPEG and MJPEG video compression
- The VMS shall be able to trigger recordings based on: Schedule, Manual trigger, alarm, event
- The VMS shall be able to use a wide range of different communication links to different areas/sites.
- All recordings shall be electronically watermarked and show time and date.
- It shall be possible to search events and recorded footage based on a combination of date, time, event, and motion in a specific part of the camera’s field of view
- Playback in slow motion and at high speed shall be possible.
- The player shall allow for multichannel playback, which allows users to play recorded video from several cameras simultaneously. This is useful if tracking suspects moving on an area with different camera views.

- It shall be possible to 'cut' footage to export only the portion of footage that is of interest.

15.4.17.6 Event management

The VMS shall:

- Support an event queue to allow the management and acknowledgment of multiple alarm events.
- It shall be possible to look at a new event without having acknowledged a previous event.
- Support PTZ control including PTZ pre-set positions.
- Allow controller to view the location of alarms and cameras on a site layout
- Allow controller to view the location and status of all sites on a map
- Enable comments from controller to be linked to an event.
- Log events and actions for auditing purposes
- The ability of the VMS system to track movement and highlight which area of the camera field of view has triggered an alarm (This could be software based or a feature of the cameras or video analytics on site).

15.4.17.7 Hardware

- Server shall meet Eskom IT requirements for servers including:
  - Server shall be 19" rack mountable
  - 12th Generation Intel® Core™ i7 Processors.
  - 16GB RAM.
  - 8TB HDD for data storage.
- Server shall be password protected.
- Server shall connect to Eskom IT servers for antivirus and Windows security updates.
- Server shall meet with the VMS manufacturer's hardware requirements.

  Server shall be housed in a secure, access-controlled environment in a cabinet with a minimum rating of IP 65.

16 Procedure for submission and acceptance of *Contractor*'s design

- The Contractor submits all designs to the Project Manager for acceptance.
- The Project Manager reviews the Contractor's submitted documents. The Contractor ensures adherence to the Works Information and that a technically sound design approach is incorporated.
- Specific information required from the Contractor during tender phase is set-out in the VDSS.
- Each document submitted to the Project Manager requires a transmittal note (refer to Employer's template 240-71448626 for minimum metadata requirements) from the Contractor. The Contractor includes interpretation of results in every report compiled. Project Manager review cycle is in-line with NEC contract requirements and is finalised during contract negotiations with the Contractor.
- Design Review Documentation
- The Contractor conducts design reviews of the Contractor's design as per the Contractor's official design review procedure.
- The Contractor further takes note of the Employers Design Review Procedure (240-53113685) and participates in all design reviews as specified by the Employer. The Employer may "Authorise"; "Authorise with Comments" or "Not Authorise with Comments". If

required, the Contractor makes the necessary revisions on the documentation and ensures acceptance is obtained from the Project Manager. The Contractor includes these design reviews as part of the schedule and suggests appropriate timing for such reviews.

- The following design reviews below are conducted, by the Employer, as per the design review procedure (240-53113685):
    - Contract Award Review
    - Design Freeze Review(s) (Detail Design)
    - System Integrated Design Review (Detail Design)
    - Pre-Commissioning Review (per unit)
    - Hand-over Review

  Design Freeze reviews can be conducted as End-of-Phase Design Reviews or as a series of Interim Design Reviews with the aim to design freeze a system or subsystem/asset in order to enable subsequent designs to progress. The number of design freeze reviews is accepted by the Employer.

Documentation Synopsis

The contract documentation synopsis, prepared by the Contractor, consists of documentation that is produced for the Works.
The Contractor's documentation synopsis is a summary and general overview of the whole documentation package forming part of the Works. It provides the Project Manager with a clear indication of its contents for assessment and acceptance.
The synopsis lays down the structure and content of documentation supplied as part of the Works and includes a list with test procedures and drawings allowing the Project Manager to visualise what is supplied during the various project phases and stages.
The format, content, layout and quality of all documentation are subject to acceptance by the Project Manager.

Failure to supply documentation and drawings

In the event of completed drawings, instruction manuals, procedures, switchover methodologies, schedules and programmes not being in the possession of the Project Manager within the specified period of five days (5 days) prior to Completion for each project phase, the Contractor does not proceed to the next project phase or stage until the documents are supplied by the Contractor and accepted by the Project Manager.
Dates of supply of documentation are planned by the Contractor and shown in the Accepted Programme.

Documentation and drawings of third party equipment

All third party equipment used by the Contractor to Provide the Works is accompanied by the following documentation and submitted in format as obtained from third party supply:

- All technical drawings (layout, etc.)
- Maintenance, operating manuals and engineering manuals.
- User manuals.
- Software copies of manuals, drawings etc.

Documentation and drawing general requirements

All the documentation and drawings are provided by the Contractor within the specified periods for the various project phases and stages as shown in the Accepted Programme.

