



GAUTENG PROVINCE
ROADS AND TRANSPORT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF ROADS AND TRANSPORT

TENDER NUMBER: DRT 21/01/2025/PRETORIA

TENDER NUMBER: DRT 21/01/2025/PRETORIA THE SUPPLY, MAINTENANCE AND COMMISSIONING OF PROVINCIAL STREET LIGHTS ON VARIOUS PROVINCIAL ROADS AND SECURITY LIGHTING OF BUILDINGS FOR A PERIOD OF THREE (3) YEARS: IN GAUTENG PROVINCE

PROCUREMENT DOCUMENT

AUGUST 2025

ISSUED BY:

**HEAD OF DEPARTMENT DEPARTMENT OF ROADS AND TRANSPORT PRIVATE BAG X83
MARSHALLTOWN
2107**

NAME OF TENDERING ENTITY:.....

ADDRESS:

TEL NO.

FAX NO.

TOTAL OF PRICES INCLUSIVE OF VALUE ADDED TAX:

R.....

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PART T1 TENDERING PROCEDURES

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Part T1 Tendering Procedures

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Part T1: Tendering Procedures

Reference no. DRT 21/01/2025/PRETORIA

TENDER NOTICE AND INVITATION TO TENDER

THE GAUTENG PROVINCE, DEPARTMENT OF ROADS AND TRANSPORT REQUESTS INTERESTED TENDERERS TO BID FOR THE FOLLOWING TENDER:

TENDER NUMBER	SERVICE	CIDB GRADING REQUIREMENT	COMPULSORY SITE BRIEFING	CLOSING DATE
DRT 21/01/2025/PRETORIA	The Supply, Maintenance and Commissioning Of Provincial Street Lights on Various Provincial Roads And Security Lighting Of Buildings For A Period Of Three (3) Years: In The Gauteng Province	8 EP or Higher	VENUE Main Boardroom, Department of Roads and Transport, 1215 Nico Smith Street Koedoespoort Pretoria Date: 16 September 2025 Time: 10h00 am Failure to attend the compulsory briefing session will result in disqualification of the bidder	DATE: 07 October 2025 TIME: 11H00 am Tender Box situated at the Gauteng Department of Roads and Transport Ground Floor, Life Centre Building, 45 Commissioner Street, Johannesburg

The Gauteng Department of Roads and Transport adhere to all relevant Acts including but not limited to, the Constitution of the Republic of South Africa of 1996, the Black Economic Empowerment Act No.53 of 2003, Preferential Procurement Policy Framework Act No.5 of 2000, Employment Equity Act No. 55 of 1998 and the Public Finance Management Act No 1 of 1999.

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Part T1: Tendering Procedures

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Gauteng Department of Roads and Transport will apply the 90/10 preference point system in terms of Regulation 5 of the Preferential Procurement Regulations, 2022 (as published in the Government Gazette No. 47452 on 04 November 2022).

The principle of the “work-spread model” will be implemented as follows at the tender evaluation:

Bidders must complete schedule of recently completed and current contracts in the Department of Roads and Transport

- **A bidder will be disqualified:**

- if the bidder has three (3) or more contracts that are currently in progress or have not been certified as practically complete at the time of tender closure with the Department; or
- If the bidder has contract/s that amounts to more than R250 million which have a contractual remaining period of more than 12 months with the Department that are currently in progress or have not been certified as practically complete at the time of tender closure.

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OBJECTIVE CRITERIA:

1. The Department will apply their work spread model as objective criteria to multiple tenderers, irrespective of highest total number of points scored, which comprises the following:
 - 1.1. A tenderer will not be awarded more than two (2) bills of quantity (contracts). The tenderer scoring the highest points for more than two (2) bills of quantity (contracts), will be limited to the two (2) highest Rand value bills of quantity (contracts), at the time of award.
 - 1.2. The remaining bills of quantity will be awarded to the qualifying tenderers scoring the highest points.
 - 1.3. In the event that there are insufficient qualifying bidders for the remaining bills of quantity, the Department reserves the right to award more than two (2) bills of quantity (contracts) to a qualifying tenderer, provided that the tenderer submitted a price proposal for the applicable bill of quantity (contract).

COMPULSORY/MANDATORY TENDER REQUIREMENTS:

Failure to submit the following required documents will render the bidders tender disqualified:

- Attach proof of registration or provide registration number with the Construction Industry Development Board (CIDB) in accordance with the CIDB grading in the table above.
- Contracts Manager must have as a minimum an NQF Level 7/BTech/BSC or higher qualification in Electrical Engineering and an Active registration with ECSA as a Professional Electrical Engineer/ Professional Electrical Technologist (PrEng/Tech Eng). (**NB:** Proof of Qualification and ECSA Registration Certificate OR Registration Number must be submitted as part of bidders' tender documents).
- Site Manager / Agent must have as a minimum NQF Level 6/Diploma or higher qualification in Electrical Engineering and an active registration with ECSA as a Professional Electrical Engineering Technician (Pr Techni Eng) or higher. (**NB:** Proof of Qualification and ECSA Registration Certificate OR Registration Number must be submitted as part of bidders' tender documents).
- The Construction Health and Safety Officer must be registered and in good standing with the SACPCMP as a Construction Health and Safety Officer (CHSO) or Construction Health and Safety Manager (CHSM).
 - **NB:** Candidate registration is not acceptable for all the above mentioned key personnel.
- In the case of joint ventures and consortia, a detailed signed agreement must be attached as part of the submitted tender document, which must be signed by all parties to the agreement detailing the percentage (%) split between the parties and portion/s of work to be shared.
- Complete and sign Standard Bidding Document SBD 4 and 6.1 which forms part of the tender document.
- Bidders must attend the compulsory site briefing as indicated above:

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- The attendance register must be completed and will be used as proof of your attendance.
- Tenderers that do not attend the compulsory pre-bid meeting / site meeting will be disqualified.
- The representative attending the compulsory pre-bid meeting / site briefing may only attend on behalf of one bidding enterprise and/or Joint Venture/Consortium/Trust.

OTHER KEY RETURNABLES:

- Tax Compliance Status Pin that will grant a third-party access to the bidder's Tax Compliance Status (A trust, consortium or joint venture must submit a Tax Compliance Status Pin of each partner in the trust, consortium, or joint venture).
- Registration Documents of the business with the Companies and Intellectual Property Commission (CIPC) OR Master of the High Court in South Africa
- Central Supplier Database (CSD) registration summary report
- Certified ID copies of company directors or members and shareholders.
- Workmen's Compensation registration certificate (or proof of payment of contribution in terms of the COID Act no. 130 of 1993)

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FUNCTIONALITY EVALUATION REQUIREMENTS:

Functionality will be scored out of 100 points and the minimum threshold to qualify is 70 points. Bidders who fail to meet the minimum threshold will not be considered for further evaluation. The evaluation criteria to score bidders on functionality is as follows:

FUNCTIONALITY CRITERIA			
Key personnel (Max 30 points) Bidders MUST complete the T2.13, T2.14, T2.15 and T2.16 forms attached in the tender document for key personnel and MUST clearly indicate street- and highway lighting experience, project description, duration, and contactable references.	Company experience in installation and/ or maintenance of streetlights (Max 35 points)	Project Plan and Quality Control Plan and Proof of Plant ownership (Max 20 points)	Bank Rating (Max 15 points)
Contracts Manager: Contracts Manager must have as a minimum an NQF Level 7/BTech/BSC or higher qualification in Electrical Engineering and an Active registration with ECSA as a (PrEng/Tech Eng), with relevant experience in streetlight installation and/or maintenance (Attach proof or provide registration number of ECSA registration Certificate) (Max 10 points) Experience: 5 years or more experience (10 points) 3 to less than 5 years' experience (7 points) 1 to less than 3 years' experience (5 points) 0 to less than 1 years' experience	Previously completed in maintenance of streetlights and electricity reticulation with contactable references - will be assessed as follows: (Max 35 points) 5 or more projects completed: (35 points) 4 projects completed: (25 points) 3 projects completed: (15 points) 2 projects completed: (5 points)	Project Plan: (Max 10 points) Briefly outline project plan indicating time allocations, milestones, cost predictions and resources related to streetlight maintenance: - Work program and sequence of activities (4 points) - Resources and materials required and	Rating A: (15 points) Rating B: (10 points) Rating C: (5 points) Rating D to H (0 points) (Failure to submit proof of bank rating from the relevant bank will result in the bidder

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(0 points) Site Agent Site Manager / Agent must have as a minimum NQF Level 6/Diploma or higher qualification in Electrical Engineering and an active registration with ECSA as a (Pr Techni Eng) or higher, with relevant skills and experience in streetlight maintenance and electrical reticulation. (Attach proof or provide registration number of ECSA registration) (Max 10 Points) Experience: • 5 years or more experience (10 points) • 3 to less than 5 years' experience (7 points) • 1 to less than 3 years' experience (5 points) • 0 to less than 1 years' experience (0 points) The Construction Health and Safety Officer: qualified Safety Officer must be registered and active with SACPCMP as at least Traffic Safety Officer (must be permanently based on the site for the duration of the project. The Traffic Safety Officer with relevant experience will be assessed as follows: (Attach - professional registration certificate or provide professional registration number (Max 10 points)) Experience: • 5 years or more experience (10 points) • 3 to less than 5 years' experience	• 1 project Completed: (0 points) (Failure to submit at least completion or taking over certificates will result in the bidder scoring zero points). NB: Completion or taking over certificates must be signed by all relevant parties (Completion or taking over Certificate that is not signed by all relevant parties will result in the bidder forfeiting points). NB: "Practical Completion Certificates will not be considered.	how they will be utilised including plant and equipment (6 points) Quality Control Plan: (Max 10 points) If company is certified with SABS for ISO 9002 then please submit certification to claim the 10 points above. If company is not certified then please provide a brief outline quality control procedure plan indicating the following: • Procedures of installation of Mast and Luminaires (5 points) • Procedures of testing of electrical	getting zero points)
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(7 points) • 1 to less than 3 years' experience (5 points) • 0 to less than 1 years' experience (0 points) NB: The key personnel must be permanently based on the site for the duration of the project. An official is not permitted to perform a dual role i.e. the bidder cannot nominate an official more than once as a key personnel.		systems (5 points) Failure to submit relevant documents and attachments will result in the bidder getting zero points.	
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PREFERENCE POINT SYSTEM EVALUATION:

In terms of Preferential Procurement Regulation of 2022, the department will be applying either the 80/20 or 90/10 preference point system, which is applicable to bids with a Rand value lessor/equal or above R 50 million (all applicable taxes included), shall be applied, where a maximum of 80/90 points will be allocated for price and maximum of 20/10 will be allocated for the Specific Goals specified in this tender.

The points will be allocated as follows:

PREFERENCE POINT SYSTEM	POINTS	POINTS
Price	80	90
Specific Goals (refer to requirements below)	20	10
Total points for Price and Preference Points	100	100

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Specific Goals Requirements:

To qualify for Specific Goal points, Bidders must provide evidence of ownership of 51% or more per the specified Historically Disadvantaged Individuals (HDI) categories. Bidders must submit verifiable documentation as proof to claim the Preference Points.

Bidders who fail to submit valid B-BBEE credentials will forfeit their preference points.

SPECIFIC GOALS	PROOF OF EVIDENCE	POINTS (20)	POINTS (10)
HDI	The bidder must submit a valid B-BBEE Certificate or Sworn Affidavit with at least 51% black ownership to claim points.	1	1
Woman	The bidder must submit a valid B-BBEE Certificate or Sworn Affidavit with at least 51% owned by women to claim points.	7	3
Youth	The bidder must submit a valid B-BBEE Certificate or Sworn Affidavit with at least 51% owned by youth and copies of Identity Documents for Directors to claim points.	5	2
Disability	The bidder must submit a valid B-BBEE Certificate or Sworn Affidavit with at least 51% owned by people with disability to claim points	5	3
Bidder must be located within Gauteng Province	The bidder must submit a copy of a municipal rates & taxes invoice or statement not older than Three (3) months or Lease agreement in the name of the Lessee signed by both parties.	2	1

Guidance on valid B-BBEE Certificates and/or valid Sworn Affidavits to substantiate preference points claimed for Specific Goals.

- Valid B-BBEE Certificate issued by a SANAS accredited agency.
- Bidders qualifying as EME/QSE must submit a valid Sworn Affidavit (DTIC - format) or a B-BBEE Certificate issued by the Companies & Intellectual Property Commission (CIPC) on behalf of the DTIC, which serves as an Affidavit. NB! Sworn affidavits must be original or certified as a true copy of the original and be signed by the deponent and attested to by a Commissioner of Oaths

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- A Trust, Consortium or Joint Venture (JV) must submit a valid consolidated B-BBEE Certificate issued by a SANAS accredited agency. No sworn affidavit will be accepted for a Consortium or JV.
- The Department is requesting the B-BBEE credentials in order to validate and evaluate the points claimed by the Bidder based on the Specific Goals outlined in this tender document and the SBD 6.1.

NB: The submission of a fraudulent B-BBEE credentials will result in the bidder being disqualified and criminal proceedings being instituted against the bidder. The bidder, the shareholders and / or directors will further be restricted from doing business with any organ of the state for a maximum period of 10 years

BIDDERS SHOULD NOTE THE FOLLOWING:

- Where the proposed prices of critical materials to be supplied to the Department are considerably less than the expected market price or rates, the Department reserves the right to verify the proposed prices by requesting quotations from the supplier(s) cited in the compilation of the bid.
- Only suppliers who are registered on the National Centralised Supplier Database (CSD) will be considered for appointment.
- Potential suppliers must note that in terms of the departmental policy, the Department reserves the right to restrict a person from doing business with government in accordance with National Treasury's PFMA SCM Instruction No. 03 of 2021/22 dated 31 March 2022, in the event that the supplier fails to adequately perform in terms of the awarded contract.
- The bid validity period is 120 days (Excluding Public Holidays). However, the Department reserves the right to request all bidders to extend such validity period should the need arise.
- In terms of the Occupational Health and Safety (OHS) Act the bidder is required to appoint a **Construction Health and Safety Officer** who is registered with the South African Council for the Project and Construction Management Professions (SACPCMP). Compliance in respect of the OHS is the responsibility of the bidder.
- The successful bidder/s will be required to enter into a formal contract with the Department. Such a contract will be governed in accordance with **The FIDIC Conditions of Contract for construction for building and engineering works designed by the Employer (1999), issued by the International Federation of Consulting Engineers**
- The Department will not compensate the bidder for any costs incurred in the preparation and submission of a bid offer, including the costs of any tests which have been deemed necessary in the demonstration of compliance with the stated requirements (forming part of this RFP).
- **The department will conduct a detail risk assessment of the recommended bidders.**

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Please Note:

1. Amounts written in words take precedence over amounts in figures, in case of any discrepancy.
2. Bidders are required to sign a bids submission register which will be handled by the security officer.

CORRESPONDENCE:

- For the availability of the bid document and technical specifications enquiries contact the following e-mail at simphiwe.hlatshwayo@gauteng.gov.za
- Closing date for enquiries: 15 September 2025.
- Bidders to expect responses within 7 days prior to the closing date
- Bidders must regularly check, e-Portal and Departmental Websites for publication of responses and other communication.

TENDER DOCUMENTS

Prospective bidders can download and print their own version of the tender document at no cost (free of charge) by accessing the e-Tender Publication Portal website (www.etenders.gov.za). Bidders are advised to ensure that all bid documents are properly bound upon submission on the closing date. Failure to submit all the required pages of the Bid Document may result in the bidder either being disqualified or forfeiting the available points on functionality, depending on the nature of the submission.

Tender documents will be available on the E-Tender publication portal from 05 September 2025.

BID SUBMISSION:

Bidders must complete and submit all the required pages of the tender document, as published. The submission of bids either electronically, or by telegraphic, telephone, telex, facsimile, emails or similar apparatus will NOT be accepted.

Bid submissions must be clearly marked "TENDER NO. DRT 21/01/2025 The Supply, Maintenance and Commissioning Of Provincial Street Lights on Various Provincial Roads And Security Lighting Of Buildings For A Period Of Three (3) Years: In The Gauteng Province and bid documents must be submitted in a sealed envelope and deposited into the Tender Box situated at the Gauteng Department of Roads and Transport, Ground Floor, Life Centre Building, 45 Commissioner Street, Johannesburg by the closing date and before the closing time. Late bids will NOT be accepted.

Clearly numbered Bid Documents together with all applicable attachments must be deposited in the tender box in the foyer at ground floor, Life Centre Building, at 45 Commissioner Street, Johannesburg, by no later than 11h00 on the closing date as stated above.

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T1.2 Tender Data

The conditions of tender are the Standard Conditions of Tender as contained in SANS 10845-3:2015 Edition 1.

Clause number	Tender Data
2.0	Terms and Conditions: For the purposes of this document, the following terms and definitions apply
2.1	Bill of Quantities: Document that lists the items of work and the quantities and rates associated with each item to allow contractors to be paid, at regular intervals, an amount equal to the agreed rate for the work multiplied by the quantity of work completed.
2.3	Comparative Offer Tenderer's financial offer after all tendered parameters that can affect the value of the financial offer have been taken into consideration to enable comparisons to be made on a comparable basis.
2.4	Conflict of Interest Any situation in which someone in a position of trust has competing professional or personal interests which make it difficult for him to fulfil his duties impartially, an individual or organization is in a position to exploit a professional or official capacity in some way for his personal or for corporate benefit, or incompatibility or contradictory interests exist between an employee and the organization which employs that employee
2.6	Corrupt Practice Offering, giving, receiving or soliciting of anything of value to influence the action of the employer or his staff or agents in the tender process
2.10	Fraudulent Practice Misrepresentation of the facts in order to influence the tender process, or the award of a contract arising from a tender offer to the detriment of the employer, including collusive practices intended to establish prices at artificial levels
3.0	General Requirements

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3.1	Actions The employer and each tenderer submitting a tender offer shall comply with the standard conditions of tender. In their dealings with each other, they shall discharge their duties and obligations, as set out in Clauses 4 and 5, in a timely manner and with integrity, behave equitably, honestly and transparently, comply with all legal obligations and not engage in anti-competitive practices. The employer and the tenderer, and all the agents and employees involved in the tender process, shall avoid conflicts of interest and, where a conflict of interest is perceived or known, declare any such conflict of interest, indicating the nature of such conflict. Tenderers shall declare any potential conflict of interest in their tender submissions. Employees, agents and advisors of the employer shall declare any conflict of interest to whoever is responsible for overseeing the procurement process at the start of any deliberations relating to the procurement process or as soon as they become aware of such conflict, and abstain from any decisions where such conflict exists or recuse themselves from the procurement process, as appropriate. The employer shall not seek and a tenderer shall not submit a tender without having a firm intention and the capacity to proceed with the contract.
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Clause number	Tender Data																		
	NOTE 1 A conflict of interest can arise due to a conflict of roles which can provide an incentive for improper acts in some circumstances or positions. A conflict of interest can create an appearance of impropriety that can undermine confidence in the ability of that person to act properly in said circumstance or position, even if no improper acts result. NOTE 2 Conflicts of interest with respect to those engaged in the procurement process include direct, indirect or family interests in the tender or outcome of the procurement process and any personal bias, inclination, obligation, allegiance or loyalty which can in any way affect any decisions taken.																		
3.2	The Tender Documents issued by the employer comprise the following documents: PART T1 : TENDERING PROCEDURES <table><tr><td>T1.1</td><td>Tender notice and invitation to tender</td><td>White</td></tr><tr><td>T1.2</td><td>Tender data</td><td>Pink</td></tr></table> PART T2 : RETURNABLE DOCUMENTS <table><tr><td>T2.1</td><td>List of returnable documents</td><td>Yellow</td></tr><tr><td>T2.2</td><td>Returnable schedules</td><td>Yellow</td></tr></table> PART C1 : AGREEMENTS AND CONTRACT DATA <table><tr><td>C1.1</td><td>Forms of offer and acceptance</td><td>White</td></tr><tr><td>C1.2</td><td>Contract data</td><td>White</td></tr></table>	T1.1	Tender notice and invitation to tender	White	T1.2	Tender data	Pink	T2.1	List of returnable documents	Yellow	T2.2	Returnable schedules	Yellow	C1.1	Forms of offer and acceptance	White	C1.2	Contract data	White
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C1.3	Other standard forms	White
PART C2 : PRICING DATA		
C2.1	Pricing instructions	Yellow
C2.2	Bill of quantities	Yellow
PART C3 : SCOPE OF WORKS		
C3.1	Project overview	Blue
PART C4 : SITE INFORMATION		
C4	Site information	Blue
PART C5 : ANNEXURES		
C5	Annexures	White

Clause number	Tender Data
3.4	Communication and employer's agent Each communication between the employer and a tenderer shall be to or from the employer's agent only, and in a form that can be read, copied and recorded, and in the language stated in the tender data. The employer shall not take any responsibility for non-receipt of communications from or by a tenderer. The name and contact details of the employer's agent are stated in the tender data.
3.5	Employer's right to accept or reject any tender offer The employer may accept or reject any variation, deviation, tender offer, or alternative tender offer, and may cancel the tender process and reject all tender offers at any time before the formation of a contract.
4.1	Eligibility Submit a bid offer only if the bidder satisfies the criteria outlined in the Tender Notice and Invitation to Tender:
4.2	Cost of tendering Accept that, unless otherwise stated in the tender data, the employer does not compensate the tenderer for any costs incurred in the preparation and submission of a tender offer, including the costs of any testing necessary to demonstrate that aspects of the offer comply with requirements.

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4.3	Checking documents Check the tender documents on receipt for completeness and notify the employer of any discrepancy or omission, prior to bid closure. No amendments to bidder's proposal will be allowed after bid closure.
4.4	Confidentiality and copyright of documents Treat as confidential all matters arising in connection with the tender. Use and copy the documents issued by the employer only for the purpose of preparing and submitting a tender offer in response to the invitation.
4.5	Reference documents Obtain, as necessary for submitting a tender offer, copies of the latest versions of standards, specifications, conditions of contract and other publications, which are incorporated into the tender documents by reference.
4.6	Acknowledging addenda Acknowledge receipt of addenda to the tender documents, which the employer may issue, and, if necessary, apply for an extension to the closing time stated in the tender data, in order to take the addenda into account.
4.7	Compulsory site briefing is outlined in the Tender Notice and Invitation to Tender
4.11	Alterations to documents Do not make any alterations or additions to the tender documents, except to comply with instructions issued by the employer, or necessary to correct errors made by the tenderer. All signatories to the tender offer shall initial all such alterations.

Clause number	Tender Data
4.13.1	Tenderers are to submit one tender only, either as a single tendering entity or as a member of a Joint Venture and/or Consortium.
4.13.3	Each tender offer communicated on paper shall be submitted as an original, plus 0 copies.
4.13.4	Submit only the signed original tender
4.13.5	No telegraphic, telephonic, telex, facsimile or electronic tender offers will be accepted.
4.13.6	A two-envelope procedure will not be followed.

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4.15	The employer's details and address for delivery of tender offers and identification details that are to be shown on each tender offer package are: Location of tender box: Ground Floor of Life Centre Building Physical address: 45 Commissioner Street, Johannesburg. Identification details: TENDER NUMBER: DRT 21/01/2025/PRETORIA THE SUPPLY, MAINTENANCE AND COMMISSIONING OF PROVINCIAL STREET LIGHTS ON VARIOUS PROVINCIAL ROADS AND BUILDINGS FOR A PERIOD OF THREE (3) YEARS: IN THE GAUTENG PROVINCE <Process for tender closing? > The closing time for submission of tender offers is 11:00 as stated in the Tender Notice and Invitation to Tender. Tenders will be opened immediately after the closing time
4.16	The tender offer validity period is 120 days (Excluding Public Holidays).
4.20	The tenderer is required to submit with his tender a letter of intent from an approved insurer undertaking to provide the Form of Guarantee to the format included in Part T2.1 of this procurement document.
5.11.3	Functionality Evaluation Requirements and the Price and Preference Point System Evaluation are outlined in the Tender Notice and Invitation to Tender. Tender offers will only be accepted if: b) The proposed Guarantor must complete the form of intent to provide a Guarantee to the tenderer on the format included in Part 2.2 of this procurement document. c) The tenderer or any of its directors/shareholders is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector; d) The tenderer has not; i) abused the Employer's Supply Chain Management System; or ii) failed to perform on any previous contract and has been given a written notice to this effect; e) Has completed the Compulsory Enterprise Questionnaire and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interests of the employer or potentially compromise the tender process and persons in the employ of the state are permitted to submit tenders or participate in the contract;

Clause number	Tender Data
5.13.9	Functionality Evaluation Requirements and the Price and Preference Point System Evaluation are outlined in the Tender Notice and Invitation to Tender.

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PART T2 : RETURNABLE DOCUMENTS

CHECK LIST

FORM NO	FORM DESCRIPTION	TICK IF COMPLETED (if applicable to this bid)
A1:	Compulsory Enterprise Questionnaire	
A2:	Record of Addenda to tender documents	
A3:	Certificate of Authority	
A4:	Schedule of Proposed Subcontractors	
A5:	Schedule of recently completed and current contracts	
A6:	Schedule of Plant and Equipment	
A7:	Occupational Health and Safety Act: Statement by Tendering Entity	
A8:	Tenderer's Bank Details	
A9:	Schedule of Tenderer's Litigation History	
A10:	Certificate of Insurance Cover	
A11:	Registration with Construction Industry Development Board	
A12:	Tax Compliance Status Pin	
A13:	Form of Intent to Provide a Form of Guarantee	
SBD 4	Bidder's Disclosure	
SBD 6.1	Preference Points Claim Form in Terms of the Preferential Procurement Regulations 2022	
B1:	Tenderer's Schedule of Work Experience	
B2:	Tenderer's B-BBEE Verification Certificate	
C1	CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS	
C2	SCHEDULE OF SPECIAL MATERIALS	
C3	MANAGEMENT PROPOSAL	
C3.1	LUMINAIRE SPECIFICATION DETAILS	
C3.2	DRAWINGS AND INFORMATION - CONSUMER DISTRIBUTION PILLARS AND KIOSKS	
NOTES:		
	SCHEDULES/DOCUMENTS REQUIRED FOR TENDER EVALUATION PURPOSES	
	SCHEDULES/DOCUMENTS THAT WILL BE INCORPORATED INTO THE CONTRACT	

)

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T2.1 List of Returnable Documents

1 Documents required for tender administrative purposes

- Form A1: Compulsory Enterprise Questionnaire
- Form A2: Record of Addenda to Tender Documents
- Form A3: Certificate of Authority
- Form A4: Schedule of Proposed Subcontractors
- Form A5: Schedule of recently completed and current contracts
- Form A6: Schedule of Plant and Equipment
- Form A7: Occupational Health and Safety Act: Statement by Tendering Entity
- Form A8: Tenderer's Bank Details
- Form A9: Schedule of Tenderer's Litigation History
- Form A10: Certificate of Insurance Cover
- Form A11: Registration with Construction Industry Development Board
- Form A12: Tax Compliance Status
- Form A13: Form of Intent to Provide a Form of Guarantee.
- Forms T2.25, T2.26, T2.27 and T2.28 for Key Personnel

2 Returnable Schedules required for tender evaluation purposes

- Certificate of attendance at clarification meeting
- SBD 4: Declaration of Interest
- Form B1: Tenderer's Schedule of Work Experience

3 Returnable Schedules that will be used for tender evaluation purposes and be incorporated into the contract.

- Form B2: Tenderer's B-BBEE Verification Certificate
- SBD 6.1: Preference Points Claim Form in Terms of the Preferential Procurement Regulations 2022
- Form C1: Contractor's Establishment on Site and General Obligations
- Form C2: Schedule of Special Material
- Form C3: Management Proposal
- Form C3.1: Luminaire Specification Details
- Form C3.2: Drawings and Information – Consumer Distribution Pillars and Kiosks
-

4 C1.1 Forms of Offer and Acceptance

5 C1.2 Contract Data (C1.2.1, C1.2.2 and C1.2.3)

6 C2.2 Bill of Quantities

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Form A1: Compulsory Enterprise Questionnaire

The following particulars must be furnished. In the case of a joint venture, **separate** enterprise questionnaires in respect of each partner must be completed and submitted.

Section 1: Name of enterprise:

Section 2: VAT registration number, if any:

Section 3: CIDB registration number, if any: (Not Compulsory)

Section 4: Particulars of sole proprietors and partners in partnerships

Name*	Identity number*	Personal income tax number*

* Complete only if sole proprietor or partnership and attach separate page if more than 3 partners

Section 5: Particulars of companies and close corporations

Company registration number

Close corporation number Tax
reference number

Section 6: Record in the service of the state

Indicate by marking the relevant boxes with a cross, if any sole proprietor, partner in a partnership or director, manager, principal shareholder or stakeholder in a company or close corporation is currently or has been within the last 12 months in the service of any of the following:

- an employee of any provincial department, national
- ☐ a member of any municipal council ☐ or provincial public entity or
provincial legislature within the meaning of the Public Finance ☐ constitutional institution a member of any
- ☐ a member of the National Assembly or the National Management Act, 1999 (Act 1 of 1999)
Council of Province a member of an accounting ☐ authority of any national a member of the board of
- ☐ directors of any or provincial public entity
municipal entity an employee of Parliament or a ☐ provincial legislature an official of any municipality or
- ☐ municipal entity

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If any of the above boxes are marked, disclose the following:

Name of sole proprietor, Partner, director, manager, principal shareholder or stakeholder	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

*insert separate page if necessary

Section 7: Record of spouses, children and parents in the service of the state

Indicate by marking the relevant boxes with a cross, if any spouse, child or parent of a sole proprietor, partner in a partnership or director, manager, principal shareholder or stakeholder in a company or close corporation is currently or has been within the last 12 months been in the service of any of the following:

- an employee of any provincial department, national
- ☐ a member of any municipal council ☐ or provincial public entity or provincial legislature within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999)
- ☐ a member of the National Assembly or the National Council of Province a member of an accounting authority of any national a member of the board of directors of any or provincial public entity
- ☐ municipal entity an employee of Parliament or a provincial legislature an official of any municipality or municipal entity

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		Status of service (tick appropriate column)
--	--	--

Name of spouse, child or parent	Name of institution, public office, board or organ of state and position held	Current	Within last 12 months

*insert separate page if necessary

The undersigned, who warrants that he / she is duly authorised to do so on behalf of the enterprise:

- i) authorizes the Employer to obtain a tax clearance certificate from the South African Revenue Services that my / our tax matters are in order;
- ii) confirms that neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004;
- iii) confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption;
- iv) confirms that I / we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest; and
- v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

Signed

Date

Name

Position



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Enterprise name

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Form A2: Record of Addenda to tender documents

We confirm that the following communications received from the Employer before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer:

NO.	DATE	TITLE OR DETAILS
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Attach additional pages if more space is required.

Signed _____ Date _____

Name _____ Position _____

Enterprise
name

TENDER NUMBER: DRT 21/01/2025 THE SUPPLY, MAINTENANCE AND COMMISSIONING OF PROVINCIAL STREET LIGHTS ON VARIOUS PROVINCIAL ROADS AND SECURITY LIGHTING OF BUILDINGS FOR A PERIOD OF THREE (3) YEARS: IN GAUTENG PROVINCE

Form A3: Certificate of Authority

This Returnable Schedule is to be completed by the tendering entity.

I/We, the undersigned, are submitting this tender offer and hereby authorise Mr/Ms
., authorised signatory of the company
., acting in the capacity of, to
sign all documents in connection with the tender offer and any contract resulting from it on our behalf.

NAME OF FIRM	ADDRESS	DULY SIGNATORY	AUTHORISED
		Signature. Name Designation	
		Signature..... Name Designation	
		Signature..... Name Designation	

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Form A4: Schedule of Proposed Subcontractors

We notify you that it is our intention to employ the following Subcontractor/s for work in this contract.

Contractor shall carry out full scope of works except for Security works portion that can be only sub-contracted. If we are awarded a contract we agree that the final list of Subcontractor/s, with supporting documents (Company Registration, BBBEE and Valid Tax Clearance Certificate) will be submitted to the Project Engineer for approval before implementation

Name and address of proposed Subcontractor	Description of Work to be executed by Subcontractor	Previous experience with Subcontractor

Attach additional pages if more space is required

Signed _____ Date _____

Name _____ Position _____

Enterprise name _____

Form A5: Schedule of recently completed and current contracts

List not more than seven contracts completed.

Contract title:	Employer (name) Place (town)	Reference person		Contract Amount (R million)	Contract Period (months)	Date Completion* of
		Name	Tel			
1						
2						
3						
4						
5						
6						
7						

*Completed means that a certificate has been issued in terms of a contract by the employer, signifying that the whole of the construction works have reached a state of readiness for occupation or use for the purposes intended, although some minor work may be outstanding.

List all current contracts not complete at the time

Project:	Employer (name) Place (town)	Reference person		Contract Amount (R million)	Contract Period (months)	Date of commencement	Date of expected Completion*
		Name	Tel				
1							
2							
3							
4							
5							
6							
7							
8							
9							



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ROADS AND TRANSPORT
REPUBLIC OF SOUTH AFRICA

10								
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*Date when defects liability period commenced

Signed _____ Date _____

Name _____ Position _____

*Enterprise
name*

THE MAINTENANCE OF PROVINCIAL STREET LIGHTS ON VARIOUS PROVINCIAL ROADS AND BUILDINGS FOR A PERIOD OF THREE (3) YEARS: IN THE GAUTENG PROVINCE

Form A6: Schedule of Plant and Equipment

The following are lists of major items of relevant equipment that I / we presently own or lease and will have available for this contract or will acquire or hire for this contract if my / our tender is accepted.

The tenderer shall state below what equipment will be immediately available for this contract, what equipment will become available by virtue of outstanding orders, and what further equipment will be acquired or hired for the work should he be awarded the contract.

a) EQUIPMENT IMMEDIATELY AVAILABLE (I)

b) EQUIPMENT ON ORDER (O)
(State details of arrangements made, with delivery dates)

c) EQUIPMENT THAT WILL BE ACQUIRED OR HIRED (H)
(State details of delivery arrangements)

Note to tenderer: State with relevant symbol in the availability column.

(a) Details of major equipment that is owned by and immediately available for this contract. **(Attach vehicle Registration documents as proof of ownership, serial numbers of attenuators, serial numbers of generators)**

Description, size, capacity, etc.	Quantity	Availability

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Attach additional pages if more space is required.

- (b) Details of major equipment that will be hired, or acquired for this contract if my / our tender is acceptable.
(Attach a letter of intent from Rental Companies)

Description, size, capacity, etc.	Quantity	Availability

Attach additional pages if more space is required.

--	--	--

Signed

Date

Name

Position

Tenderer

Form A7: Occupational Health and Safety Act: Statement by Tendering Entity

I, duly authorised
to represent (company name)
in my capacity as
hereby confirm that I accept full and exclusive responsibility for compliance by myself and all persons who
perform work for me with the provisions of the Occupational Health and Safety Act, No. 85 of 1993 (as
amended) and all regulations promulgated from time to time, whilst performing work on

.....
I confirm that all employees who perform work on the site shall be properly trained to do this in a manner which
is safe and without risk to health and safety to themselves and others in the vicinity and undertake to have our
activities adequately supervised in the interest of health and safety.

Signed

Date

Name

Position

Tenderer

Form A8: Tenderer's Bank Details

Notes to tenderer:

- 1. The tenderer shall attach to this form a letter from the bank at which he declares he conducts his account. The contents of the bank's letter must state the credit rating that it, in addition to the information required below, accords to the tenderer for the business envisaged by this tender. Failure to provide the required letter with the tender submission may render the tenderer's offer unresponsive in terms of tender condition F.3.8.**
- 2. The tenderer's banking details as they appear below shall be completed.**
- 3. In the event that the tenderer is a joint venture enterprise, details of all the members of the joint venture shall be similarly provided and attached to this form.**

The tenderer shall provide the following:

- i) Name of Account Holder: ii)
Account Number:
iii) Bank name:
iv) Branch Number:

v) Bank and branch contact details
.....

SIGNED BY TENDERER:

Form A9: Schedule of Tenderer's Litigation History

Note to tenderer:

The tenderer shall list below details of any litigation with which the tenderer (including its directors, shareholders or other senior members in previous companies) has been involved with any organ of state or state department within the last ten years. The details must include the year, the litigating parties, the subject matter of the dispute, the value of any award or estimated award if the litigation is current and in whose favour the award, if any, was made.

Employer	Other litigating party	Dispute	Award value	Date resolved

SIGNED BY TENDERER:

Form A10: Certificate of Insurance Cover

Note to tenderer:

In the event of the tenderer being a joint venture/consortium the details of the individual members must also be provided.

The tenderer shall provide the following details of this insurance cover:

i) Name of Tenderer: ii)
Period of Validity:

iii) Value of Insurance:

- Insurance for Works and Contractor's Equipment

Company:

Value:

- Insurance for Contractor's Personnel

Company:

Value:

- General public liability

Company:

Value:

- SASRIA

Company:

Value:

SIGNED BY TENDERER:



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Form A11: Registration with Construction Industry Development Board

The tenderer shall provide a printed copy of the Active Contractor's Listing off the CIDB website www.cidb.org.za. In the case of a Joint Venture, a printed copy of the Active Contractor's Listing must be provided for each member of the Joint Venture.

Complete the following details of his registration with the Construction Industry Development Board.

Name of Contractor:

Contractor Grading Designation:

CIDB Contractor Registration Number:

Registration expiry date:

Note:

The tenderer is required to be registered for the duration of the tender offer validity period.