The Contractor supplies the following as minimum:

- Standard brochures, catalogues, descriptions.
- Design standards, codes of practice, design guidelines.
- Installation, test, commissioning and optimisation procedures.
- Installation, test, commissioning and optimisation results.
- QA&QC documents as specified.

- Design modification procedure.
- Documentation that indicates all Hendrina Power Station specific settings of all components of the process control and monitoring system.
- Operating and maintenance manuals.
- Engineering manuals.
- Documentation detailing the verification, formulation and design & engineering of operating and control philosophies
- All drawings, manuals and schematics are uniquely identified and cross referenced with all related documents, whether produced by the forward documentation system or not
- Third party documentation, drawings, as built settings.
- Spares listings.

Contents requirements

All manuals are of good quality, prepared by experienced personnel and contain the following:

- General arrangement drawings
- Installation drawings and instructions
- Operating, maintenance and engineering instructions for all components.
- Detailed parts lists accompanied by exploded view type drawings clearly detailing and identifying each part for certain plants if available and not proprietary
- Technical descriptions of the equipment and component parts
- Spare part ordering and storage details
- All special tools required for maintenance and operating are identified in a scheduled included in the manual.

Manuals are in English, including all third party information, and each manual comes complete with:

- Power Station name and contract number
- Index including the following:

The final O&M and Engineering manuals and Project Manager acceptance thereof are a prerequisite to Completion of the whole of the Works.

Documentation control system

The Contractor implements an integrated and comprehensive document management system for control of all correspondence, drawings, procedures and manuals. It provides for information on document revision status, revision update motivations and the status of each document in relation to the “As Built” and “As designed” status on each plant.

Where modifications take place to address Defects that are found and notified by either the Supervisor or the Contractor after Completion of the whole of the Works and up to the defects date, the Contractor provides additional or amended pages for all the relevant documentation already provided to the Employer. These additional or amended pages are submitted to the Project Manager for acceptance within the period for reply.

Master drawing register

The Contractor establishes and maintains an updated drawing register. The register is updated continuously by the Contractor and submitted to the Project Manager for acceptance on a monthly basis.

Supply of drawings

Drawings supplied by the Contractor conform to the following:

- All drawings (are) shall be created in the required format which is Microstation version 7SE/8i, according to the specified drawing format and standards 36-945, , 36-946.

Accompanying the new drawings will be the item list with full component descriptions. All other related information is available on requested from the Drawing Office.
- Documents that are A3 size (P&ID drawings, Civil drawings, Mechanical drawings, Electrical drawings, Process flow diagrams, all Process Control and Monitoring System drawings.
- Documents that are A4 size (Signal flow diagrams, Functional diagrams, I/O allocation drawings, and others) Drawing title blocks and format conform to the Employer's standard
- All the types of drawings not listed to be clarified at the technical clarification stage regarding appropriate size namely A3 or A4. The Contractor makes provision for the worst case scenario regarding cost to produce hardcopies.
- Auto generated drawings of the control system will not be required to be on the Employers required format and will have to be hard issued as part of the documents in A4.

Four (4) copies of each drawing are supplied for approval and acceptance by the Project Manager as a prerequisite to Completion of the whole of the Works prior to the submission of the final copies.

Drawings to be submitted to the Project Manager for:
- Verification of the application of the drawing standard and format.
- Allocation of drawing numbers.
- Allocation of KKS codes.

Copyright

The Employer has full rights to make unlimited copies and use the material in any form or manner desired for use within Hendrina Power Station.

Confidentiality

All work done by the Contractor is confidential and may only be disclosed to third parties with the written consent of the Project Manager. The Employer treats this with the same confidentiality.

17 Other requirements of the *Contractor*'s design

Piping design

Further details must be available on the detail design since the piping will be utilised only for protection of cables.

Electrical design

As per requirement of the system, sub-system and major components the power supply must be designed. Existing electrical supply to North and South reception buildings will be used for access control equipment and supporting systems. The system should include a back-up power supply in case of unavailability of electrical supply, this can either come as a battery-unit or standard UPS as per recommendations from the relevant system engineer and detail design from the contractor.

Waste Storage and Transportation

Packaging material and other generated waste from the project must be disposed according to the Waste Management Procedure HSPPIN/003.

Maintenance requirements

Comprehensive training should be arranged for all maintenance personnel on how to work with the system and its components.
Special tools required for maintenance should be supplied as part of the project.

Clear boundaries should be established to mark the limits of responsibility when different departments are required to execute work on the system.
Spares for the new system should be catalogued and made stock item before the project is handed in.
Maintenance strategy to be updated to include the newly installed components before handover.
Loop drawings and P&ID drawings to be updated to reflect as build plant status before hand over.
Quality inspection plans to be included in the hand over package.

Reliability, maintainability, availability assessment

Full system redundancy will allow local systems to function independently of one another in the event of system failure or loss of power. Thus, a redundant system on all hardware/software dependent systems will ensure 100% up time.
Monitoring of system health to determine for example, if hardware is still within life cycle and undamaged, and to indicate when a system redundancy is compromised.
The system will have a manual override/bypass for cases of emergency, outages and system failure.