SIGNED BY TENDERER:



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Form A12: Tax Compliance Status

The tenderer is to affix to this page:

A valid Tax Compliance Status Pin, issued by the South African Revenue Services, that will grant a third-party access to the bidder's Tax Compliance Status.

Note:

Failure to affix a valid Tax Compliance Status Pin may result in this tender not being considered for the award of the contract

Form A13: Form of Intent to Provide a Form of Guarantee

- 1 With reference to the tender of
 (hereinafter referred to as the “**TENDERER**” for the project
 (hereinafter referred to as the “**CONTRACT**” for the DEPARTMENT OF ROADS AND TRANSPORT of the Gauteng Provincial Government, (hereinafter referred to as the “**EMPLOYER**” for the tender dated
 for the offered total of prices of
 (R.....)
 (in words)

- 2 I/We in my/our capacity as
 and hereby representing

 (hereinafter referred to as the “**GUARANTOR**” advise that the “**GUARANTOR**” undertakes to provide a **Form of Guarantee** to the **EMPLOYER** to the Employer’s format included in Part C1.3 of this document within fourteen (14) working days of the written acceptance of the contractor’s tender offer.

Thus done and signed at on

.....
Name of signatory

.....
Capacity of authorised signatory

.....
As witness

.....
*for and on behalf of the **Guarantor** who
 by signature hereof warrants authorisation
 hereto*

Experience of Key Staff

Forms T2.25, T2.26, T2.27 and T2.28 for Key Personnel

Bidders shall complete Schedule of Key Staff below and attach certified copies of qualification & registration accordingly for:-

Contract Manager

Site Agent

Traffic Safety Officer

The undersigned, who warrants that he / she is duly authorised to do so on behalf of the enterprise, confirms that the contents of this schedule are within my personal knowledge and are to the best of my belief both true and correct.

Signed

Date

Name

Position

Tenderer

THE MAINTENANCE OF PROVINCIAL STREET LIGHTS ON VARIOUS PROVINCIAL ROADS AND BUILDINGS FOR A PERIOD OF THREE (3) YEARS: IN THE GAUTENG PROVINCE

Schedule of Key Staff
Contract Manager

NAME	DATE OF BIRTH	POSITION IN TEAM	QUALIFICATION	REGISTRATION NUMBER OF ECSA/SACPCMP

Note1:

- List only the projects completed in the last 10 years or more that the tenderer considers relevant to the specified scope of works.

Technical Experience

CLIENT & PROJECT NO.	PROJECT TYPE	RELEVANT EXPERIENCE STARTED	RELEVANT EXPERIENCE ENDED	VALUE	POSITION HELD	CONTACT PERSON AND POSITION	CONTACT NO.

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Site Agent

NAME	DATE OF BIRTH	POSITION IN TEAM	QUALIFICATION & REGISTRATION

Note1:

- List only the projects completed in the last 5 years or more that the tenderer considers relevant to the specified scope of works.

Technical Experience

CLIENT & PROJECT NO.	PROJECT TYPE	RELEVANT EXPERIENCE STARTED	RELEVANT EXPERIENCE ENDED	VALUE	POSITION HELD	CONTACT PERSON AND POSITION	CONTACT No.

THE MAINTENANCE OF PROVINCIAL STREET LIGHTS ON VARIOUS PROVINCIAL ROADS AND BUILDINGS FOR A PERIOD OF THREE (3) YEARS: IN THE GAUTENG PROVINCE

Traffic Safety Officer

NAME	DATE OF BIRTH	POSITION IN TEAM	QUALIFICATION	REGISTRATION NUMBER SACPCMP	OF

Note1:

- List only the projects completed in the last 5 years or more that the tenderer considers relevant to the specified scope of works.

Technical Experience

CLIENT & PROJECT NO.	PROJECT TYPE	RELEVANT EXPERIENCE STARTED	RELEVANT EXPERIENCE ENDED	VALUE	POSITION HELD	CONTACT PERSON AND POSITION	CONTACT No.



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SBD 4

BIDDER'S DISCLOSURE

1. PURPOSE OF THE FORM

Any person (natural or juristic) may make an offer or offers in terms of this invitation to bid. In line with the principles of transparency, accountability, impartiality, and ethics as enshrined in the Constitution of the Republic of South Africa and further expressed in various pieces of legislation, it is required for the bidder to make this declaration in respect of the details required hereunder.

Where a person/s are listed in the Register for Tender Defaulters and / or the List of Restricted Suppliers, that person will automatically be disqualified from the bid process.

2. BIDDER'S DECLARATION

2.1 Is the bidder, or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest¹ in the enterprise, employed by the state? **YES/NO**

2.1.1 If so, furnish particulars of the names, individual identity numbers, and, if applicable, state employee numbers of sole proprietor/ directors / trustees / shareholders / members/ partners or any person having a controlling interest in the enterprise, in table below.

Full Name	Identity Number	Name of State institution

¹ the power, by one person or a group of persons holding the majority of the equity of an enterprise, alternatively, the person/s having the deciding vote or power to influence or to direct the course and decisions of the enterprise.



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2.2 Do you, or any person connected with the bidder, have a relationship with any person who is employed by the procuring institution? **YES/NO**

2.2.1 If so, furnish particulars:

.....
.....

2.3 Does the bidder or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest in the enterprise have any interest in any other related enterprise whether or not they are bidding for this contract?

YES/NO

2.3.1 If so, furnish particulars:

.....
.....

3 DECLARATION

I, _____ the _____ undersigned, (name)..... in submitting the accompanying bid, do hereby make the following statements that I certify to be true and complete in every respect:

- 3.1 I have read and I understand the contents of this disclosure;
- 3.2 I understand that the accompanying bid will be disqualified if this disclosure is found not to be true and complete in every respect;
- 3.3 The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium² will not be construed as collusive bidding.
- 3.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.

² Joint Venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.



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- 3.4 The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.
- 3.5 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.
- 3.6 I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT.

I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

.....	
Signature	Date
.....	
Position	Name of bidder

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SBD 6.1

**PREFERENCE POINTS CLAIM FORM IN TERMS OF THE
PREFERENTIAL PROCUREMENT REGULATIONS 2022**

This preference form must form part of all bids invited. It contains general information and serves as a claim form for preference points for Broad-Based Black Economic Empowerment (B-BBEE) Status Level of Contribution

NB: BEFORE COMPLETING THIS FORM, BIDDERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF B-BBEE, AS PRESCRIBED IN THE PREFERENTIAL PROCUREMENT REGULATIONS, 2022.

1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to invitations to tender:

- the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and
- the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

1.2 To be completed by the organ of state

(delete whichever is not applicable for this tender).

- a) The applicable preference point system for this tender is the 90/10 preference point system.
- b) The applicable preference point system for this tender is the 80/20 preference point system.
- c) Either the 90/10 or 80/20 preference point system will be applicable in this tender. The lowest/highest acceptable tender will be used to determine the accurate system once tenders are received.

1.3 Points for this tender (even in the case of a tender for income-generating contracts) shall be awarded for:

- (a) Price; and
- (b) Specific Goals.

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1.4 To be completed by the organ of state:

The maximum points for this tender are allocated as follows:

	POINTS	POINTS
PRICE	80	90
SPECIFIC GOALS	20	10
Total points for Price and SPECIFIC GOALS	100	100

1.5 Failure on the part of a tenderer to submit proof or documentation required in terms of this tender to claim points for specific goals with the tender, will be interpreted to mean that preference points for specific goals are not claimed.

1.6 The organ of state reserves the right to require of a tenderer, either before a tender is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the organ of state.

2. DEFINITIONS

- (a) **“tender”** means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation;
- (b) **“price”** means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts;
- (c) **“rand value”** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;
- (d) **“tender for income-generating contracts”** means a written offer in the form determined by an organ of state in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the organ of state and a third party that produces revenue for the organ of state, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions; and
- (e) **“the Act”** means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1. POINTS AWARDED FOR PRICE

3.1.1 THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS

A maximum of 80 or 90 points is allocated for price on the following basis:

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80/20

or

90/10

$$P_s = 80 \left(1 - \frac{P_t - P_{min}}{P_{min}} \right) \text{ or } P_s = 90 \left(1 - \frac{P_t - P_{min}}{P_{min}} \right)$$

Where

P_s = Points scored for price of tender under consideration

P_t = Price of tender under consideration

P_{min} = Price of lowest acceptable tender

3.2. FORMULAE FOR DISPOSAL OR LEASING OF STATE ASSETS AND INCOME GENERATING PROCUREMENT

3.2.1. POINTS AWARDED FOR PRICE

A maximum of 80 or 90 points is allocated for price on the following basis:

80/20

or

90/10

$$P_s = 80 \left(1 + \frac{P_t - P_{max}}{P_{max}} \right) \text{ or } P_s = 90 \left(1 + \frac{P_t - P_{max}}{P_{max}} \right)$$

Where

P_s = Points scored for price of tender under consideration

P_t = Price of tender under consideration

P_{max} = Price of highest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

4.1. In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1 below as may be supported by proof/ documentation stated in the conditions of this tender:

4.2. In cases where organs of state intend to use Regulation 3(2) of the Regulations, which states that, if it is unclear whether the 80/20 or 90/10 preference point system applies, an organ of state must, in the tender documents, stipulate in the case of—

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- (a) an invitation for tender for income-generating contracts, that either the 80/20 or 90/10 preference point system will apply and that the highest acceptable tender will be used to determine the applicable preference point system; or
- (b) any other invitation for tender, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable tender will be used to determine the applicable preference point system,
- then the organ of state must indicate the points allocated for specific goals for both the 90/10 and 80/20 preference point system.

Table 1: Specific goals for the tender and points claimed are indicated per the table below.

(Note to organs of state: Where either the 90/10 or 80/20 preference point system is applicable, corresponding points must also be indicated as such.)

Note to tenderers: The tenderer must indicate how they claim points for each preference point system.)

The specific goals allocated points in terms of this tender	Number of points allocated (90/10 system) (To be completed by the organ of state)	Number of points allocated (80/20 system) (To be completed by the organ of state)	Number of points claimed (90/10 system) (To be completed by the tenderer)	Number of points claimed (80/20 system) (To be completed by the tenderer)
HDI (Race)	1	1		
Women	3	7		
Youth	2	5		
Disability	2	5		
Bidder must be located in the Gauteng Province	2	2		

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DECLARATION WITH REGARD TO COMPANY/FIRM

- 4.3. Name of company/firm.....
- 4.4. Company registration number:
- 4.5. TYPE OF COMPANY/ FIRM
- ☐ Partnership/Joint Venture / Consortium
 - ☐ One-person business/sole propriety
 - ☐ Close corporation
 - ☐ Public Company
 - ☐ Personal Liability Company
 - ☐ (Pty) Limited
 - ☐ Non-Profit Company
 - ☐ State Owned Company
- [TICK APPLICABLE BOX]
- 4.6. I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/ firm for the preference(s) shown and I acknowledge that:
- i) The information furnished is true and correct;
 - ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
 - iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;
 - iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –
 - (a) disqualify the person from the tendering process;
 - (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
 - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
 - (d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and



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- (e) forward the matter for criminal prosecution, if deemed necessary.

..... SIGNATURE(S) OF TENDERER(S)	
SURNAME AND NAME:	
DATE:	
ADDRESS:	



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Form B1: Tenderer's Schedule of Work Experience

Note to tenderer:

The Tenderer shall enter in the spaces provided below a complete list of the last ten electrical/street lighting contracts awarded to him. This information is deemed to be material to the award of the contract.

EMPLOYER (NAME, TEL NO & FAX NO)	CONSULTING ENGINEER (NAME, TEL NO & FAX NO)	NATURE OF WORK	VALUE OF WORK	YEAR COMPLETED



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Form B2: Tenderer's B-BBEE Verification Certificate

Notes to tenderer:

1. The tenderer shall attach to this form a B-BBEE verification certificate in accordance with the Construction Sector Codes of Practice promulgated in Gazette 32305 on 5 June 2009 (see F.3.11.8 of the tender data).
2. In the event of a joint venture (JV), a consolidated B-BBEE verification certificate in the name of the JV shall be attached.
3. The attached verification certificate and the associated assessment report shall identify:
 - (a) The name and domicilium citandi et executandi of the tenderer.
 - (b) The registration and VAT number of the tenderer.
 - (c) The dates of granting of the B-BBEE score and the period of validity.
 - (d) The expiry date of the verification certificate.
 - (e) A unique identification number.
 - (f) The standard and/or normative document, including the issue and/or revision used to evaluate the tenderer.
 - (g) The name and/or mark/logo of the B-BBEE verification agency or registered auditor.
 - (h) The category (Generic, QSE, Exempt) in which the tenderer has been measured.
 - (i) The B-BBEE status level.
 - (j) The South African National Accreditation System (SANAS) (k) The B-BBEE procurement recognition level.
 - (l) The score achieved per B-BBEE element.
 - (m) The % black shareholding.
 - (n) The % black women shareholding.
 - (o) The % black persons with disabilities (p) The value added status of the tenderer.
4. The Employer will not be responsible to acquire data that it needs for its own reporting systems and which may not form part of a verification agency's standard certificate format. The tenderer, at its own cost, must acquire any missing specified data listed in 3 above from its selected verification agency or registered auditor and have it recorded on the certificate. Alternatively, such missing data must be supplied separately, but certified as correct by the same verification agency or registered auditor and also attached to this form. Failure to abide by this requirement will result in such tenderer scoring zero preference.

• FORM C1: CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS

Should the extended and combined total tendered for:

The Contractor's general obligations:

C3.2.1.3.1 (a) : Fixed obligations

C3.2.1.3.1 (b) : Time-related obligations



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exceed a maximum of 15 % of the Accepted Contract Amount, the Tenderer shall clearly set out his reasons for tendering in this manner in a letter attached to this page.

The Employer will duly consider these reasons but reserves the right to consider the tendered rates to be imbalanced and to deal with them in terms of Condition of Tender F.3.9.4 contained in this volume.

Total tendered for Items C3.2.1.3.1 (a) and C3.2.1.3.1 (b) expressed as a percentage of the Accepted Contract Amount:

.....%

Note to tenderer:

If the tenderer should require additional compensation for his obligations under section C3.2.1 (over and above the total tendered for items C3.2.1.3.1 (a) and C3.2.1.3.1 (b) by including such additional compensation in the tendered rates and/or lump sum of items in the bill of quantities, these items and the value of such additional compensation shall also be set out in a letter attached to this form.

SIGNED BY TENDERER:



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• **FORM C2: SCHEDULE OF SPECIAL MATERIALS**

Notes to tenderer:

1. Refer to Particular Condition of contract amending sub clause 13.8 of the General Conditions of Contract.
2. Only net bitumen content of asphalt and bituminous products shall be subject to rise and fall and no account shall be taken of transport, emulsifiers, diluents or modifiers that may be supplied ex refinery or added later.
3. For the purpose of clarity when using this form, a supplier is any company (including refineries) that supplies to a tenderer a bituminous product that it manufactures using bitumen as the sole or blended ingredient in the product. A tenderer shall, in compliance with note 4 below, attach to this form a letter of supply from each supplier it intends using in the performance of the contract.
4. Tenderers shall append to this page the following information on a letterhead from their selected supplier:
 - The supplier's company registration and address details; and
 - The product range available including refinery from which the base bitumen is drawn; and
 - The net base bitumen type and content for each product; and
 - The supply price (excluding VAT but including all other obligatory taxes and levies) to the tenderer for the net bitumen base content of each product; and - The date from which the supply prices apply.
5. Rise and fall adjustments shall only be made upon receipt by the engineer of the appropriate letters of supply in compliance to note 4 above, but with the changed supply prices and date of application, as well as reasons for the changes.
6. A change of supplier may be permitted, but only upon application to the engineer with the appropriate letters of supply in compliance to Note 4 above and approval thereof.
7. Non-disclosure of reduction in supply prices shall be deemed a contractor's deliberate action to defraud the Employer and grounds for the Employer, at its sole discretion, to terminate the contract.

Each material dealt with as a special material in terms of clause 4 of the Contract Price Adjustment Schedule of the Appendix to the Particular Conditions of Contract as amended by the Particular Conditions is stated in the list below. The rates and prices for the special materials shall be furnished by the tenderer as an attachment to this Form, which rates and prices shall not include VAT but shall include all other obligatory taxes and levies.

SPECIAL MATERIAL	UNIT*	NAME OF SUPPLIER AND RATE OR PRICE FOR THE BASE MONTH
Steel	Ton	

Notes to tenderer:



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1. **When called upon to do so, the tenderer shall substantiate the above rates or prices with acceptable documentary evidence.**
2. **Refer to Particular Condition amending sub-clause 13.8 of the General Conditions of Contract**

SIGNED BY TENDERER:



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• **FORM C3: MANAGEMENT PROPOSAL**

The tenderer shall submit a signed copy of his management proposal, providing a clear statement of his understanding and approach to execute the work, using the headings and sub-headings listed as follows:

(a) Personnel

A curriculum vitae (not longer than one A4 page) is required for each person as follows, indicating the relevant experience, and duration on both GDRT and other contracts. In addition, the form for each person regarding qualification, registration and years of experience in the electrical engineering/street lighting construction and maintenance field, is to be completed.

- (i) Contract manager
 - contract management experience
 - streetlight installation experience
 - Form C3.1
- (ii) Contractor's representative
 - contract management experience
 - streetlight installation experience
 - road safety experience
 - Form C3.2
- (iii) Traffic Safety Officer (TSO)
 - contract management experience
 - streetlight installation experience
 - road safety experience
 - Form C3.3

(b) Management of site

- (i) access to resources (number of personnel and equipment available in the company)
- (ii) quality assurance plan
- (iii) site management systems
- (iv) organisational structure (refer to Form C3.3 for details required)

SIGNED BY TENDERER:



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FORM C3.1: LUMINAIRE SPECIFICATION DETAILS

Tenderers shall submit the following luminaire details with their tender documents:

- (a) Manufacturer
- (b) Catalogue number
- (c) Iso-candela diagrams (candelas)
- (d) Iso-illumination diagram (lux)
- (e) Efficiency curves for the luminaires
- (f) Mass of the luminaires with and without the control gear
- (g) Reflector material and its thickness
- (h) Full particulars of the control gear
- (i) Maximum permissible ambient and storage temperatures
- (j) Adjustability of lamp holder
- (k) LED luminaire specifications to be issued and approved on as and when required basis

Information to be provided as per item no. C3.6.5.4



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**FORM C3.2: DRAWINGS AND INFORMATION - CONSUMER DISTRIBUTION PILLARS AND
KIOSKS**

Tenderers shall submit full details of the Consumer distribution kiosks and pillars offered with the following drawings with the tender:

- a drawing indicating all dimensions of the pillar & kiosk
- a drawing indicating the general internal equipment layout of the pillar & kiosk

The successful tenderer shall, before the manufacturing of the pillar/kiosk commences, submit the final drawings to the Engineer for approval.