Construction

- All junction boxes are of the totally enclosed free standing or wall mounted front access type.
- Junction boxes are fabricated from sheet stainless steel having a minimum thickness of 2mm. A slanted roof is provided to allow material to slide off easily and to prevent material accumulating between the door and panel body. Free standing junction boxes are provided with a 75mm deep channel section base-frame, painted black. Refer to Eskom Standard 240-56355815.
- Adequate access and space should be allowed for maintenance purposes. Cable entry is from the bottom. Bolts are of the correct size for the holes provided and fitted with matching sizes of washers and lock-washers. Self-tapping screws, captive head nuts or cage nuts must not be used in the construction of the boxes.
- Effective measures are taken to prevent electrolytic corrosion. Wires passing through holes are protected by means of neoprene grommets. Bevelling of sheet steel is not acceptable.
- The door has adequate points of hinging and latching. It is reinforced to prevent distortion when open. Stays are fitted to prevent over swing when opening.
- Gland plates of pre-galvanised steel plate cover the complete cable gland area. Each cable is suitably sealed and protected by a gland and shroud.
- An earth terminal (brass or bronze), 12mm diameter, to which all metal parts are connected, is provided at the bottom of each box. The earth terminal is connected to a set of earth links by means of a copper earthing strap on the inside of the box. The terminal and earth links are in an accessible position to allow for the earthing of cables. Refer To SANS 10142 – 2 for bonding requirements.
- Provision is made for connecting the terminal to earth, externally to the box.

Corrosion protection

- The surfaces are prepared by abrasive blast clean to grade Sa 2,5 or by degreasing, rinsing, pickling and phosphate application.
- Primer coat: Apply one coat epoxy resin-based primer by spray. Dry film thickness 25 micro-meters.
- Under coat: One coat polyamide cured epoxy undercoat by spray. Dry film thickness 25 micro-meters.
- Final coat: Apply one coat twin pack polyurethane enamel by spray. Dry film thickness 25 micro-meters.
- Nuts and bolts: After installation all nuts and bolts used for securing the box are patch primed with epoxy red oxide or zinc chromate and over coated with paint, matching the rest of the cabinet.
- The colour of the final outside coating is G29 (colour to SABS 1091), with a high gloss surface finish. Inside surfaces is gloss white. Alternatively stainless steel panels are left as a brushed finch.

Termination of cables

- All cable screens are terminated on standard terminals at one end of the cable, or both ends depending on the design. Terminated cables wires must not have any slack other than 10% from distance of entry to termination in junction box.
- Terminals for signal cabling are clip-on spring-loaded type. Hooked blade type lugs are fitted. Lugs must fit cross-area of conductor to which they are crimped.
- The correct crimping tool is used.
- Terminals fit snugly together to avoid accumulation of foreign matter between them. End barriers are provided for open sided patterns.
- All terminal blocks are readily accessible.
- 20% spare terminals must be provided.
- Spare cores to be allowed for in all cables. The minimum number of spare cores requirements is as follows:
  - Cable 8 pairs : Minimum one spare pair
  - Cable up to 16 pairs : Minimum three spare pairs
  - Cable up to 32 pairs : Minimum five spare pairs
  - Cable up to 40 pairs : Minimum six spare pairs.

The redundant communication buses (fibre optic and co-axial cable) are run in different routes throughout the plant areas, i.e. no two cable sections forming part of the same communication loop is run along the same route.

- The routes for control and instrumentation, power supply cabling and the racking shall provide a consistent and integrated design together with the control system particularly taking into account different routes for common modes of failure and separate routes for the redundancy within in the control system physical distribution.
- The selection and installation method of cabling and associated equipment, such as racking and junction boxes shall be based on the environmental conditions it will operate in. (such as temperature, chemical, vibration, water ingress, mechanical damage etc,) All cabling insulation shall be fire retardant and halogen free.
- All cables are secured every 1.5 m with suitable cable glands, straps or clamps both on racks and in junction boxes, cubicles and control room equipment.

Test Equipment

- All test and calibration equipment necessary for checking the installation and calibration of the field equipment is provided and maintained to the required standard of accuracy.
- Test equipment for checking the calibration of instrumentation has an accuracy of better than ± 0.1%. Calibration equipment has to be recent (within 12 months) for certification by a SANAS accredited authority.

18 Use of *Contractor*'s design

- All documentation as specified in this document is supplied to the *Project Manager* by the *Contractor* this includes any detail design drawings, as well as fabrication drawings, that is required for maintenance or requested in this *Works* Information.
- The *Employer* reserves the right to issue the *Contractor's* design or drawings to *Other Contractor*s for purposes of maintenance, spares, verifications, modifications in future or any *Other* purposes required by the *Employer*; the *Employer* has total rights to use the design as the *Employer* requires.
- Any detail design drawings required for maintenance purposes is supplied to the *Project Manager*, by the *Contractor*. The detail design drawings or fabrication drawings supplied to the *Project Manager* by the *Contractor* can be supplied to any maintenance partner that the *Employer* wishes to enter into a partnership with during the life of Hendrina Power Station.

The *Contractor* notes that all GA, assembly and dismantling drawings become the property of the *Employer* upon Completion of the *Works*. The *Employer* is permitted to purchase replacement parts off these drawings from the lowest cost suppliers

19 Design of Equipment

- The *Contractor* is required to furnish and maintain the necessary tools and Equipment to provide the Works (including all manual and power tools, cranes, elevators, lifts, etc.). The *Contractor* is encouraged to share Equipment use where possible and locate cranes in the main work areas based on coordination with Others. The *Contractor* is advised to mark all tools, scaffolds, and Other Equipment for ease of identification.
- The Contractor is responsible for all temporary Works that is used by the *Contractor* to complete the Works. The *Contractor* submits all designs or proposals for temporary Works to the Project Manager. The *Project Manager* reviews but does not accept the temporary Works. The *Project Manager* comments on the effectiveness, necessity or risk of the temporary Works or Equipment, to allow the *Contractor* to provide the Works efficiently and without delay. For details on expected temporary Works refer to **section 5.1.**

20 Equipment required to be included in the *works*

- The *Contractor* provides all labour, installation tackle, gear and tools, vehicles, rigging tackle, consumables, site Workshops, site offices, stores and any Other facilities, equipment and cleaning materials required to provide the Works.
- The *Contractor* provides all the test equipment for testing the individual modules, the sub-assemblies and the functional groups for site testing, commissioning and performance testing.
- The *Contractor* provides all necessary scaffolding required to complete the Works.

21 As-built drawings, operating manuals and maintenance schedules

21.1 Drawings

The Contractor is required to ensure the following:

- The Contractor submits detailed drawings of all the separate items of the Works included in the specification for acceptance once the general arrangement drawings have been accepted. If Works or materials are supplied before such acceptance has been given, the Contractor shall modify or replaces such Works or material at his own expense if called upon by the Project Manager to do so.

- Submit All “as built” drawings with approval signatures at Completion by the ECSA registered professional engineer for each discipline as required by the design, backed up on the electronic medium, without delay on request by the Project Manager.

21.2 Technical, Operating and Maintenance Manuals

- The Contractor provides good quality operating and maintenance manuals prepared by suitably experienced personnel. The maintenance manuals shall state explicitly the maintenance requirements for each piece of equipment. Four (4) copies of the first draft manuals as well as all “as built” drawings are submitted to the Project Manager for review and acceptance. Manuals shall be written in English and each manual front page should contain the Power Station’s name, contract number and index. - - - The Contractor also provides an electronic copy of these documents in Microsoft Word for Windows format as well as PDF format, two (2) electronic copies are required.
- All manuals are required to contain, as a minimum, all aspects required for training. The manuals should indicate the level of responsibility of the operating personnel for each action in the procedures. Included in these manuals are the following:
    - Design data including descriptions of control philosophy with alarms, set-points, interlocks and logics clearly explained.
    - Process and instrumentation diagrams.
    - Range, calibration factors, calibrations certificates, data sheets, etc., for all control and instrumentation equipment.
    - General arrangement and installation drawings and instructions.
    - Operating procedures and instructions for normal and emergency conditions, including flow diagrams.
    - Maintenance procedures and instructions for specific plant and equipment.
    - All drawings required for component location, dismantling and re-assembly for maintenance.
    - Equipment details such as make, model, type, and specifications
    - Detailed parts lists and ordering instructions pertaining to storage of spare parts or to their shelf life.
    - Exploded view type drawings clearly detailing the part and uniquely identifying it, technical descriptions of the equipment and component parts.
    - Troubleshooting and fault finding guide.
    - Safety procedures and instructions.
    - All special tools and equipment required for maintaining and operating the Works.

- The maintenance manuals shall be separated into mechanical, electrical and C&I volumes. The manuals shall be designed such that they can be clearly understood by technical, maintenance and operating personnel.
- The technical manuals shall include fully detailed descriptions, as-built drawings, diagrams, illustrations, schedules and data for use by Eskom technical staff to evaluate performance, trace faults, adjust, maintain and fully understand the plant and plant equipment and to allow satisfactory training of junior staff in conjunction with the operating manuals.
- The operating manuals shall be set out in simple terms in ordinal, tabular or pictorial form to provide factual and concise descriptions of:
    - How to carry out start-up, shut-down, and service operation of the plants by automatic, semi-automatic and by manual control.
    - What an alarm condition implies and how it is corrected.
    - What problems can occur and how they are overcome.
    - A routine visual plants inspection procedure.