A schematic wiring diagram of the kiosk/pillar, as wired and colour coded, shall be submitted at the completion of the contract.

Information to be provided as per item no. C3.6.8.2.5



**COMMISSIONING OF PROVINCIAL STREET LIGHTS ON VARIOUS PROVINCIAL ROADS AND BUILDINGS
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PART C1 AGREEMENTS AND CONTRACT DATA

Part C1 Agreements and Contract Data

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**C1.1 FORMS OF OFFER AND ACCEPTANCE C1.1.1
FORM OF OFFER**

Head of Department
Department Of Roads and Transport
Private Bag X83
Marshalltown 2107

Sir,

**TENDER NUMBER: DRT 21/01/2025/PRETORIA THE SUPPLY, MAINTENANCE AND COMMISSIONING
OF PROVINCIAL STREET LIGHTS ON VARIOUS PROVINCIAL ROADS AND BUILDINGS FOR A
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I/we, by signing this part of the forms of offer and acceptance, confirm that I/we practise the principles of corporate governance that abhors corruption and fraud and that I/we have examined the documents listed in the tender data and addenda thereto as listed in the returnable schedules and am/are duly authorised to represent and commit the tenderer to the contractual obligations contained therein.

I/we further confirm that by submitting this offer the tenderer accepts the conditions of tender and 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 tender and the conditions of contract identified in the contract data.

THE OFFERED TOTAL OF THE PRICES (INCLUSIVE OF VALUE ADDED TAX) IS;

GUATENG PROVINCE
.....(in words)
(R in figures)

You may accept this offer by signing and returning to the tenderer one copy of the Form of acceptance before the end of the period of validity stated in the tender data, (or at the end of any agreed extension thereof), whereupon the tenderer becomes the party named as the contractor in the conditions of contract identified in the contract data.

Notwithstanding anything contained in a covering letter to this tender, I/we declare this offer is submitted entirely without variations or deviations other than those stipulated in the form for Proposed Amendments and Qualifications by the tenderer and that it is made free from any fraud, corruption and misrepresentation.

Yours faithfully

SIGNATURE: DATE:

NAME (IN CAPITALS):

CAPACITY:

Date and minute reference of Board resolution if different from returnable document: Certificate of Authority
Part C1: Agreements and Contracts Data **C1.2**

Reference no. DRT 21/01/2025



GAUTENG PROVINCE
ROADS AND TRANSPORT
REPUBLIC OF SOUTH AFRICA

**TENDER NUMBER: DRT 21/01/2025 THE SUPPLY,
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Certificate of Authority for signature

NAME AND ADDRESS OF ORGANISATION:

NAME AND SIGNATURE OF WITNESS:

SIGNATURE: DATE:

NAME (IN CAPITALS):

C1.1.2 FORM OF ACCEPTANCE

To

..... (Name of successful tenderer)

Dear Sir,

**TENDER NUMBER: DRT 21/01/2025/PRETORIA THE SUPPLY, MAINTENANCE AND
COMMISSIONING OF PROVINCIAL STREET LIGHTS ON VARIOUS PROVINCIAL ROADS AND
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1. It is our pleasure to inform you that the Department of Roads and Transport (the Employer) accepts your **(select if applicable corrected/corrected alternative/alternative)** offer for all five Regions in the amount of R..... (i.e. including VAT but excluding CPA, and any contingent sum not in the priced schedule).

ALL FIVE REGIONS (CHANGE THIS TO "GAUTENG PROVINCE")

.....(in words)

(R in figures)

2. The amount due may not be the accepted price but payment shall be made in accordance with the conditions of contract identified in the contract data.
3. Acceptance shall form an agreement between us according to the terms and conditions contained in this form and in the contract that is comprised of:

Part C1: Agreements and Contract Data (including this form of acceptance),
Part C2: Pricing Data,
Part C3: Scope of the Work,
Part C4: Site Information, and
Part C5: Annexures

together with issued drawings and other documents, or parts thereof, which may be incorporated by reference into the Parts listed above.

- a) Deviations and/or variations included in your offer as well as any changes to the terms of the offer agreed by us during the process of offer and acceptance shall not be valid unless contained in the appended schedule of deviations. (If no deviation state "There are no deviations, variations or

Part C1: Agreements and Contracts Data

C1.3

Reference no. DRT 21/01/2025

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changes to the documents.) Addenda issued during the tender period are deemed not to be deviations to the tender documents and schedules.

b) Within 14 calendar days of the date of this form of acceptance (including the schedule of deviations if any) you shall deliver to the Employer:

- Performance Security (per clause 4 of the FIDIC Conditions of Contract) a proforma of which is attached for your reference. The 10% calculation shall be based on the accepted contract value as contained in this form and there shall be no deviations from the wording of the proforma guarantee.
- Proof of insurance in terms of the information provided in the contract data and clause 18 of the FIDIC Conditions of Contract. Proof of currency of insured cover shall be provided on a monthly basis until contract completion.
- Proof that the contract has been registered by the Department of Labour in terms of Occupational Health and Safety legislation, for which purpose the relevant forms have already been partially completed by the Employer and attached hereto.
- The completion of the attached Employer's Form of Banking Details.

Failure to fulfil any of these obligations shall constitute a repudiation of this agreement.

4. The effective date of the contract shall be the date of this form of acceptance unless you, within seven (7) calendar days of the effective date, notify the Employer in writing of any justification why you cannot accept the contents of this agreement.
5. The commencement date of the contract shall be that on which the site hand-over meeting is held, which shall not be later than *(Usually 28 calendar days after the date of this form, or earlier if circumstances demand and as agreed between tenderer/Employer).*
6. Notwithstanding that a full, original-signed copy of the contract document containing all contract data and schedules (including that of accepted deviations) will be delivered to you, this form of acceptance constitutes the binding contract between us.

Signature Date

Name

Capacity

for the Employer Department of Roads and Transport
Chief Directorate Maintenance

Name and

Signature of

Witness Date

.....

C1.1.3 APPENDIX TO FORM OF ACCEPTANCE

Schedule of deviations

1. The deviations listed below constitute agreed variations/amendments to the tender data and schedules negotiated between the tenderer and Employer based on information provided in Form

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- A4: Schedule of Variations or deviations by tenderer or conditions imposed by the Employer in its acceptance of the offer.
2. In the event that an alternative offer is accepted in terms of F.2.12 of the Tender Data, it is a fundamental condition of acceptance that all responsibilities and concomitant liabilities arising from the alternative design pass from the Employer to the contractor.
 3. Addenda issued during the tender period are deemed not to be variations to the tender.

1.
2.
3.
4.

- ***(Note to compiler: In the event that an alternative offer has been accepted by the Employer, the various elements of the alternative offer must be listed in this appendix)***

C1.2 CONTRACT DATA

C1.2.1 CONDITIONS OF CONTRACT

Note to tenderer:

1. **The Conditions of Contract for Construction (1999 edition) prepared by the International Federation of Consulting Engineers (FIDIC), as amended, shall apply to this contract. The amendments are those issued by FIDIC and reproduced hereafter, together with additional amendments (particular conditions of contract) as prescribed by The Department of Roads and Transport**

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APPENDIX TO THE PARTICULAR CONDITIONS: C1.25
CONTRACT PRICE ADJUSTMENT SCHEDULE C1.25

PART A: GENERAL CONDITIONS - FIDIC AMENDMENTS

Up to 5 December 2017 no amendments have been issued by FIDIC.

PART B: PARTICULAR CONDITIONS OF CONTRACT

Note to tenderer:

The following amendments are the Department of Roads and Transport's standard particular conditions to the general conditions and shall apply to this contract.

The following additional amendments to the FIDIC Conditions of Contract 1999 apply to this contract: Up to 5 December 2017 no amendments have been issued by FIDIC.

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**FOR A PERIOD OF THREE (3) YEARS: IN THE GAUTENG PROVINCE
CONDITIONS OF CONTRACT**

PARTICULAR CONDITIONS AMENDING THE GENERAL CONDITIONS OF FIDIC

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PARTICULAR CONDITIONS AMENDING THE GENERAL CONDITIONS OF FIDIC

1.1 Definitions

1.1.1 The Contract

Replace 1.1.1.1 with:

“**Contract**” means the Form of Offer and Acceptance, Contract Data, these Conditions, the Specifications, the Drawings, the Schedules, and the further documents (if any), which are listed in the Form of Offer and Acceptance, and further includes drawings and documents or parts thereof, which any of the aforesaid documents incorporate by reference.”

Replace 1.1.1.3 with:

“**Letter of Acceptance**” means the Form of Acceptance as contained in part C1.1.2 of the contract documents.”

Replace 1.1.1.4 with:

“**Letter of Tender**” means the Form of Offer as contained in part C.1.1.1 of the contract document.”

Replace 1.1.1.5 with:

“**Specification**” means that document entitled Scope of Work, as included in the Contract, and any additions and modifications to the Scope of Work in accordance with the Contract. Such document specifies the Works.”

Replace 1.1.1.7 with:

“**Schedules**” means the document(s) completed by the Contractor and submitted with his tender offer, as included in the Contract. Such document(s) may include the Bill of Quantities, data lists and schedules of rates and/or prices.”

Replace 1.1.1.8 with:

“**Tender**” means that section of the Form of Offer and Acceptance called ‘Offer’ and all other documents which the Contractor submitted as Returnable Documents, as included in the Contract.”

Replace 1.1.1.9 with:

“**Appendix to Tender**” means the completed section entitled C1.2.2 Contract Data – Information provided by the Employer included in the Contract Data.”

1.1.1.10 - Add the following:

“**Bill of Quantities**” shall also mean the Pricing Schedule as contained in section C2.2 of the contract document.”

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1.1.3 Dates, Tests, Periods and Completions

Replace 1.1.3.9 with:

"A **"day"** means a calendar day, except for any extension of time that is granted under sub-clause 8.4, [Extension of Time for Completion], in which case a day means a working day. A **"Year"** means 365 calendar days"

1.1.6 Other Definitions

1.1.6.5 "Laws"

In the 1st line, replace "(or state)" with "(or other spheres of government)" and in the 2nd line, after "other laws", insert "including the South African Common Law".

Add the following:

"1.1.6.10 **"Supplementary Agreement"** means an agreement between the Employer and the Contractor for executing work, supplemental to the original Contract, which was not contemplated in the original Contract and is also not required for the proper completion of the original Contract."

1.2 Interpretation

Replace the contents of (d) with:

"The expression **"written"**, **"in writing"**, **"notify"**, **"the giving of notice"**, **"giving consent"**, **"as instructed"** or **"at the request of"** means that communication, either hand-written or printed by whatever means, including transmission by telefax or e-mail, and resulting in a permanent record. However, such notice, instruction, consent or request is not deemed to have been delivered by virtue of its appearance in the minutes of meetings."

1.3 Priority of Documents

Replace sub-paragraphs items (a) to (h) with:

- (a) the Forms of Offer and Acceptance
- (b) the Appendix to Tender within the Contract data
- (c) the Particular Conditions of Contract
- (d) the General Conditions
- (e) the Scope of Works,
- (f) the project Drawings,
- (g) the standard Specifications,
- (h) the standard Drawings, and
- (i) the Schedules and any other documents forming part of the Contract."

1.4 Contract Agreement

Replace the 1st two sentences with the following:

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"The Parties shall enter into a Contract Agreement when the Employer issues the Form of Acceptance (see Particular Condition 1.1.1.3). The Contract Agreement shall be in the form prescribed in the tender documents"

1.5 Assignment

Change the title of this sub-clause to read "Assignment/Cession" and replace its contents with the following:

"Neither Party shall, without the written consent of the other, assign the contract or any part thereof or any obligation under the Contract or cede any right or benefit thereunder."

1.6 Care and Supply of Documents

In the 1st paragraph, 2nd line, change "two copies" to "one copy".

In the 2nd paragraph, 3rd line, change "six" to "two".

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2.3 Employer's Personnel

In the 1st sentence delete "and the Employer's other contractors".

3.1 Engineer's Duties and Authority

After the 3rd paragraph insert the following:

"In addition to the actions stipulated in the General Conditions whereby the Engineer shall first obtain the approval of the Employer, the Employer's approval shall also be obtained before taking any action under sub-clauses 8.4, 11.9, 13.3 and 20.1 as amended in these Particular Conditions".

4.2 Performance Security

Replace the 2nd paragraph with:

"The Contractor shall deliver the Performance Security to the Employer within 14 days of the date of issue of the Letter of Acceptance. The Performance Security shall be issued by a bank or insurance company registered or licensed as a bank or insurance company to do business in the Republic of South Africa and approved by the Employer and having an office or banking facility in the Republic of South Africa. The Performance Security shall be subject to approval by the Employer and shall be in the form prescribed in the tender documents or in another form approved by the Employer."

In the last line of the last paragraph replace the words "Performance Certificate" with "Taking-Over Certificate".

4.4 Subcontractors

In the first paragraph delete "the whole of the Works" and add "more than 40% of the Works without the express approval of the Employer".

4.7 Setting Out

Amend the second line of the second paragraph to read:

".....reference, provided that the Contractor shall provide proof of their inaccuracy before they are used."

4.8 Safety Procedures

Add the following sub-paragraph:

"(f) enter into and execute an agreement as provided for under Section 37(2) of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) and shall comply with all other requirements of Act No 85 of 1993 and Construction Regulations, 2014 (as amended). The agreement in the relevant form shall be prepared at the expense of the Employer."

4.10 Site Data

In the 1st paragraph, 1st sentence, replace "prior to the Base Date" with "either as part of or by reference in the Tender Documents or, otherwise, not later than 7 days before the latest date for submission of the Tender Documents", and delete the 2nd sentence.

4.12 "SMME"

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as defines in C3.4.2.8, In this contract the minimum target values shall be as follows:

- (i) Labour maximisation 6%
- (ii) SMME/BE utilisation 15% of which at least 90% is to be contributed by BEs who are also SMMEs

4.13 Rights of Way and Facilities

Add the following paragraph:

“The Contractor shall abide by the procedures for the provision of deviation, haul and construction roads, and the requirements for the construction, maintenance and final reinstatement of such roads, all as set out in the standard Specifications.”

4.17 Contractor’s Equipment

Add the following paragraph:

“The Contractor shall notify the Engineer, in writing, of the names and addresses of the owners of all major items of equipment not owned by the Contractor.”

4.18 Protection of the Environment

In the 1st paragraph, 1st sentence add “and shall ensure compliance with all the environmental requirements indicated in part C3 Scope of Work.”

Add the following paragraph:

“The Contractor shall indemnify the Employer against any liability arising from or in relation to any of the above matters.”

4.19 Electricity, Water and Gas

In the 1st paragraph, 1st line, delete “except as stated below”, and delete the 2nd and 3rd paragraphs.

4.20 Employer’s Equipment and Free-Issue Material

Delete “and Free-Issue Material” from the title of the sub-clause and delete the 3rd and 4th paragraphs.

4.21 Progress Reports

In the 1st paragraph, 2nd line, delete “in six copies”.

4.22 Security of the Site

Replace the full stop at the end of sub clause (b) with a comma and continue this clause as follows:

“... on the Site, or utility or service owners whom the Employer or the Engineer identifies as having also been authorised. Without said notice, the Contractor may refuse access to such utility or service owners; and”

Add the following sub clause:

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“(c) The Contractor shall indemnify the Employer against any liability for damage incurred to, or loss of, property within the site identified in the contract documents as not belonging to the Employer regardless of whether or not such damage or loss is caused by the Contractor’s equipment.”

4.24 Fossils

In the 1st paragraph, 1st sentence after “fossils” insert “and graves” and in the 2nd sentence, add “and shall indemnify the Employer against any liability arising from such loss or damage.”

6.5 Working Hours

Replace the 1st sentence with the following:

“No work shall be carried out on Site on Sundays or on any special non-working day stated in the Contract Data or between sunset and sunrise on any day, unless.”

6.7 Health and Safety

Replace the 1st paragraph with the following:

“The Contractor shall provide and maintain on the Site adequate and suitable sanitary and first aid services (including the provision at all times of a person qualified to render medical first aid) and a supply of potable water for the Contractor’s, the Employer’s and the Engineer’s personnel engaged on the Contract and, if necessary, similar facilities elsewhere for such personnel off the Site.” *Add the following sub-clause:*

6.12 Indemnity by Contractor

The Contractor shall indemnify the Employer against and from all damages, losses and expenses (including legal fees and expenses) resulting from:

- (a) the loss of output and delay caused by the slowing down or partial or total stoppage of work caused by:
 - i. all or any of the Contractor’s workforce as a result of a dispute between all or any of the Contractor’s workforce and the Contractor; or ii. all or any of the Contractor’s suppliers’ difficulty or impossibility to deliver goods or materials needed to perform the Works;
- (b) any unlawful, riotous or disorderly conduct by or amongst the Contractor’s personnel.”

8.1 Commencement of Work

In the 1st paragraph, delete the 1st sentence, and in the 2nd sentence replace “42 days after the Contractor receives the Letter of Acceptance” with “28 days of the date of issue of the Letter of Acceptance.”

In the 2nd line of the 2nd paragraph, after the words “Commencement Date”, insert “but within the period stated in the Contract Data.”

8.4 Extension of Time for Completion

Replace the word “Engineer” with “Employer” in the last sentence of the last paragraph.

8.7 Delay Damages

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Add the following after the first paragraph:

“The Contractor shall in consultation with the specific regional manager determine the commencement date and the period required to complete a specific work order. Should the Contractor fails to comply he shall pay delay damages to the Employer as stated in the Appendix to Tender.”

Add the following paragraph:

“Where stated in the Appendix to tender, the contractor shall be subject to penalties for non-compliances with specified accommodation of traffic road signage identified by the engineer and for each additional day of lane closure needed to complete programmed work sections.”

10.2 Taking Over of Parts of the Works

Delete the 2nd paragraph.

Between the 3rd and 4th paragraphs insert the following paragraph:

“The Employer may make use of any part of the Permanent Works prior to the issue of a Taking Over Certificate.”

Delete the 5th paragraph.

11.9 Performance Certificate

In the 1st paragraph, 2nd line and in the 2nd paragraph, 1st line, replace the word “Engineer” with “Employer”.

Delete the last sentence of the 2nd paragraph.

11.11 Clearance of Site

Replace the 1st paragraph with the following:

“With the exception of Plant, Materials and Contractor’s Equipment required to complete any outstanding work or to remedy defects or damage as notified by, or on behalf of, the Employer and which Plant, Materials and Contractor’s Equipment have been agreed by the Engineer and the Contractor, the Contractor shall, upon receipt of the Taking-Over Certificate, remove all Contractor’s Equipment and surplus material, wreckage, rubbish and Temporary Works, from the Site unless otherwise instructed by the Engineer.”

In the 2nd paragraph, replace “after the Employer receives a copy of the Performance Certificate” with “after the issue of the Taking-Over Certificate”.

12.3 Evaluation

Delete this clause.