- The operating manuals are intended for daily use and therefore shall be separated from the technical and maintenance manuals. Bold print, diagrams, illustrations, etc. shall be used. Materials shall be suitable for heavy duty, preferably covered with protective transparent material, and be in loose leaf form to allow substitution and addition of pages.
- The maintenance instruction manuals shall include schedules to cover plant inspection procedures, fully detailed maintenance programmes for plant and plant equipment services at daily, monthly, three monthly, six monthly, yearly and any Other necessary intervals, and contain manufacturer’s and supplier’s detailed maintenance and lubrication instructions, diagrams, sectional drawings giving part numbers, descriptions, etc. Where spare parts have been provided theses should be coloured

in, scheduled, and their filling procedure described. The manual shall also include minimum surveillance requirements for the plant.
- Detailed maintenance procedures, covering removal, dismantling, replacement of parts, re-erection, checking, and reassembly and re-commissioning shall be included for all equipment. The re-commissioning shall be included for all equipment. The maintenance manual shall be fully comprehensive and cover all plants and plant equipment installed. As the manuals will be frequently used for training and maintenance, they shall be prepared similarly to those described for the operating instruction manuals for use by operating personnel.
- The design material selection ensures low / minimal maintenance. The intention is to enable the maintenance personnel to specialise in similar type of designs and technology; hence standardisation of designs and suppliers is critical. The systems and layout shall be designed in a way that will make maintenance easier.

22 Procurement

22.1 People

22.1.1 Minimum requirements of people employed on the Site

- In addition to the expertise required to fulfil the requirements of the Works Information, the Contractor supplies a qualified Authorised Supervisor (AS) and responsible person (RP)
- The Contractor appoints people to attend the Employer's Authorised Supervisor and Responsible Person Plant Safety Regulations Course. No work will commence without an accredited Authorised Supervisor and accredited Responsible Person on site. Allow a minimum of three weeks and a half for authorisation. The Employer provides training free of charge.
- The Contractor ensures qualified site management
- The Contractor ensures qualified safety management

22.2 BBBEE and preferencing scheme

- As per the Employer's commercial regulations

23 Subcontracting

23.1 Preferred subcontractors

23.2 Subcontract documentation, and assessment of subcontract tenders

Subcontracting of the any section of the works is done with prior approval of the Employer in order to align all works to the contract requirements

23.3 Limitations on subcontracting

- Subcontracting of the any section of the works is done with prior approval of the Employer in order to align all works to the contract requirements

23.4 Attendance on subcontractors

- Subcontracting of the any section of the works is done with prior approval of the Employer in order to align all works to the contract requirements

24 Plant and Materials

25 Plant & Materials provided "free issue" by the *Employer*

25.1 Site yard

- It is required, for the proper coordination and execution of the works, that the Contractor has an office on site for the duration of the contract.
- A site will be made available to the Contractor for his yard, within the power station security perimeter. The proposed site will be shown to the Contractor during the site meeting or clarification meeting. The yard is a raw site of approximately two standard shipping containers in size and will be used by the Contractor for the establishment of his offices, workshop and stores.
- The Contractor's yard is subject to periodic inspection by the Project Manager.
- The location of the nearest sewer manhole, power distribution point, potable water connection, storm water channel and road access point as provided when required.
- The Contractor is responsible for connection to the closest point of supply.

26 *Contractor*'s procurement of Plant and Materials

- The Contractor procures, transport, offload and store all plant and material to provide the Works as per the Works Information of this contract.

27 Spares and consumables

- The Contractor shall provide a list of critical spares to be kept on site at all times.
- The list of spares shall consist of the following items:
    a. Strategic spares
    b. Stock items
    c. As required spares
    d. Consignment stock

28 Tests and inspections before delivery

Core Clauses 40 and 41 both make reference to the Works Information regarding tests and inspections. Specify any requirements here for any tests and inspections that are to be done by the *Supervisor* or Others before delivery to the Working Areas, particularly if such tests and inspections are to be carried out by agents of the *Employer* overseas.

29 Marking Plant and Materials outside the Working Areas

- All works plant and materials are marked according to sectional area planned works.
- Plant and materials are clearly marked by the Contractor before usage and being included to the existing equipment.

30 *Contractor*'s Equipment (including temporary works).

- The Contractor provides all the necessary equipment to provide the Works.
- The Contractor will keep comprehensive records of all of the Contractor's equipment brought on and removed from site. The Contractor must comply with the Employer's site access procedures.

31 Construction

31.1 Temporary works, Site services & construction constraints

31.1.1 *Employer*'s Site entry and security control, permits, and Site regulations

- The rules and regulations for site access and security measures are contained in HSPHO 020 "*Access control – protective services"*. The *Contractor* is required to adhere to this procedure at all times.
- The *Contractor* shall adhere to the Eskom "Life Saving" rules at all times. These rules are clearly communicated during the induction process and are also indicated on signage within the perimeter of the station.
- Failure to adhere to any of the access, security or "Life Saving" rules at any time will result in the suspension of the permit for the relevant person and may also lead to criminal prosecution for the violation of safety rules and regulations.