13.3 Variation Procedure

Replace the 3rd paragraph with the following:

Part C1: Agreements and Contracts Data

C1.15

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"Each instruction to execute a Variation, unless the Variation is to be executed on a Day work basis, shall be a written instruction presented in the form of a Variation order. The Variation order shall be presented to the Employer, who shall signify his approval before the order is signed by the Engineer and issued to the Contractor, who shall acknowledge his acceptance by signing the order. The Contractor shall not accept a Variation order that is not approved and signed by the Employer".

13.5 Provisional Sums

In the 1st line of sub-paragraph (b) after "services" insert "and including items for which a prime cost sum has been provided in the Bill of Quantities".

13.6 Day work

Replace the 2nd and 3rd sentences in the 1st paragraph with "The following procedure shall apply."

Add the following as the 5th paragraph of this sub-clause:

"The work shall be valued in accordance with the Day work Schedule included in the Contract or, in the absence of a Day work Schedule or for items not included in the Day work Schedule the Contractor shall be paid the aggregate of:

- (i) the gross remuneration of the workmen for the time they are actually engaged on the work concerned,
- (ii) the net cost of Materials actually used,
- (iii) an amount in respect of Contractor's Equipment which shall be charged on a time basis at the rates stated in the Tender, failing which at rates, to be agreed between the Contractor and the Engineer or, failing agreement, to be determined by the Engineer on the basis of ruling equipment hire rates and
- (iv) the percentage allowances stated in the Contract Data, which allowances shall be held to cover all charges for the Contractor's and/or Subcontractor's profits, timekeeping, clerical work, insurance, establishment, superintendence and the use of hand tools."

13.8 Adjustments for Changes in Costs

Replace this sub-clause with the following:

"The value of certificates issued in terms of Sub-clause 14.6 (excluding the value of those special Materials specified in the Contract Data) shall be increased or decreased by applying a Contract Price adjustment factor calculated according to the formula and the conditions set out in the Contract Price adjustment Schedule appended to these Particular Conditions.

Price adjustments for variations in the costs of special Materials specified in the Contract Data shall be made in the manner set out in the Contract Price adjustment schedule."

14.3 Application for Interim Payment Certificates

In the 1st line of the 1st paragraph, delete "in six copies."

In the 4th line of the 1st paragraph, change "the report" to "reports."

In the 2nd paragraph, sub-paragraph (c), after "above amounts" insert "and 80% of the value of Materials on Site" and add the following as a final paragraph:

Part C1: Agreements and Contracts Data

C1.16

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"If, as stated in the Contract Data, a Retention Money Guarantee is permitted and the Contractor elects to furnish it, the guarantee shall, at the cost of the Contractor, be executed by an insurance company or bank in a form approved by the Employer.

The said company or bank shall be registered or licensed to do business in the Republic of South Africa and shall have an office and banking facility in the Republic of South Africa and shall be subject to approval by the Employer.

The aggregate liability under the guarantee shall be the maximum amount of retention monies to be retained by the Employer, which amount shall be as stated in the Contract Data.

Other conditions, if any, additional to the above standard conditions shall be as stated in the Contract Data.

The guarantee shall expire on the date on which the last of the retention monies (which, but for the guarantee, would have been retained by the Employer) becomes payable to the Contractor.

The guarantee shall be returned to the guarantor upon final payment of the aggregate liability or on the date of expiry, whichever is the earlier."

14.5 Plant and Materials intended for the Works

In the first paragraph delete "If this Sub-Clause applies".

Delete the 2nd paragraph.

In the 3rd paragraph, delete sub-paragraphs (b) and (c) (i) and amend sub-paragraph (a) so that (c)(ii) becomes (a)(iii) thus:

- "(a) (ii) supported by satisfactory evidence; and
- (a)(iii) the relevant Plant and Materials have been delivered to and ..."

Add the following paragraph:

"If so agreed in writing by the Employer, the provisions of this Sub-Clause 14.5, as amended herein, shall apply equally to Plant and Materials intended for incorporation in the Permanent Works and stored at places other than the Site."

14.6 Issue of Interim Payment Certificates

In the 2nd line of the 1st paragraph replace "28" with "14"

14.7 Payment

In sub-paragraphs (b) and (c) of the 1st paragraph replace "56" with "28".

Delete the 2nd paragraph.

14.8 Delayed Payment

Replace the 2nd paragraph with the following:

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"These financing charges shall be at the rate prescribed in terms of the Prescribed Rate of Interest Act, 1975 (Act No 55 of 1975)".

14.10 Statement at Completion

In the 2nd line of the 1st paragraph delete "six copies of".

14.11 Application for Final Payment Certificate

In the 2nd line of the 1st paragraph delete "six copies of".

In the 3rd paragraph, replace the last sentence with:

"Thereafter, when the dispute is finally resolved, the Contractor shall then prepare and submit to the Employer (with a copy to the Engineer) a Final Statement."

14.15 Currencies of Payment

Delete this sub-clause.

15.2 Termination by the Employer

Delete sub-paragraph (f) and replace with the following:

"(f) Gives or has given, offers to give or has offered to give (directly or indirectly) to any person any bribe, gift, gratuity, commission or other thing of value, as an inducement or reward:

- (i) for doing or forbearing to do any action in relation to the Contract or any other contract with the Employer or State Department or Organ of State, or
- (ii) for showing or forbearing to show favour or disfavour to any person in relation to the Contract or any other contract with the Employer or State Department or Organ of State,

or if any of the Contractor's Personnel, agents or Subcontractors gives or has given, offers to give or has offered to give (directly or indirectly) to any person any such inducement or reward as is described in this sub-paragraph (f). However, lawful inducements and rewards to Contractor's Personnel shall not entitle termination."

Add the following sub-paragraph:

"(g) Misrepresented, whether innocently, negligently or fraudulently, the true facts requested in the tender documents."

Insert the following after the expression e) or f) in the penultimate line of the second paragraph:

"or g)"

Replace the full stop at the end of the third paragraph with a comma and add the following:

"including the right to terminate any other contract between the Employer and the Contractor and to forbid the Contractor or any employee, partner, shareholder or director of the Contractor to tender on any future projects put out to tender by the Employer for a period of five years from the date of notice of termination, which period may be reduced by application to and at the sole discretion of the Employer."

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17.3 Employer's Risks

Add the following to sub-paragraph (c):

"unless these risks are insurable with the South African Special Risks Insurance Association (SASRIA) at the time of tendering and it is stipulated in the Contract Data that the Contractor is to effect insurance against these risks".

18.1 General Requirements for Insurances

Replace this sub-clause with the following:

"The Contractor shall effect all insurances as have been proposed and agreed by the Contractor as being necessary to adequately cover his insurable obligations under the Contract and shall maintain such insurances for the duration of the Contract.

With regard to the insurances to be effected for insurance against injury to Persons and Damage to property the Contractor shall arrange for the policy to be issued in the joint names of the Contractor, the Employer and Subcontractors and will incorporate a Cross Liability clause.

The Employer shall be entitled at his discretion to call for evidence of the scope and validity of such insurance as and when this may be required.

If required, the Contractor shall provide proof that he has paid all contributions required in terms of the compensation for Occupational Injuries and Diseases, 1993 (Act No 130 of 1993)."

18.2 Insurance for Works and Contractor's Equipment

Delete this sub-clause.

18.3 Insurance against Injury to Persons and Damage to Property

Delete this sub-clause.

18.4 Insurance for Contractor's Personnel

Delete this sub-clause.

19.1 Definition of Force Majeure

In the third line of sub clause 19.1(iii) insert "or suppliers," after the word "Subcontractors".

19.5 Force Majeure Affecting Subcontractor

Amend the title to read "Force Majeure Affecting Subcontractor and Supplier".

In the first line insert "or supplier" after the word "Subcontractor"

20.1 Contractor's Claims

In paragraph 5, insert the following after the first sentence:

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"If an extension of time is granted the Contractor shall be paid such additional time-related Preliminary and General allowances as are appropriate having regard to any other compensation which may already have been granted in respect of the circumstances concerned. Payment of costs additional to the above will only be considered if the costs derive from claims that fall within the terms of Clause 13 [Variations and Adjustments] and/or Sub-clause 17.3 [Employer's Risks]."

Replace the 6th paragraph with the following:

"After receiving a claim or any further particulars supporting a previous claim, the Engineer shall present such claim or particulars to the Employer, together with his recommendations, for a ruling, which ruling shall be given to the Contractor within 42 days after receiving a claim or any further particulars, provided that the said period of 42 days may be extended by application from one Party and approval of the other. If the Employer fails to give his ruling within the specified period, or agreed extension thereto, it shall be deemed that the Employer has dismissed the claim."

Delete the 8th paragraph.

20.2 to 20.8

Replace these sub-clauses with the following:

20.2 Settlement of Disputes

- (a) The Contractor shall have the right to dispute any ruling given or deemed to have been given by the Employer or the Engineer, provided that, unless the Contractor shall, within 42 days after his receipt of a ruling or after a ruling shall have been deemed to have been given, give written notice (hereinafter referred to as a "Dispute Notice") to the Engineer, referring to this Clause, disputing the validity or correctness of the whole or a specified part of the ruling, he shall have no further right to dispute that ruling or the part thereof not disputed in the said Dispute Notice.
- (b) All further references herein to a ruling shall relate to the ruling, or part thereof, specified in the Dispute Notice, as varied or added to by agreement between the Contractor and the Engineer or by the Engineer's decision in terms of sub-paragraph (c) or by the Mediator's opinion to the extent that it has become binding in terms of Sub-clause 20.3(f).
- (c) The Engineer shall
 - i) before giving his decision on the dispute, consult the Employer thereon and give the Contractor a reasonable opportunity to present written or oral submissions thereon, which latter shall be confirmed in writing within 7 days
 - ii) deliver his decision in writing to the Employer and to the Contractor, and
 - iii) give his decision within 56 days of his receipt of the Dispute Notice, or within any further period as may be agreed between the Engineer and the Contractor, failing which, he shall be deemed to have given a decision affirming, without amendment, the ruling concerned.
- (d) Unless either the Employer or the Contractor, shall, within 28 days after his receipt of notice of the decision in terms of sub-paragraph (c)(ii) or after the decision is deemed to have been given in terms of sub-paragraph (c)(iii), have given notice in writing to the Engineer, with a copy to the other Party, disputing the Engineer's decision or a specific part thereof, he shall have no further right to dispute any part of the ruling not specified in his said notice.

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- (e) If either Party shall have given written notice in compliance with sub-paragraph (d), the dispute shall be referred to mediation in terms of Sub-Clause 20.3 unless either Party has given written notice to the other Party of its intention to refer the matter in dispute to court, which notice shall be given either:
- i) within 28 days of receipt of notice of the Engineer's decision, or
 - ii) within 14 days of receipt by the one Party of the other Party's notice of dispute of the Engineer's decision.

If notice of intention to refer the matter in dispute to Court has been served by either party, the matter in dispute shall not be referred to mediation but shall be referred to Court.

- (f) Notwithstanding that the Contractor may, in respect of a ruling, have given a Dispute Notice, the ruling shall be of full force and carried into effect unless and until otherwise agreed by both Parties in terms of Sub-Clause 20.3(f) or as determined in a court judgement.

20.3 Mediation

- (a) The mediation referred to in Sub-Clause 20.2(e) shall be conducted by a mediator selected by agreement between the Parties or, failing such agreement within 7 days after a written request by either Party for such agreement, nominated on the application of either Party by the President for the time being of the South African Institution of Electrical Engineers.

If, for any reason, the person appointed fails to assume or to continue in the office concerned:

- (i) the provisions of Sub-Clause 20.3 shall apply mutatis mutandis in the appointment of a successor, and
 - (ii) in making his nomination in terms of this sub-clause, the president for the time being of the South African Institution of Electrical Engineers shall, at his own discretion, act in consultation with the presidents for the time being of Consulting Engineers South Africa and the Electrical Contractors of South African, and
 - (iii) if the president required to make a nomination in terms of this sub-clause shall have a direct or indirect interest in the subject matter of the dispute, the nomination shall be made by the chief executive officer or the next senior officer of the body concerned who has no such interest.
- (b) Neither Party shall be entitled to be represented at any hearing before, or at, any meeting, or in any discussion, with the mediator except by any of the following:
- (i) the Party himself, if a natural person, ii) a partner in the case of a partnership, iii) an executive director in the case of a company, iv) a member in the case of a close corporation, v) the Engineer, vi) a bona fide employee of the party concerned, and vii) a professional engineer appointed for the purpose by the Party concerned. (c) The mediator shall, as he deems fit, follow formal or informal procedure and receive evidence or submissions orally or in writing, sworn or unsworn, at joint meetings with the Parties or separately or from any person whom he considers can assist in the formulation of his opinion, provided that:
 - i) each Party shall be given reasonable opportunities of presenting evidence or submissions and of responding to evidence or submissions of the other Party, and
 - ii) each Party shall be given full details of any evidence or submissions received by the Mediator from the other Party or any other person otherwise than at a meeting where both Parties are present or represented.

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- (d) The mediator shall have the power to propose to the Parties compromise settlements of or agreements in disposal of the whole or portion of the dispute.
- (e) The mediator shall, as soon as reasonably practical, give to each of the Parties his written opinion on the dispute, setting out the facts and the provisions of the Contract on which the opinion is based and recording the details of any agreement reached between the Parties during the mediation.
- (f) The mediator's opinion shall become binding on the Parties only to the extent correctly recorded as being agreed by the Parties in the mediator's written opinion or otherwise as recorded as being agreed in writing by both Parties subsequent to the receipt of the mediator's opinion.
- (g) The dispute on any matter still unresolved after the application of the provisions of sub-paragraph (f) shall be resolved by court proceedings.
- (h) Save for reference to any portion of the mediator's opinion which has become binding in terms of sub-paragraph (f), no reference shall be made by or on behalf of either Party, in any proceedings subsequent to mediation, to the mediator's opinion, or to the fact that any particular evidence was given, or to any submission, statement or admission made in the course of the mediation.
- (i) Irrespective of the nature of the mediator's opinion:
 - (i) each Party shall bear his own costs arising from the mediation, and
 - (ii) the Parties shall in equal shares pay the mediator the amount of his expenses and the amount of his fee based on a scale of fees as agreed between the mediator and the Parties before the commencement of the mediation.

20.4 Reference to Court

If a dispute is still unresolved as provided for in sub-paragraph (g) of sub-clause 20.3 or the dispute is one described in sub-clause 20.5, the dispute shall be determined by court proceedings, provided that:

- (a) nothing herein contained shall deprive the Contractor of the right to institute immediate court proceedings in respect of failure by the Employer to pay the amount of a payment certificate on its due date or to refund any amount of retention money on its due date for refund,
- (b) no ruling or decision given by the Engineer in accordance with the provisions of the Contract shall disqualify him from being called as a witness and giving evidence before the court on any matter whatsoever relevant to the dispute concerned, and
- (c) the court shall have full power to open up, review and revise any ruling, decision, order, instruction, certificate or valuation of the Engineer relevant to the matter in dispute.

20.5 Special Disputes

Notwithstanding anything elsewhere provided in sub-clauses 20.2, 20.3 and 20.4, any dispute between the Contractor and the Employer,

- (a) not relating to a ruling, decision, order, instruction or certificate by the Engineer, or
- (b) arising after the completion of the Contract or, if a Defects Notification Period is provided, after the termination of that period,

shall be determined, without the application of the provisions of sub-clauses 20.2 and 20.3 by court proceedings which may be initiated by either Party, in which event the provisions of sub-clause 20.4 shall apply.

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20.6 Continuing Validity of sub-clauses 20.2 to 20.6

Sub-clauses 20.2 to 20.6 inclusive constitute a separate, divisible agreement from the rest of the Contract and shall remain valid and applicable, notwithstanding that the Works may have been completed or that the rest of the Contract may be void or voidable or may have been cancelled for any reason."

APPENDIX: General Conditions of Dispute Adjudication Agreement

ANNEX: Procedural Rules

APPENDIX TO THE PARTICULAR CONDITIONS:

CONTRACT PRICE ADJUSTMENT SCHEDULE

- Contract** In accordance with sub-clause 13.8, the value of each certificate issued in terms **Price** of sub-clause 14.6 shall be increased or decreased by the amount obtained by **Adjustment** multiplying "Ac", defined in clause 2 of this Schedule, by the Contract Price adjustment factor, rounded off to the sixth decimal place (or the fourth decimal place if expressed as a percentage), determined according to the formula:

$$(1 - x) \left[\frac{aL_t}{L_o} + \frac{bE_t}{E_o} + \frac{cM_t}{M_o} + \frac{dF_t}{F_o} - 1 \right]$$

in which the symbols have the following meanings:

"x" is the proportion of "Ac" which is not subject to adjustment. Unless otherwise stated in the Appendix this proportion shall be 0, 15.

"a", "b", "c" and "d" are the co-efficient determined by the Engineer and specified in the Contract Data, which are deemed, irrespective of the actual constituents of the work, to represent the proportionate value of labour, equipment, materials (other than "special materials" specified, in terms of sub-clause 13.8, in the Contract Data) and fuel respectively. The arithmetical sum of "a", "b", "c", and "d" shall be unity.

"L" is the "Labour Index" and shall be the "Consumer Price Index" for the urban area specified in the Contract Data, as published in the Statistical Release P0141, Additional tables, Table 13, of Statistics South Africa.

"E" is the "Equipment Index" and shall be the "Electrical Engineering Plant Index" as published in the Statistical Release P0142.1, Table 12, of Statistics South Africa. Note that Statistics South Africa's "Electrical Engineering Plant" includes equipment.

"M" is the "Materials Index" and shall be the "Price Index of Electrical Engineering Materials", as published in the Statistical Release P0142.1, Table 11, of Statistics South Africa.

"F" is the "Fuel Index" and shall be the index for diesel oil – Coast and Witwatersrand, as published in the Statistical Release P0142.1, Table 12, of Statistics South Africa.

The suffix "o" denotes the basic indices applicable on the Base Date as defined in sub-clause 1.1.3.1 of the

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The suffix “t” denotes the current indices applicable to the month in which the last day of the period falls to which the relevant payment certificate relates.

If any index relevant to any particular Payment Certificate is not known at the time when the certificate is prepared, the Engineer may estimate the value of such index. Any correction which may be necessary when the correct indices become known shall be made by the Engineer in subsequent Payment Certificates.

2. **Assessment of amount subject to adjustment** For the purpose of calculating the adjustment to the value of the certificates, the amount “Ac” shall be determined by the formula:
- $$Ac = T - S - D - W - G - Ap$$

In which formula the symbols have the following meanings:

“T” is the summation of the total value of the

- (i) preliminary and general items,
- (ii) work done, and
- (iii) Materials on Site

as certified in the Payment Certificate under consideration without any deduction whatsoever and before any adjustment made in terms of this Schedule

“S” is the aggregate of (i), (ii), (iii) and (iv), referred to below, and included in “T”:

- (i) the amounts actually expended and substituted for any prime cost sums;
- (ii) the value of any work done by Nominated Subcontractors;
- (iii) the value of any work done against Provisional Sums
- (iv) the value of any extra or additional work done under a Variation order

where special arrangements for price adjustments in respect of those amounts were made and recorded at the time the work was ordered.

“D” is the value of work included in “T” and done at new rates fixed in terms of sub-clause 12.3, where those rates are not based on labour, Contractor’s Equipment or Materials costs in force at the time of tendering. Generally new rates may be based on current costs and de-escalated to the Base Date of the indices, in which case work done at these rates shall not be included in the value of “D”.

“W” is the amount included in “T” and paid for any Day work executed at Cost plus percentage allowances as set out in sub-clause 13.6 as amended by Particular Condition.

“G” is the amount included in “T” for Materials classified and dealt with as “special materials” in terms of sub-clause 13.8 as amended by Particular Condition.

“Ap” is the summation of all “Ac” amounts determined in terms of Clause 2 of this Schedule for all Payment Certificates preceding in time the Payment Certificate under consideration.

3. **Reduction of CPAF after** Save only for Variations ordered to be carried out after the Time for Completion has expired, the Contract Price adjustment factor to be

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Time for applied to certificates relating to work done or materials supplied after the of **Completion** the Time for Completion shall be half the factor calculated by inserting in the **has expired** formula referred to in Clause 1 of this Schedule the indices Lt, Et, Mt and Ft applicable at the date of expiry of the Time for Completion.

5. **Assessment of indices if certificates are not issued monthly** If more than one month intervenes between the months applicable to any Payment Certificate and the month applicable to the immediately succeeding payment certificate, then the indices "Lt", "Et", "Mt" and "Ft" applicable to the succeeding Payment Certificate shall each be taken as the arithmetic mean, rounded off to the second decimal place, of the relevant indices applicable to the month of measurement and to such intervening months.

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C1.2.2 CONTRACT DATA - INFORMATION PROVIDED BY THE EMPLOYER

APPENDIX TO TENDER

Note: Clause numbers (Cl. No.) refer to the FIDIC "General Conditions of Contract for Construction for Building and Engineering Works designed by the Employer" (1999). The prefix A refers to an amendment in the Particular Conditions.

<u>Item</u>	<u>Clause No</u>	<u>Data</u>
Employer	1.1.2.2	means The Department of Roads and Transport The Employer's address is: Department of Roads and Transport Private Bag X83 Marshalltown 2107
Engineer	1.1.2.4	The Deputy Director, Directorate Technical Auxiliary, Co-ordination and Office Support at Koedoespoort will act as the Engineer.
Communications	1.3	The addresses for communication between the parties shall be: 90 days after the closing date for tenders
Period of validity of tender		
Time for completion of works	1.1.3.3.	36 months maximum including the contractor's holidays in December and January
Defects for notification period	1.1.3.7	12 calendar months
Laws	1.1.6.5	The law governing this contract is South African law
Time for access to the site	2.1	Nil (access on Commencement Date)
Amount of performance security	4.2	10 % of the accepted contract amount (Cl no. 4.11)
Base date	13.8	Base date for this contract is the month prior to the date of tender closure

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Special non-working A6.5 All designated public holidays (including all
hours/days foreseeable statutory declared election days),

Period in which works A8.1 Not later than 14 days after the date on a Works
must commence Order

Delay damages for the works A8.7 (a) Delay Damages
(i) Complete works **R 5000/day** for any specific
works order

Evaluation A12.3 The term "fixed rate item" shall apply to all items of

Day work allowances

Special materials

CPA

Retention money:
- Percentage

- Limit

Contractor to insure
with SASRIA

Appointment of DAB

BEE Target values
(CPG)

Labour Content

SMME/BE utilization

Termination by
Employer

Suspension and
Termination by
Contractor

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	work listed in the Pricing Schedule.(Including agreed items of work listed in variation orders)
A 13.6	Not applicable
A13.8	Applicable- Refer to schedule of special materials
A13.8	CPA Applicable – Refer to Contract Price Adjustment Schedule. x=0,15 a=0,30 b=0,10 c=0,50 d=0,10 “L” is the Consumer Price Index for Gauteng are CPA factor rounded to fourth decimal
14.3 (c)	Not Applicable
14.3 (c)	Not Applicable
A17.3 (c)	Applicable / Required
A 20.2	Not Applicable
E3.2	Not Applicable
	Not Applicable
	Not Applicable
15	Applicable
16	Applicable
17	Applicable

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Risk and Responsibility	18.1	Applicable / Required
Insurance		
Insurance for contractors works and equipment	18.2	Applicable / Required
General Public Liability cover for claims against the contractor	18.3	Applicable / Required
Insurance for contractors personnel	18.4	Applicable / Required

SIGNED BY TENDERER:



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C1.2.3 CONTRACT DATA – INFORMATION PROVIDED BY THE TENDERER

The Contractor is

.....

Physical Address:

.....

.....

Telephone:

Facsimile:

Email.....

The authorised and designated representative of the Contractor is:

Name:

The postal address for receipt of communications is:

.....

.....

Physical Address:

.....

Telephone:

Facsimile:

Email.

C1.3 OTHER STANDARD FORMS

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**C1.3.1 FORM OF OCCUPATION HEALTH AND SAFETY ACT 1993
(ACT NO. 85 OF 1993)**

This AGREEMENT made at on this the day of in the year between THE DEPARTMENT OF ROADS AND TRANSPORT (hereinafter called "the Employer") on the one part, herein represented by in his capacity as and delegate of the Employer in terms of the Employer's standard powers of delegation pursuant to the provisions of Act No. 7 of 1998, and (hereinafter called "the Mandatory") on the other part, herein represented by in his capacity as

WHEREAS the Employer is desirous that certain works be constructed, viz TENDER NR:

.....:for.....

..... and has accepted a tender by the Mandatory for the construction, completion & maintenance of such works and whereas the Employer and the Mandatory have agreed to certain arrangements and procedures to be followed in order to ensure compliance by the Mandatory with the provisions of the Occupational Health and Safety Act 1993 (Act 85 of 1993);

NOW THEREFORE THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. The Mandatory shall execute the work in accordance with the contract documents pertaining to this contract.
2. This Agreement shall hold good from its commencement date, to either :
 - a) the date of the Performance Certificate issued in terms of sub-clause 11.9 of the FIDIC Conditions of Contract for Construction for building and engineering works designed by the Employer (1999) (hereinafter referred to as "the GCC"), as contained in Volume 1 of the contract documents pertaining to this contract, or
 - b) the date of termination of the contract in terms of clauses 15, 16 or 19 of the GCC.
3. The Mandatory declares himself to be conversant with the following:-
 - a) All the requirements, regulations and standards of the Occupational Health and Safety Act (Act 85 of 1993), hereinafter referred to as "The Act", together with its amendments and with special reference to the following Sections of The Act.
 - i) Section 8: General duties of employers to their employees.
 - ii) Section 9: General duties of employers and self-employed persons to persons other than employees.
 - iii) Section 37: Acts or omissions by employees or mandatories and iv) Sub-section 37(2) relating to the purpose and meaning of this Agreement.

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- b) The procedures and safety rules of the Employer as pertaining to the Mandatory and to all his subcontractors.
4. In addition to the requirements of sub-clause 4.8, 6.7 and 17.1 of the GCC and all relevant requirements of Volume 3 of the contract documents pertaining to this contract, the Mandatory agrees to execute all the works forming part of this contract and to operate and utilize all machinery, plant and equipment in accordance with The Act.
- 5.
6. The Mandatory is responsible for the compliance with the Act by all his subcontractors, whether or not nominated and/or approved by the Employer.
7. The Mandatory warrants that all his and his subcontractors' workmen are covered in terms of the Compensation for Occupational Injuries and Diseases Act 1993, which cover shall remain in force whilst any such workmen are present on site. A letter of good standing from the Compensation Commissioner to this effect must be produced to the Employer upon signature of the agreement.
8. The Mandatory undertakes to ensure that he and/or his subcontractors and/or their respective employees will at all times comply with the following conditions:
 - a) The Mandatory shall assume the responsibility in terms of Section 16.1 of The Act. The Mandatory shall not delegate any duty in terms of Section 16.2 of The Act without the prior written approval of the Employer. If the Mandatory obtains such approval and delegates any duty in terms of section 16.2 a copy of such written delegation shall immediately be forwarded to the Employer.
 - b) All incidents referred to in The Act shall be reported by the Mandatory to the Department of Labour as well as to the Employer. The Employer will further be provided with copies of all written documentation relating to any incident.
 - c) The Employer hereby obtains an interest in the issue of any formal enquiry conducted in terms of section 32 of The Act into any incident involving the Mandatory and/or his employees and/or its subcontractors.

In witness thereof the parties hereto have set their signatures hereon in the presence of the subscribing witnesses:

SIGNED FOR AND ON BEHALF OF EMPLOYER:

WITNESS:

NAME (IN CAPITALS)

SIGNED FOR AND ON BEHALF OF THE MANDATARY

WITNESS:

NAME (IN CAPITALS):

C1.3.2 FORM OF GUARANTEE

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To: The Department of Roads and Transport
Private Bag X83
Marshalltown
2107

Note to tenderer:

This pro forma is for information only. The successful tenderer's guarantor will need to reproduce it without amendment, omission or addition for completion and lodgement with the Employer. A separate copy of this pro forma will be issued to the successful tenderer with the letter of acceptance.

**TENDER NUMBER: DRT 21/01/2025/PRETORIA MAINTENANCE AND INSTALLATION OF
PROVINCIAL STREET LIGHTS ON VARIOUS PROVINCIAL ROADS, INCLUDING
MAINTENANCE OF SECURITY LIGHTS AT ALL REGIONAL BUILDINGS FOR ALL FIVE
REGIONS OF GAUTENG PROVINCE FOR A PERIOD OF THREE (3) YEARS**

1. I/We, the undersigned, and in
our respective capacities as
and

.....
and as such duly authorised to represent:

.....
(hereinafter referred to as "the Guarantor") **(in the case of a company, a resolution to be attached)**

do hereby hold at your disposal the amount of

(R.....) including VAT, for the due fulfilment by
(insert the name of Contractor) (hereinafter referred to as "the Contractor") of its obligations to The
Department of Roads and Transport (hereinafter referred to as "Employer") in terms of the above
stated contract between the Contractor and the Employer.

2. The Guarantor hereby renounces the benefits of the exceptions non numeratae pecuniae, non causa debiti, excussionis and divisionis, the meanings and effect whereof we declare ourselves to be fully conversant.

3. The Guarantor undertakes and agrees to pay to the Employer the said amount of R
.....

(R.....) including VAT, or such portion as may be demanded on receipt of a written demand from the Employer, which demand may be made by the Employer if, (in your opinion and at your sole discretion), the said Contractor fails and/or neglects to commence the work as prescribed in the contract or if he fails and/or neglects to proceed therewith or if, for any reason, he fails and/or neglects to complete the services in accordance with the conditions of contract, or if he fails or

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neglects to refund to the Employer any amount found to be due and payable to the Employer, or if his estate is sequestrated or if he surrenders his estate in terms of the Insolvency Law in force within the Republic of South Africa.

4. Subject to the above and without in anyway detracting from your rights to adopt any of the procedures set out in the contract, the said demand can be made by you at any stage.

5. The said amount of R

(R.....) including VAT, or such portion as may be demanded may be retained by the Employer on condition that after completion of the service, as stipulated in the contract, the Employer shall account to the Guarantor showing how this amount has been utilised and refund to the Guarantor any balance due.

6. This guarantee is neither negotiable nor transferable and

- a) must be surrendered to the Guarantor at the time when the Employer accounts to the Guarantor in terms of clause 5 above, or
- b) shall lapse upon the issue of the Taking-Over Certificate in terms of sub-clause 10.1 of the General Conditions of Contract and
- c) shall not be interpreted as extending the Guarantor's liability to anything more than payment of the amount guaranteed.

7. This guarantee shall be governed by South African Law and subject to the jurisdiction of South African Courts.

THUS DONE AND SIGNED AT

ON THIS DAY OF 20

GUARANTOR:

AS WITNESSES: 1 2

NAMES (PRINT) 1 2

ADDRESSES 1 2

.....

.....

C1.3.3 FORM OF REGISTRATION OF CONTRACT WITH DEPARTMENT OF LABOUR

Annexure A



GAUTENG PROVINCE
ROADS AND TRANSPORT
REPUBLIC OF SOUTH AFRICA

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Occupational Health and Safety Act, 1993

Construction Regulations, 2014 (as amended)

Regulation 3 of the Construction Regulations, 2014 (as amended)

NOTIFICATION OF CONSTRUCTION WORK

1. (a) Name and postal address of principal contractor:

.....
.....

(b) Name and telephone number of principal contractor's contact person:

.....

2. Principal contractor's compensation registration number:

.....

3. (a) Name and postal address of client:

The Department of Roads and Transport, (insert Regional office postal address)

(b) Name and telephone number of client's contact person or agent:

Client: **(enter Project Manager Name and telephone number)**

.....

Agent: **(enter Engineer name and telephone number)**

.....

4. (a) Name and postal address of designer(s) of the Project:

.....

(b) Name and telephone number of the designer's contact person:

.....

5. Name and telephone number of principal contractor's construction supervisor on site appointed in terms of Regulation 6(1):

.....

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6. Name(s) of principal contractor's subordinate supervisors on site appointed in terms of Regulation 6(2):

.....

7. Exact physical address of the construction site or site office:

.....

8. Nature of construction work:

.....

.....

9. Expected commencement date:

10. Expected completion date:

11. Estimated maximum number of persons on the construction site:

12. Planned number of contractors on the construction site accountable to the principal contractor:

.....

13. Name(s) of contractors already chosen:

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PRINCIPAL CONTRACTOR

DATE

.....
CLIENT

.....
DATE

- THIS DOCUMENT IS TO BE FORWARDED TO THE OFFICE OF THE DEPARTMENT OF LABOUR PRIOR TO COMMENCEMENT OF WORK ON SITE.
- ALL PRINCIPAL CONTRACTORS THAT QUALIFY TO NOTIFY MUST DO SO EVEN IF ANOTHER PRINCIPAL CONTRACTOR ON THE SAME SITE HAD DONE SO PRIOR TO THE COMMENCEMENT OF WORK

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C1.3.4 FORM OF BANKING DETAILS

Notes to Contractor:

1. The Employer applies an Electronic Funds Transfer system for all payments.
2. If you are already registered as a vendor with the Employer, you are not required to submit the documentation as per note 3.
3. If you are not registered as a vendor with the Employer, you are required to supply:
 - an original cancelled cheque bearing your company name and account number; or
 - if you are unable to supply an original cancelled cheque, you are to provide a letter on your letterhead as per the pro forma below and return the original letter to the address as stated in clause 1.3 of C1.2.2 - Information provided by the Employer, delivered by hand or sent by post.

To:
The Department of Roads and Transport
Chief Directorate Maintenance
1215 Nico Smith Street
Koedoespoort
Pretoria 0186

Dear Sir

TENDER NUMBER: DRT 21/01/2025/PRETORIA MAINTENANCE AND INSTALLATION OF PROVINCIAL STREET LIGHTS ON VARIOUS PROVINCIAL ROADS, INCLUDING MAINTENANCE OF SECURITY LIGHTS AT ALL REGIONAL BUILDINGS FOR ALL FIVE REGIONS OF GAUTENG PROVINCE FOR A PERIOD OF THREE (3) YEARS

BANKING DETAILS

By signing this document we accept the following:

- The banking details submitted are those of **(Note to Compiler: insert name of successful contractor)** and we take full responsibility for their correctness.
- We indemnify the Employer from any and all outcomes if an electronic transfer is made into an incorrect bank account using the banking details submitted.

Account Name:

Bank:

Branch Name:



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Branch Code:

Account Number:

Yours sincerely

.....
Authorised Signatory for

DATE: '

PART C2: PRICING DATA

Part C2: Pricing Data

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C2.2 Bill of Quantities	C2.1.3

C2.1.1

Part C2 Pricing Data

C2.1 Pricing Instructions

1. Measurement and payment shall be in accordance with the relevant provisions of the COLTO Standard Specification for Road and Bridge Works for State Authorities (1998 edition) as amended in the Scope of Works.
2. The units of measurement described in these Bill of Quantities are metric units. Abbreviations used in these Bill of Quantities are as follows:
3.

4. % = percent	5. m ² -pass = square meter-pass
6. h = hour	7. m ³ = cubic meter
8. ha = hectare	9. m ³ -km = cubic meter-kilometer
10. kg = kilogram	11. MN = mega newton
12. kl = kiloliter	13. MN.m = mega newton-meter
14. km = kilometer	15. MPa = mega Pascal
16. km-pass = kilometer-pass	17. No. = number
18. kPa = kilopascal	19. Prov sum = Provisional sum
20. kW = kilowatt	21. PC sum = Prime Cost sum
22. l = liter	23. R/only = Rate only
24. m = meter	25. sum = lump sum
26. mm = millimeter	27. t = ton (1000 kg)
28. m ² = square meter	29. W/day = Work day
30. For the purpose of these Bills of Quantities, the following words shall have the meanings hereby assigned to them:
31. Unit: The unit of measurement for each item of work as defined in the COLTO Standard Specification for Road and Bridge Works for State Authorities (1998 edition).
32. Quantity: The number of units of work for each item.
33. Rate: The agreed payment per unit of measurement.
34. Amount: The product of the quantity and the agreed rate for an item.

C2.1: Pricing Instructions

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C2.1.2

35. Lump sum: An agreed amount for an item, the extent of which is described in the Bill of Quantities but the quantity of work of which is not measured in any units.
36. Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.
37. It will be assumed that prices included in the Bill of Quantities, unless otherwise stated in the Scope of Work, are based on Acts, Ordinances, Regulations, By-laws, International Standards and National Standards that were published before the closing date for tenders. (Refer to www.stanza.org.za or www.iso.org for information on standards)
38. The prices and rates in this Bill of Quantities are fully inclusive prices for the work described under the items. Such prices and rates cover all costs and expenses that may be required in and for the execution of the work described in accordance with the provisions of the Scope of Work, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the Contract Data, as well as overhead charges and profit.
39. Where the Scope of Work requires detailed drawings and designs or other information to be provided, all costs associated therewith are deemed to have been provided for and included in the unit rates and sum amount tendered such items

All items in the Bill of Quantities must be completed separately. No grouping of items with a single lump sum will be allowed.