31.1.2 Restrictions to access on Site, roads, walkways and barricades

- Restrictions and hours of work may apply on some Sites. It is very important that the *Contractor* keeps records of his people on Site, including those of his Subcontractors which the *Project Manager* or Supervisor have access to at any time.

31.1.3 People restrictions on Site; hours of work, conduct and records

- Normal working hours are from 07:00 to 16:15 on Monday to Thursday and from 07:00 to 12:00 on Fridays. Lunchtime is from 12:00 to 12:30.
- An extension to working hours as well as working on weekends is allowed with permission from the Project Manager.
- No Outgage scheduled claims by the *Contractor* regarding overtime hours will be considered and the responsibility for the completion of the *works* within the contract period remains with the *Contractor*. The Employer will notify the Contractor of the Outage dates 20 working days prior to the relevant outage.
- The *Contractor* will at all times keep a record of his personnel who are on site and will record all activities for his personnel in the form of a time sheet.
- No compensation events for additional or standing time will be considered without the relevant proof of presence and activity as contained in a time sheet.

31.1.4 Health and safety facilities on Site

- In line with the South African government pandemic requirements, the *Contractor* ensures COVID 19 safety awareness at all times through continuous training and development procedures
    a. The procedure and training must address all Covid-19 protocols (social distance, sanitising & wearing of mask)
    b. The safety awareness training and procedure addresses the process of reporting positive cases in line with the Employer reporting process

c. The safety awareness training and procedure state the process of contact tracing process when there is a positive case

31.1.5 Environmental controls, fauna & flora, dealing with objects of historical interest

- Request permission from the Project Manager through a notification when matters under this section arises

31.1.6 Title to materials from demolition and excavation

- All removed equipment is transported to the areas specified by the *Employer*. All such areas are located within the boundaries of Hendrina Power Station.
- All equipment and material that is removed is deemed re-usable and remains the property of the *Employer*.
- Where field equipment or cabling have been removed, the area will be made good in accordance with the requirements of the *Project Manager*.
- The term “making good” refers to the following:
    a. The removal of all the equipment and components of the old system. These include signal cabling, conduit, trunking, racking, supports and support frames, bolts, transducer racks and junction boxes.
    b. Trunk cabling from the old junction boxes to the equipment room is left on the existing cable racks, but cable ends are pulled back.
    c. All areas where equipment was removed on the plant are made neat by means of closing holes, grinding of old anchor points and welding, repainting and resurfacing.
    d. The interface point between the new system and existing equipment or plant is made neat and functional to prevent weak points in the final delivered product e.g. fixing of brackets and supports of interface boxes, covers, locking nuts etc.

31.1.7 Cooperating with and obtaining acceptance of Others

- The *Contractor* co-operates with others in obtaining and providing information which they need in connection with the *works.* The Contractor also co-operates with Others and shares the Working Areas with them as stated in the Works Information.

- As the Contractor’s activities interfaces with works done by Others, planning around those activities is shared and influenced by Others.

- The *Contractor* provides each programme (detailed) with information as described by clause 31.2 and includes in the programme any matters regarding the order and timing of the work of the *Employer*, *Contractor* and Others which the *Contractor* is take account of in his programme.

31.1.8 Publicity and progress photographs

- All photographs taken are with the permission of the *Employer* only and such permission shall be obtained in writing from the Project Manager.
- All photographs shall be taken only with approved cameras belonging to the *Employer* and shall remain the property of the *Employer*. Distribution of the photographs in any form to parties other than the *Employer* is prohibited.

- Photographs shall only be distributed to the *Contractor* by the project manager where he deems it necessary for the successful completion of the *works*.

31.1.9 *Contractor*'s Equipment

- All equipment for the works are provided by the *Contractor* and records of such are kept on site and communicated to the Project Manager in writing
- The *Contractor* will keep comprehensive records of all of the *Contractor's* equipment brought on and removed from site. The *Contractor* must comply with the *Employer*'s site access procedures

31.1.10 Equipment provided by the *Employer*

- The *Employer* does not provide any equipment as such are priced for by the *Contractor.*

31.1.11 Site services and facilities

32.1.11.1 Supply of Electricity

- Electricity will be made available for construction purposes free of charge from power points which will be indicated prior to the commencement of the works. The *Contractor* will be responsible for the provision of the reticulation system from the point of supply. All points of supply requested by the *Contractor* are provided in terms of quality and location at the discretion of the Project Manager.
- No guarantees of power supply quality are given and power supply breaks of some duration may occur without warning. Planned outages are also a possibility. The *Contractor* makes arrangements at his own expense to improve continuity and quality of power where necessary for any reason and no claim of any nature relating to power failures is considered.
- No connection is made to the permanent installation at the power station without the prior acceptance of the Project Manager.
- The power supply is managed in accordance with the latest revision of the Eskom safety regulations i.e. ESKARAAG 4: "*Operating regulations for high-voltage systems"*.
- A 36-681 "*Generation plant safety regulations"* CoC for the site installation is required prior to power being switched on.

32.1.11.2 Lighting

- The *Contractor* at his own expense provides temporary lighting in accordance with the requirements of the OHS Act as amended. The *project manager* provides no local lighting.
- All construction lighting is the responsibility of the Contractor.

32.1.11.3 Water

- Water will be made available on request and free of charge from water points on site. The *Contractor* supplies at his own cost all connections, fittings, piping work, temporary plumbing and pumps necessary to lead water from the *Employer's* point of supply to the various points where it is required. The Contractor is responsible to maintain this equipment and to remove it at the completion of the works.
- The *Project Manager* does not guarantee continuity of supply and the *Contractor* makes his own provision for standby supplies to maintain continuity of work. Claims of any nature relating to the discontinuity of water supply are not considered.

31.1.12 Facilities provided by the *Contractor*

31.1.12.1 Contractor's yard offices , workshop and stores

- It is required, for the coordination and execution of the works, that the *Contractor* has an office on site for the duration of the contract
- The *Contractor* includes in his establishment rates for all further treatment of the yard areas that he considers necessary for his entire operation throughout his period of occupation and under all weather conditions. The *Contractor* also includes for all security fencing, security and access arrangements. Maintenance of the yard is the *Contractor's* responsibility and to the Project Manager's acceptance.
- Outfall drainage and surface run-off drains is constructed to the acceptance of the Project Manager in order to minimise erosion and to effect control of contaminated water. The *Contractor's* plan for the layout of his yard area are accepted by the Project Manager prior to occupying the yard and the Contractor does not occupy any other site area other than that allocated to him. The Contractor's plan states fully what measures are taken regarding waste removal and storage of topsoil, stabilisation of eroded areas and further loss of topsoil
- The *Contractor* complies with the environmental policy given in the Site Regulations. The *Contractor* provides, erects and maintains for his own use adequate size office accommodation and stores together with such drainage, lighting, heating and hot and cold water services as may be required. Provision is also made for adequate parking and a turning area adjacent to all the aforesaid structures. The Supervisor prior to commencement of any work on site, accepts all designs and layouts for these provisions.
- The *Contractor* dismantles and clears the yard of all such temporary structures and associated foundations and infrastructure at the direction of the *Supervisor* on completion of the whole of the works. No such dismantling and clearance work is carried out without prior acceptance from the supervisor.

31.1.12.2 Telecommunication

N/A

32.13 Sanitary Facilities and Refuse

- The *Contractor* is to supply his own sanitary facilities at his *Contractor's* yard. A refuse control system will be established by the *Contracto*r. All waste and refuse is collected and disposed of, as directed by the *Project Manager*, at the Hendrina Power Station refuse disposal site.

32.14 Equipment/ Appliances

- Any electrical equipment or appliances used by the Contractor conforms to the applicable OHS Act safety standards and is maintained in a safe and proper working condition. The Project Manager has the right to stop the Contractor's use of any electrical equipment or appliance which, in the opinion of the Project Manager, does not conform to these safety standards.
- The Employer may assist the Contractor with the off-loading of equipment, plant and material, but the responsibility for off-loading remains with the Contractor.
- Any special tools and equipment to be used on site for the execution of the works is the responsibility of the Contractor
- Should a crane, skyjack or similar equipment be required for the execution of the works, it will be supplied by the Employer only if it is available.
- Arrangements for such a crane must be made in advance at least two weeks prior to the required date. No extension of time and/or claims for standing time will be granted should the Contractor not conform to this specification.

32.1.15 Access to site

- The Employer to provide such unrestricted access in the relevant plant areas in order to minimise standing time and the loss of productivity
-

32.1.16 Laydown

- No plant and material lay down areas are permitted on site. The Contractor delivers all plant and materials to the point of erection as and when needed.

32.1.16 Site regulations

- The *Contractor* complies with the site regulations, a copy of which is available at the *Project Manager's* office.
- Any subject within the authority of the *Project Manager* may be addressed by a site regulation.
- Before work starts on Site, a kick-off meeting is held with the *Contractor* and the *Project Manager*, to explain in detail all requirements of the Site Regulations.
- The *Contractor* is issued with a file of current Site Regulations at the project kick-off meeting. The file remains the property of the *Project Manager* and the *Contractor* is responsible for its maintenance and updating to include new or revised regulations as issued by the *Project Manager* during the course of the works.

32.1.17 Permit to work system

- In parallel to the *Employer* providing support, the *Contractor* allocates staff to be trained and authorised as Responsible Persons according to the *Employer's* Plant Safety Regulations and/or High-Voltage Regulations. These Responsible Persons are available on site as and when required to take out permits to work.

32.1.18 Accommodation and transportation

- The *Contractor* provides his own accommodation and transport for all his employees engaged in the execution of the works. This includes the needs of his sub-contractors. The cost of accommodation, as well as for transportation to and from site is included in the prices.
- No accommodation is available at Hendrina Power Station. The *Contractor's* employees are not allowed to sleep on site.