40. The quantities set out in these Bill of Quantities are approximate and do not necessarily represent the actual amount of work to be done. The quantities of work accepted and certified for payment will be used for determining payments due and not the quantities given in this Bill of Quantities.
41. Reasonable compensation will be received where no pay item appears in the Bill of Quantities in respect of work required in terms of the Contract and which is not covered in any other pay item.
42. The short descriptions of the items of payment given in these Bill of Quantities are only for the purposes of identifying the items. More details regarding the extent of the work entailed under each item appear in the Scope of Work.
43. The item numbers appearing in the Bill of Quantities refer to the corresponding item numbers in the COLTO Standard Specification for Road and Bridge Works for State Authorities (1998 edition).
44. The contractor shall bear all the costs and charges for special and temporary rights of way required by him in connection with access to the Site. The Contractor shall also provide at his own cost any additional facilities outside the Site required for the purposes of the Works.
45. The Bill of Quantities in the Tender Document must be completed in Black Ink and signed. (LOOK AT TAKING THIS OUT, SEE GDRT DOCUMENT)
46. The Bill of Quantities in the Tender Document must be fully completed – every item must be priced.

C2.1: Pricing Instructions

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47. The contract will come to an end when either the money or the time period is finished. It is the sole discretion of the Department to increase the quantities nor not.

C2.1.2

C2.2 Bill of Quantities

BILL A: GAUTENG PROVINCE

NB: TENDERERS MUST COMPLETE THE SCHEDULE IN BLACK INK. (LOOK AT TAKING OUT, SEE GDRT DOC).



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C2.1.3

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PART C3: SCOPE OF WORKS

Part C3: Scope of Works

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C3.1 PROJECT OVERVIEW

C3.1.1 THE SITE

The construction site includes maintenance to the following routes:

Item No.	Road Description	Actual Distance
1	P66/1 (R55) Laudium Road	16.07
2	P62/1 (Molefe Makinta)	6.8
3	D636 (Klipgat Road)	8.2
4	D604 (Bushveld Road)	12.4
5	P158/1 (N14)	14.3
6	P12 (Old Johannesburg Road)	22.75
7	P252/1	4.64
8	K103	13.5
9	P102/1	16.65
10	P39/1	25.94
12	Zwartkop Camp	
12	Hammanskraal Camp	
13	Ga-Rankuwa Camp	
14	Derdepoort Camp	

Please note, that additional scope of work can be added during the course of the project.

The description of the works shall include reference to all the layout plans.

C3.1.2 ELECTRICAL WORKS

The program consists of projects that seek to address the roads lighting and camp yard lighting noncompliance. The identified sites where lighting restoration will be restored, are those that had previous furnished with the lighting infrastructure. The lighting restoration programme shall be implemented in three Gauteng Department of Roads and Transport regions (i.e. Pretoria, Krugersdorp and Benoni).

To enhance the security of lighting infrastructure, each of the newly installed luminaires shall be fitted with a tracker to identify its location, at all times. The geographical location of each luminaire shall be embedded on a secured network.

The infrastructure rehabilitation programme shall consist of:

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1. Replacing the damaged luminaire with an LED type, in order to enhance energy demand management
2. Replace all damaged cables, that form lighting power distribution network
3. Replace lighting mast poles
 - a. Replace the poles circuit breakers where pole is in position, but the circuit breaker is removed
 - b. Cast new foundations for the new poles
4. Replace all non-functional photocells for each circuit.
5. Toque all the loose bolts in all the masts poles
6. Test the earthing on each pole
7. Reinstate the functionality of each power supply point per street light section and issue certificate of compliance.
8. The contractor shall be required to conduct routine maintenance and rehabilitation where infrastructure is damaged.

C3.1.3 DEFINITIONS

"Prime Equipment" means equipment whose reliability is central to illumination operation.

"Auxiliary Equipment" means equipment needed for testing adjusting or improving illumination equipment.

"Fault" means failure of any reason of the system or a portion thereof to operate satisfactorily.

"Random Fault" means a fault caused by a combination of circumstances which are outside the control of the Contractor.

C3.1.4 DEFINITIONS OF FAULT CATEGORIES

It will be the Residential Engineer's responsibility to categorise the work order and the following guidelines shall be used.

Category 1 (Cat 1)

In general this will be an "easy to repair" fault. This will typically be the routine patrol or security patrol reporting lights not working or a mast is off. Other types of faults will be a circuit breaker needing to be reset or any other fault of a minor nature.

Category 2 (Cat 2)

This type of fault will typically be cables that need to be replaced (cause could be theft or failure of the cable). This category can be escalated by the Residential Engineer to a Cat 3, depending on the circumstances.

Category 3 (Cat 3)

The repair of this type of fault would mean time is needed or there are circumstances not under the control of the contractor. This could be for instance a power outage by the supply authority or the location of the cable fault is not directly visible. It can also mean that new concrete needs to be poured. On this type of fault a start date for repair will be specified.

Category 4 (Cat 4)

This category is basically the same as category 3, but the time lost would be the unavailability of spares or the contractor is waiting for outside approval to continue. Typically a new substation or transformer needs to be ordered or lane closures must take place (for instance a new mast has to be erected). In the event of further information becoming available, such a fault can be downgraded to a Cat 3 fault by the Resident Engineer.

C3.1.5 MAINTENANCE AND ASSOCIATED DUTIES

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C3.1.5.1 Preamble

All repairs and maintenance of equipment shall be carried out timeously in a methodical professional manner according to the requirements of the Operating and Maintenance Manuals for the equipment.

The Contractor shall employ only competent suitably trained and qualified persons.

In the event of any major item of equipment becoming defective, the Contractor will upon receipt of the Engineer's Instruction remove such equipment entirely and replace it with a spare item (if such spare exists) or replace a major sub-assembly that is defective with the spare part held in store or, with a bought-out spare. Any defective "major spare" or "major sub-assembly" (as hereinafter defined) shall be expeditiously repaired and returned to store.

All work of any nature carried out on any item of equipment shall be recorded on the Worksheet by the Contractor and submitted to the Engineer for measurement purposes.

C3.1.5.2 Types of Maintenance Work

The types of maintenance to be carried out are as follows:

(a) Preventative Maintenance

The Contractor shall carry out tasks such as inspecting, cleaning, making minor adjustments, lubricating, performance checks, scheduled calibration, testing, measuring and replacing of minor components as detailed in the applicable sections.

(b) Replacement of Equipment

The Contractor shall, when instructed by the Engineer carry out tasks such as overhauls, replacements of worn or faulty major spares or components and the correction of problems found in routine maintenance inspections.

The Contractor shall satisfy himself after corrective maintenance that the equipment has been restored to good and reliable working condition, that all worn items of equipment have been repaired or replaced. Details of all replacements carried out shall be recorded for payment purposes.

(c) Emergency Work

The Contractor shall at any time upon receipt of notification from any of the various authorities, including GDRT's Traffic Management Centre or Metropolitan Police, perform any work required to make the installation and adjoining road safe, pending the carrying out of the necessary repairs to the installation.

C3.1.5.3 Service Intervals

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The intervals at which preventative maintenance of equipment are carried out shall be in accordance with the project specification.

C3.1.5.4 Extra Work

The Contractor shall, in addition to his normal duties, at any time upon receipt of an instruction by the Engineer perform any modification, installation of additional equipment, repairs, replacements or maintenance service. Where such work is not itemised in the Schedule of Quantities it shall be designated "Extra Work" and be measured for payment in accordance with the appropriate extra works item in the Schedule of Quantities.

C3.1.5.5 Technical Documentation

In terms of the original supply and installation contract for the illumination equipment, technical documentation covering operation and maintenance was required to be supplied by original equipment manufacturers. In general, copies of all documents supplied are available, however should the documentation, in the opinion of the Contractor, be deficient in any way the Contractor shall draw the Employer's attention to that fact.

C3.1.5.6 Equipment Numbering System

Each complete item of major equipment such as a minibus, pole etc., has been given an equipment number by the Employer. This equipment number identifies the type of equipment and its location in the installation. The Contractor shall indelibly stencil the equipment number on any item of equipment that is replaced during the period of the contract.

C3.1.5.7 Spare Part Stock

At the commencement of the contract, the Contractor will be required to take over the existing stock of spare masts, poles, etc., from nominated programme manager by the Gauteng Department of Roads and Transport, who will be managing the street lights maintenance contract. The equipment will be itemised on an inventory form and will be agreed by the respective parties.

It will be the tenderer's responsibility to determine the logistics requirements to take over this spare parts stock, and allow for this cost in the Site Establishment costs.

The contact details of the maintenance programme manager will be issued to the appointed contractors.

For further clarity and technical specification enquiries contact Supply Chain Management (SCM) on the following @ 011 355 7335 or 011 355 7336 or supplychain@gauteng.gov.za

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C3.1.6 DRAWINGS

The reduced drawing/s that forms part of the tender document are issued for tender purposes only.

Only figured dimensions may be used and drawings may not be scaled unless so instructed by the engineer. The engineer will supply all figured dimensions omitted from the drawings.

C3.1.7 CAMP ESTABLISHMENT, POWER SUPPLY AND OTHER SERVICES

The contractor is to make his own arrangements concerning the supply of electrical power and all other services. No direct payment will be made for the provision of electrical and other services. The cost thereof is deemed to be included in the rates and amounts tendered for the various items of work for which these services are required.

The Contractor shall select a suitable site to suit his requirements; however the location of this site camp shall not be within a GDRT road reserve.

The Contractor shall establish a site camp, approximately mid-way on the route to be maintained, and this site camp shall be approximately 5 km from the actual highway. However, the actual proposed site camp location must be specified by the Contractor in their proposed methodology.

C3.1.8 CONSTRUCTION IN CONFINED AREAS

It will be necessary for the contractor to work within confined areas. In certain places the width of the fill material and pavement layers may decrease to zero and the working space may be confined. The method of construction in these confined areas largely depends on the contractor's constructional plant.

C3.1.9 MANAGEMENT OF THE ENVIRONMENT

The contractor will be responsible for construction according to an environmental management plan in terms of Section C3.3 of the Scope of Works.

The contractor must take the utmost care to minimise the impact of his establishment and other construction activities on the environment and must adhere to the requirements as set out in Section C of the Scope of Works. Where the contractor fails to adhere to these requirements the specifications in Section C of the Scope of Works provide the methodology and cost liability of remedy.

C3.1.10 TRAFFIC

In general, lane closures shall be allowed between 09:00 and 15:00 from Monday to Thursday. Lane closures during peak traffic periods, for example the start of the Easter and December holidays shall only be allowed for emergency work. However, the Employer reserves the right to decline any lane closure request, due to any prevailing operational circumstances.

**C3.1.11 REQUIREMENTS IN TERMS OF GOVERNMENT'S PROGRAMME FOR BROADBASED
BLACK ECONOMIC EMPOWERMENT**

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The Gauteng Department of Roads and Transport is committed to the implementation of Government's policies and in turn expects the same from its contractors. Accordingly, it is a requirement of this project that tenderers are familiar with the specifications that relate to the transformation of the construction industry through the following;

- (ii) adherence to the policies of the Reconstruction and Development Programme, ASGISA and other similar Government initiatives,
- (iii) employment and/or creation of Black Enterprises (BEs),
- (iv) arrangement of generic skills, engineering skills and entrepreneurial skills training programmes for which provision has been made in the Pricing Schedule, (v) construction using labour maximisation principles and, (vi) active participation with community-based structures.

Tender adjudication takes account of tenderers' affirmed commitments towards achieving a specified Contract Participation Goal (CPG) which is based on the value of goods, services and works for which the contractor proposes to engage labour and SMMEs/BEs.

In this regard, Section C3.4 of the Scope of Works covers the contractor's requirements in detail, as well as defining the targets that comprise the CPG and the judgement criteria used in tender adjudication. Forms C1, C2 and C3 also need to be completed by tenderers and are to be found in Part T2 of this tender document. As with other returnable schedules, failure to complete, whole or in part, may adversely prejudice tenderers' tenders.

C3.1.12 CHANGES TO SCOPE OF WORK

It is a condition of this contract that the Employer reserves the right to limit the total expenditure on the Works due to possible budget constraints. Should the tender sum exceed the budgeted amount, the scope of the works may be reduced at any time before or during the contract period to ensure that the final contract amount does not exceed the budgeted amount.

C3.1.13 REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS

Refer to Section C3.5 of the Scope of Works for general requirements in terms of the OH&S requirements.

C3.1.14 NIGHT INSPECTIONS

• A night inspection of the entire installation will be required at least once per month. The Engineer's Representative and a supervisory member of the Contractor's staff will carry out these inspections. No specific payment will be made for the inspections and the Contractor will be deemed to have included for compensation in the rates tendered for his/her general obligations.

C3.1.15 SITE MEETINGS

The Contractor or his authorised representative shall attend meetings on a fortnightly basis with representatives of the Employer and the Engineer at dates and items to be determined by the

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Employer. Such meetings will be held for evaluating the progress of the contract and for discussing matters pertaining to the contract which any of the parties represented may wish to raise.

WORKING HOURS

Working hours for the execution of all work other than emergency work are to be restricted to the period between 09h00 and 15h00 on normal weekdays. Should the Contractor choose to do so, he will be permitted to work over weekends and on public holidays. This approval shall be at the absolute discretion of the Engineer, and no additional payment will be made for working outside normal working hours

KEY PERSONNEL

The minimum requirements with regards to qualification, registration and experience in the electrical engineering/street lighting construction and maintenance field, for the Contractor's key personnel shall be as indicated in the table below, according to the CIDB contractor grading designation determined for the contract.

C3.2: ELECTRICAL PREVENTATIVE MAINTENANCE SPECIFICATION

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C3.2.1: CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS

C 3.2.1.1 SCOPE

This section covers the establishment of the Contractor's organization, plant, equipment, offices, storage space and any other facility required to execute the contract. It also covers payment for certain general obligations, risks and liabilities and general items of cost not covered elsewhere.

C3.2.1.2 GENERAL REQUIREMENTS

The Contractor shall arrange to provide office and storage facilities at one (or more if he so choose) locations. The facilities provided shall be adequate to cater for the needs of the Contractor regarding offices and storage facilities for plant and equipment.

It will be necessary for the Contractor to provide storage space for materials to be installed under the contract. Such materials would include smaller items of equipment such as lamps, ballasts etc and also larger items such as masts. Provision shall also be made for the storage of traffic control devices such as signs and delineators.

The Contractor will not be required to provide office facilities for the resident engineer.

The Contractor will require specialist equipment to execute the contract such as "cherry pickers" and hydraulic lifts. No specific payment will be made for the provision of such equipment, and the Contractor will be deemed to have included the costs of providing such equipment in his rates tendered for establishment on site and his general obligations.

C3.2.1.3 MEASUREMENT AND PAYMENT

Item	Unit
C3.2.1.3.1 Contractor's Establishment on Site and General Obligations	
(a) Fixed obligations	Lump Sum
(b) Time related obligations:	per Month

The tendered lump sums shall not include any fixed or time-related obligation costs for the sub-contracts involving BE's and SMME.

Payment of the rates tendered under sub-items C3.2.1.3.1 (a) and (b) shall include full compensation for all the Contractor's charges in respect of the following:

- Setting up and maintaining his/her organization, office accommodation, storage facilities, plant and equipment at a location or locations procured by him which are accessible to the site.

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- Complying with the General Conditions of Contract and Part B1 of the Project Specifications, including the effecting of insurances and providing the sureties required.
- All general site and office overheads, profits, financing costs, risks, legal and contractual responsibilities and other costs and obligations of a preliminary or general nature which are not specifically measured for payment under any other items of payment.
- All temporary traffic accommodation personnel and devices such as:
 - Flagmen
 - Road Signs TW series, 1 500mm dia
 - Road Signs TGS series, 1 200 x 1 600mm
 - Road Signs TGS series, 1 500 x 1 600mm
 - Road Signs TR series, 1 200mm dia
 - Road Signs R series, 1 200mm dia
 - Distance plates for sign TW 40 and TGS 105, 400 x 1 500mm
 - Distance plates for sign TGS 103, 400 x 1 200mm
 - Traffic cones, 750mm high, to the approval of the Engineer
 - High visibility rear panel to maintenance vehicle with attenuator x 2
 - Delineators (DTG50J)
 - Setting up and moving the traffic control devices
 - Vehicle mounted flashing lights
 - 4 x 4ton Chery Pickers
 - Channelization devices and barricades
 - Temporary mounting system for the temporary control devices
 - And any other traffic devices
- The supply of flagmen, setting up and moving the traffic control devices, and the provision of high visibility clothing shall be deemed to be included in the rates tendered for the various items of preventative maintenance for each section of the contract.
- The tender rate shall include for the use of the appropriate traffic control devices at all times when any work is carried out on the national road at locations requiring traffic control measures in accordance with the specifications. All costs in this regard will be held to have been included in sub-items C3.2.1.3.1 (a) and (b) and the items relating to any work that is undertaken on the national roads which are included in the scope of this contract.
- Construction site Office (shall be located in a proper business park building to accommodate all material, plant, staff, etc), staffing accommodation, site office/s fully equipped & furnished, fully fence yard with adequate lighting, storage facilities to house all material and plant, at least 2 full time armed guards on a 24hr basis with alarm system, water and electricity to site office/s all costs inclusive, a suitable voltage regulator in order to maintain a constant current and voltage level at all times to prevent damage to the office equipment, all administrative costs, electric refrigerator/s for all offices of specified capacity, air-conditioning for all the offices, printers, photostat facilities, scanner/s, fax machine, etc.
- Housing and office/s for the Engineer's site personnel including the Engineer to be fully furnished which shall include full burglar proofing, electric refrigerators, air-conditioning, work station/s including desks and chairs with drawers, laptops, printing & photostat facilities, scanner, cellphones with airtime (similar or equal business talk 1000 anytime minutes including 5GB data bundle anytime usage) to make and receive calls, including proper shower facilities, three 4x2 1Ton bakkies to be used on site including fuel and

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maintenance, 3G/Wifi internet access, etc. In addition, the offices and any living accommodation are to be separated by at least 200m. Each person of the Engineer's team shall have his/her own separate office and accommodation and shall not be shared.

- All of the above shall be to the Engineer's approval.

The lump sum tendered Under Sub-Item C3.2.1.3.1 (a) above shall represent full compensation for the fixed part of the Contractor's establishment on site and general obligations i.e. that part which is substantially fixed and is not a function of the time required for the completion of the contract.

This sub-item shall not be subject to any variation whatsoever.

Payment of the lump sum tendered under Sub-Item C3.2.1.3.1 (a) will be made in three instalments, as follows:

- The first instalment, 70% of the lump sum, will be paid in the first payment certificate after the Contractor has met all his obligations under this section, and has made a substantial start with the work in accordance with the approved programme.
- The second instalment, 20% of the lump sum, will be paid one year after the commencement of the contract.
- The third instalment, 10% of the lump sum, will be paid when a Taking-Over Certificate has been issued in terms of Clause 10 of the General Conditions of Contract.

Before any payment is made under this sub-item, the Contractor shall satisfy the Engineer that he has provided adequate facilities and equipment. The Contractor shall also satisfy the Engineer that he either owns such facilities and equipment, or that he has entered into leasing or rental agreements to ensure that the facilities and equipment will be available for the duration of the contract. The Contractor may be required to produce documentary proof of ownership or lease or rental agreements, and that payments have been made in terms of such agreements.