32.1.19 Security

- The Contractor provides security necessary for the protection of the works at all times until the completion of the whole of the works.
- Access to the site is controlled and it is governed by the terms and conditions as laid down by the Station Security Officials from time to time. The proposed site will be shown to the Contractor during the site meeting or clarification meeting.
- The Contractor liaises with the Power Station Security staff via the Project Manager in order to obtain temporary permits for his staff and vehicles that will be working within the station premises.
- The Contractor submits his application for a vehicle permit to the Project Manager. Personnel and vehicles entering and leaving the site are subject to routine searches.
- The Contractor must obtain a "Gate Permit" from the Project Manager before materials and equipment can be removed from site. The "Gate Permit" gives an itemised list of materials and equipment to be removed from site.
- If any of the Contractor's staff are transferred from Hendrina or leave site, the person's permit is handed over to the supervisor. The Contractor ensures that personnel leaving site are transported out of the security area and that the permit is returned.
- No firearms, weapons, alcohol, illegal substances and cameras (including cell phones with cameras) are permitted on site. No "Private Work" is carried out for or on behalf of any Eskom employee. Any person suspected of being under the influence of alcohol, if proved to be over the acceptable limit of 0%, is refused entry to the security area.

32 Completion, testing, commissioning and correction of Defects

32.1 Work to be done by the Completion Date

On or before the Completion Date the *Contractor* shall have done everything required to Provide the Works except for the work listed below which may be done after the Completion Date but in any case before the

dates stated. The *Project Manager* cannot certify Completion until all the work except that listed below has been done and is also free of Defects which would have, in his opinion, prevented the *Employer* from using the *works* and Others from doing their work.

	Item of work	**To be completed by**
	As built drawings of the supplied system	Within 14 days after Completion

33.Use of the *works* before Completion has been certified

- Sectional completion will apply whereby completion of the system once completed will be handed over to the *Employer* for takeover; however the *Employer* rejects the Use of the Works for items that affect the safe and reliable operation of the Works. Documentation for such items is produced for Defect Corrections.

33 Materials facilities and samples for tests and inspections

- The *Contractor* provides all necessary certificates as required by the works information.

34 Commissioning

- Commissioning of the *works* is required before Completion of the *works* is certified by the *Project Manager*.
- The *Contractor* shall submit a commissioning procedure to the *Employer* one month before the planned date of commissioning. This procedure shall detail all of the steps and procedures to be taken in order to demonstrate the functionality of the system as well as checks which prove that the *Contractor* has done everything required of him to provide the *Works* and fulfil the Purpose of the *Works*.
- The Contractor provides details of the commissioning plan to the project manager for acceptance as part of the programme of works and o later than four weeks after the contract start date.
- Commissioning protocols and commissioning documentation are to be supplied as part of the programme of works.

35 Start-up procedures required to put the *works* into operation

36 Take over procedures

37 Access given by the *Employer* for correction of Defects

- The *Contractor* will apply for permits should they be required to rectify defects.

38 Performance tests after Completion

39 Training and technology transfer

- The *Contractor* to provide training to the people who will be operating the system and maintaining the system before handover
- The following people to be trained:
    - Maintenance
    - Securities (All Shifts)
    - Engineers

40 Operational maintenance after Completion

Not applicable

41 Plant and Materials standards and workmanship

Not Applicable

42 Investigation, survey and Site clearance

Not applicable

43 Building works

Not Applicable

44 Civil engineering and structural works

Not Applicable

45 List of drawings

46 Drawings issued by the *Employer*

This is the list of drawings issued by the *Employer* at or before the Contract Date and which apply to this contract.

Note: Some drawings may contain both Works Information and Site Information.

Drawing number	Revision	Title

C3.2 *CONTRACTOR*'S WORKS INFORMATION

This section could also be compiled as a separate file.

As part of the *Contractor's* responsibilities on this contract, The *contractor* provides his works information after interpreting the Works Info provided by the Employer. Such works is submitted as part of the tender returnables.

PART 4: SITE INFORMATION

Document reference	Title	No of pages
	This cover page	1
C4	Site Information	1
	Total number of pages	

PART 4: SITE INFORMATION

Core clause 11.2(16) states

“Site Information is information which

- describes the Site and its surroundings and
- is in the documents which the Contract Data states it is in.”

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

General description

Hendrina Power Station is located approximately 35km from Middleburg along the Middleburg – Hendrina road (N11) Taking the Pullenshope turn-off and continue about 8km follow the sign Hendrina Power Station & turn left to the security gates.

Existing buildings, structures, and plant & machinery on the Site

Includes all the boundaries of Hendrina Power Station

Subsoil information

Not Applicable

Hidden services

Underground cables. Cable detection to be done before any excavation

Other reports and publicly available information

Not Applicable