In the event of the Contractor being unable to satisfy the Engineer as to the ownership of the facilities and equipment or the existence of lease or rental agreements acceptable to the Engineer, the Engineer shall have the right to withhold payments under this sub-item, or to deduct from any monies owing to the Contractor payments already made under this sub-item.

The tendered rates for Sub-Item C3.2.1.3.1 (b) shall represent full compensation for that part of the Contractor's establishment on site and general obligations which are mainly a function of time.

Payment will be made in equal monthly instalments, from award until the end of the contract.

Payments under Items C3.2.1.3.1 (a) and C3.2.1.3.1 (b) will not be subject to any variation.

Should the progress of the Contractor be in arrear in regard to his approved programme at any stage, the Engineer shall have the right to withhold payments under this item until the progress of the work is again in accordance with the approved programme

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Any payment made under Item C3.2.1.3.1 will not be taken into account when determining whether the value of a certificate complies with the "minimum amount of interim certificate" as laid down in the Appendix to Tender.

Item	Unit
C3.2.1.3.2 Taking over, transporting and storage of existing stock of spares	Lump Sum
Payment under the lump sum tendered under sub-item C3.2.1.3.2 shall represent full compensation for the compiling of stock lists, taking over of stock, transporting to the storage area, loading and offloading and any other requirements for the orderly handover of the existing stock of spares into the contractor's care. Contractor shall price for all risks including travelling to numerous sites, multiple trips, transport from the previous Contractor/s sites to the Contractor's site camp. Tenderer shall price for any other risks.	

Item	Unit
C3.2.1.3.3 Training for Interns	
Provisional Sum	
(a) Provisional sum for Training	
The Provisional Sum shall be expended in accordance with the General Conditions of Contract. It shall be the amount actually paid for training, in accordance to the Client's instructions, which shall include full compensation for all the Contractor's costs arising from the organising for the training.	
(b) Contractor's handling costs and profit in respect of sub-item C3.2.1.3.3 (a)	%

The tendered % is a percentage of the amount actually paid in accordance to the Client's instructions, which shall include full compensation for the handling costs and profit pertaining to the training of interns, administration process, mentoring, etc.

(c) Training Venue	Lump Sum
Payment under the lump sum tendered under sub-item C3.2.1.3.3 (c) shall represent full compensation for the amount actually paid for the training venue, in accordance to the Client's instructions, which shall also include full compensation for all the Contractor's costs arising from the organising of the training venue.	

<u>Item</u>	<u>Unit</u>
C3.2.1.3.4 Health and Safety Compliance:	
a) Preparation of a health & Safety plan and adherence thereof	Lump Sum

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The tendered rate shall include full compensation for the preparation of a comprehensive Occupational Health and Safety file, in compliance with section C3.5 and the Construction Regulations as issued by the Department of Labour and adherence thereof.

Unit

Item

b) Costs of Health and Safety (Agent) per Month

The tendered rate shall include full compensation for the provision of a Health and Safety officer, as specified under Section 3.5 and in compliance with the Construction Regulations.

Unit

Item

c) Personal Protective Equipment for all staff (incl. safety jackets,
Lump Sum hard-hats, etc.)

The tendered rate shall include full compensation for the Personal Protective Equipment for all staff, in compliance with section C3.5 and the Construction Regulations as issued by the Department of Labour and adherence thereof.

Unit

Item

C3.2.1.3.5 (a) Compliance with the Environmental Management Plan (EMP) per Month

The tendered rate shall include full compensation for the Compliance with the Environmental Management Plan (EMP), under section C3.3 and adherence thereof.

Unit

Item

C3.2.1.3.5 (b) Crushing and disposal of Lamps Provisional
Sum

The tendered rate shall include full compensation for the Compliance with the Environmental Management Plan (EMP), under section C3.3.7.3 and adherence thereof. The Provisional Sum shall be expended in accordance with the General Conditions of Contract

Unit

Item

C3.2.1.3.5 (c) Contractor's handling costs and profit in respect of
item C3.2.1.3.6 (b) %

The tendered % is a percentage of the amount actually paid in accordance to the Client's instructions, which shall include full compensation for the handling costs and profit pertaining to the crushing of lamps, administration process, disposal of lamps, transportation, etc.

C3.2.2 ACCOMMODATION OF TRAFFIC

C3.2.2.1 SCOPE

This section covers the requirements for the accommodation of traffic while work is being carried out either on or in the vicinity of the roadway, and the measures necessary to ensure the safety of both the public and the Contractor's employees.

C3.2.2.2 GENERAL REQUIREMENTS

The area covered by the contract includes some of the most heavily trafficked freeway sections in the country. The need for the Contractor to regard the safe accommodation of traffic as a major component of the work involved in the contract can therefore not be overemphasized. The accommodation of traffic will require diligence, attention to detail, and strict compliance with the provisions of the contract on the part of the Contractor.

In addition to the high traffic volumes, there are several geometric aspects, which further complicate the accommodation of traffic. The median between the carriageways is narrow, and in general there is a median barrier, consisting either of guardrails or a concrete barrier, which prevents vehicular access to the median. Furthermore, the median shoulder is narrow, ranging from 1,0m to 1,8m in width. As a result, any work to be done on lighting poles or masts in the median will require occupation of the median lane by the maintenance vehicles and personnel.

During all work on or in the vicinity of the roadway, the Contractor will be held responsible for the safe accommodation of traffic with a minimum of inconvenience to the public. The Contractor will be required to carry out this work strictly in accordance with the provision of this specification and the drawings, and any further requirements, which may be ordered by the Engineer. Should the Contractor not do so, the Engineer shall have the right to order that the work be stopped until he is satisfied that the Contractor is in a position to comply with all the requirements. The Contractor shall not have any redress under the contract for any consequential damages suffered by him as a result of delays caused by such stoppages ordered by the Engineer.

Working hours for the execution of all work other than emergency work are to be restricted to the period between 09h00 and 15h00 on normal weekdays. Should the Contractor choose to do so, he will be permitted to work over weekends and on public holidays. This approval shall be at the absolute discretion of the Engineer, and no additional payment will be made for working outside normal working hours.

C3.2.2.3 PROCEDURES FOR THE ACCOMMODATION OF TRAFFIC

C3.2.2.3.1 Work in the Median

Work on lighting poles and masts in the median will require the use of one or more vehicles occupying the median lane. The procedures to be adopted and the traffic control devices to be employed which are described below.

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- The vehicle (or vehicles) used in the work will always proceed in the same direction as the traffic.
- The vehicle (or the rear vehicle in the case of two vehicles) will be required to be equipped with high visibility rear treatment. This consists of various signs and flashing lights attached to the rear of the vehicle. If the vehicle is unsuited for the mounting of the high visibility treatment, a trailer fitted with the high visibility treatment may be employed.
- Signs are to be displayed on both sides of the carriageway warning that maintenance operations are in progress and that there is a lane closure ahead. The supports for these signs are to be so designed that they are sturdy, easily moved to the next position, and can be accommodated within the various median configurations which will be encountered.
- Once the maintenance is under way, two flagmen are to be continuously stationed upstream of the work area. These flagmen are also to be utilized in establishing the initial taper at the start of the operation. All personnel involved in the maintenance operation are to wear high visibility clothing.
- The maximum length of the lane which may be closed off at any time is 1 km, except for the interim period when moving from one work section to the next. When moving from one section to the next, the signs and cones for the first section are to be left in place until the signs and cones for the next section are in place. In order to achieve this, two full sets of signs and cones will be required. The traffic accommodation layout shall be as specified in the South African Road Traffic Signs Manual (SARTSM), volume 2, chapter 13 of the June 1999 edition published by the Southern African Development Community.

C3.2.2.3.2 Work in Other Areas

The traffic accommodation measures provided during work in areas other than the median, such as the edge of the freeway and of ramps, and inside the interchange areas shall be in accordance with Road Traffic Signs Manual published by the Southern African Development Community. The Contractor's attention is particularly drawn to the necessity for entering and leaving the roadway in a safe manner, and for keeping both personnel and equipment as far as possible away from the edge of the roadway.

C3.2.2.4 All traffic accommodation layouts and traffic control devices shall be in accordance with Road Traffic Signs Manual published by the Southern African Development Community.

C3.2.2.5 Temporary Control Facilities

The engineer may instruct the contractor to provide any other road sign, reflective tape, etc not measured in standard pay-items. Such road signs shall conform to the requirements of the SARTSM, or specification provided by the engineer. Similarly, in order to ensure that the travelling public is kept fully informed and warned on matters relating to the accommodation of traffic, construction sign posting and the effect of the construction on the free flow of traffic through the site, the Contractor shall arrange for advertising in the press and/or for other forms of publicity as per Engineer's request.

C3.2.2.6 Traffic Safety Officer

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The contractor shall submit a CV of the candidate to the engineer for approval before the candidate is appointed as the traffic safety officer. Make himself available to discuss road safety and traffic accommodation matters whenever required by the engineer and shall be responsible for the following:

Record on neat and dimensioned sketches and submit to the engineer the position and sign reference number, where applicable, of each sign, barricade, delineator, cone, amber flicker light, guardrail and permanent or temporary painted road marking feature. The position of each shall be adequately referenced from the marker boards or other surveyed points on the site of the works.

These records shall also show the date and time at which the recorded traffic accommodation features are certified correct by the traffic safety officer, and shall be signed by the traffic safety officer before being submitted to the engineer.

The records shall similarly account for whatever changes are made in the field. Such changes shall record the position of flagmen and stop/go control men and their associated traffic accommodation equipment wherever they are used.

Personally inspect the position and condition of each traffic accommodation feature on the whole site of works twice each day by 09h30 and by 14h30, to record all irregularities discovered and the remedial action taken, and to sign off as correct and submit to the engineer such record sheets by midday of the next working day. The traffic safety officer shall keep a duplicate book for this specific purpose.

The traffic safety officer shall also submit with this report the daily labour returns of flagmen, stop/go and traffic signal control men employed.

The traffic safety officer shall be equipped with a cellular phone and shall have a traffic safety vehicle and sufficient labour at his disposal 24 hours a day, including all prescribed non-working days, and shall not be utilised for other duties. He shall be directly answerable to the contractor's site agent. The traffic safety officer shall have his own vehicle to carry out inspections and at least one assistant to accompany him full time. Furthermore the traffic safety vehicle shall be a truck with a capacity of at least 3 tons and shall be equipped with a high visibility rear panel in accordance with the requirements of the SARTSM as well as a truck mounted impact attenuator complying with TL-2 criteria when tested in accordance with NCHRP 350 or N1 criteria when tested in accordance with EN 1317. (Certification of compliance must be on site at all times). The attenuator shall be used when the vehicle is utilized to close traffic lanes or when attending to stationary or broken down vehicles or accident scenes. The words TRAFFIC CONTROL shall be written on a warning sign in highly legible letters, not less than 150 mm high, and the sign shall be mounted on both the traffic safety officer's vehicle and the traffic safety vehicle at least 1,5 m above ground level. The proposed sign and letter dimensions shall be submitted to the engineer for his approval

The vehicles shall also be equipped with an amber-coloured flashing light of the rotating parabolic reflector type with a minimum intensity of 100W. The warning light shall be switched on at all times and the sign shall be displayed when the vehicle is used on site.

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The traffic safety officer shall have a direct line of communication at all times with the police and traffic officers responsible for the area within limits of the contract.

Ensure that all obstructions related to the contractor's activities be removed at the end of each work shift where applicable as instructed by the engineer and that the roads are safe for the traveling public.

In the event of an accident the traffic officer shall record in a written report the details of the accident, record the position of all temporary road signs, barricades, delineators, flagmen and any other devices used for traffic accommodation. In addition the report shall include a neat dimensional sketch, photographs, identifiable permanent features, and any other relevant information.

At least two separate traffic safety officers and teams shall be employed when construction is carried out during the day and night.

C3.2.2.8 MEAUREMENT AND PAYMENT

The contractor's tendered rates for the relevant items in the schedule of quantities shall include full compensation for all possible additional costs which may arise from the above and no claims for extra payment due to inconvenience as a result of the modus operandi will be considered.

Item

Unit

C3.2.2.8.1 Temporary Control Facilities

a) Traffic control measures ordered by the engineer

(i)	Provision of other traffic control measures	Provisional Sum
(ii)	Handling costs and profit in respect of	
sub-item C3.2.2.5.1 (a)(i)percentage (%)		

Expenditure under this payment item, (e.g. media releases or other signs to deliver information to the public) shall be made in accordance with the general conditions of contract, sub-clause 13.5, for the supply and installation of any additional signs or other traffic control measure requested by the engineer in accordance with clause B1503(g) and C3.2.2.5.

The tendered percentage is a percentage of the actual amount spent under sub item C3.2.2.8.1(a)(i), which shall include full compensation for the handling costs of the contractor, and the profit in connection with providing other signs and traffic control measures ordered by the engineer."

Unit

Item

C3.2.2.8.2 Traffic safety officer

per Month

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The unit of measurement shall be the month that the specified duties of the traffic safety officer are performed, irrespective of the number of traffic safety officers employed in any 24 hour day.

The tendered rate shall include full compensation for the cost of the traffic safety officer(s) to conduct the duties as specified in clause C3.2.2.6 and also includes the provision of the traffic safety vehicle, his own vehicle, fuel, vehicle maintenance costs, drivers, labourers and the cost of the cellular telephone and all other incidentals related to the performance of the traffic safety officer's duties.

C3.2.3 ANNUAL PREVENTATIVE MAINTENANCE

C3.2.3.1 SCOPE

This section covers work to be carried out by the Contractor on a routine basis, and includes the general maintenance of all equipment, including the replacement of certain items of equipment if they are found to be defective, and fault detection by means of patrols and regular intervals and works also includes labour, transport and any other equipment which shall be used to perform preventative maintenance. The various components of the installation to be maintained are set out in Schedule A at the end of part C3.2.3.

C3.2.3.2 MAINTENANCE TO BE CARRIED OUT ONCE PER YEAR

High Masts

(i) Cleaning

- Distribution boards and associated electrical equipment.

The distribution boards inside the mast are to be cleaned thoroughly to remove all traces of contaminants such as grease and dust.

- Luminaires

The inside of all lanterns, including bowls reflectors and lamps are to be carefully cleaned with soft clean cloths. The outside of the bowl is to be washed with water and a detergent. All cleaning is to be carried out with due care so as not to scratch or otherwise damage the equipment.

(ii) Electrical Checks

- Distribution boards and associated electrical equipment.

The distribution boards inside the masts and the associated electrical equipment are to be tested for defective performance using an approved testing system. All electrical connections are to be inspected and tightened if necessary.

- Luminaires

All lamps are to be removed from their holders and the contacts checked for arcing. All electrical connections are to be inspected and tightened where necessary.

The power-factor correction capacitor is to be checked by measuring the "ignition" current and the "during operation" current of the lamp. These currents for various lamps should be in accordance with the values specified below,. If the measured current in any instance differs from that specified by more

than 10%, the capacitor is to be replaced. The "during operation" current is to be measured after the lamp has been burning for at least five minutes.

Electrical Trailing Cable

The electrical trailing cable shall be checked for faults or damage, and replaced if found to be defective. The following procedures for replacement shall be adopted:

1. Disconnect the trailing cable plug from its socket in the distribution board.
2. Remove the plug from the trailing cable.
3. Remove the cable sock from the rope locating plate.
4. Slide the Kellems grip off the old trailing cable.
5. Pierce a hole through the new and the old trailing cable approximately 30 mm from their respective ends.
6. With the use of a piece of steel wire, approximately 1,5 mm diameter connect the two ends together.
7. Tape up the connection to ensure a smooth profile.
8. Draw a length of the new trailing cable, approximately 1m, through the Kellems grip and reconnect the Kellems grip to the rope locating plate.
9. Fit the winch to the mast and lower the luminaire frame as per the operating instructions.
10. Whilst lowering the luminaire frame allow the new cable to feed up the mast.

Important: When the luminaire carriage reaches door level, the old trailing cable will fall to the ground with the new cable attached to its end - stand well clear 11. Disconnect the trailing cable plug from the connection box.

12. Remove the plug from the old trailing cable.
13. Remove the old trailing cable from the Kellems grip on the luminaire carriage.
14. Pull the end of the new trailing cable through the Kellems grip until the cable easily reaches the connection box.
15. Make off the ends of the trailing cable and reconnect the plug.
16. Insert the plug into the socket on the connection box.
17. Raise the luminaire carriage to the top of the mast as per the operating procedures.
18. Remove winch from the mast.

19. Take up all the unnecessary slack in the trailing cable at the Kailems grip attached to the rope locating plate.
20. Make off the trailing cable ends and reconnect the plug.
21. Insert the plug into its socket on the distribution boards.
22. Switch on the circuit breakers marked LIGHTS and check the functioning of the luminaires.
23. Close and lock the access door.

***Lighting protection**

If the mast is fitted with alighting protection earthing installation at the base, this is to be inspected and tested in accordance with the recommendations of BS CP236 (Protection of structures against lightning and BS CP1013 (Earthing).

(iii) Mechanical checks

***Canopies**

Canopies are to be checked to ensure that water is not able to penetrate to the light fitting. If found to be defective, the gasket and/or mounting bolt are to be replaced.

***Lifting equipment**

The lifting equipment must be inspected by a qualified person holding a Government Certificate of Competency. This person shall certify that the lifting equipment complies with all relevant laws and regulations, such as the Mines and Works Act and the Occupational Safety Act.

Operation of the maintenance cage in conjunction with a drum winch shall at all times comply with the recommendations of the supplier of the cage and the manufacturer of the mast. Persons operating the cage shall be fully conversant with the required safety measures and operating procedures. The Engineer will supply the Contractor with the relevant operating manuals.

***Wire ropes and mast top**

The following procedures are to be carried out:

1. Inspect rope lay on winch and section of rope visible at mast door opening for frays, kinks, or corrosion.
2. Inspect anchorage point of winch rope at compensating pulley (if fitted).
3. Inspect winch rope throughout length for frays, kinks or corrosion.
4. Inspect rope anchorage points on winch drum and lantern carriage.
5. From the base of the mast observe ropes from lantern carriage in lowered position to mast head for any obvious defects.

6. Test load the wire ropes with the maintenance cradle before using maintenance cradle to carry personnel.
 7. Lower lantern carriage, uncouple and attach maintenance cradle.
 8. Load maintenance cradle with a test load equal to safe working load shown on the SWL Plate on the side of the cradle.
 9. Using power drive hoist the head of mast and return to ground level.
 10. Remove test load.
 11. Inspect head pulleys, split pins etc. for wear and corrosion, and tighten all nuts and bolts. Pulleys have oilite bushes, which are not expected to require attention.
 12. With lanterns returned to mast head check that all lamps light.
 - 13 Check that details of rope and cable rigging (now visible in mast base) and lantern carriage docking, are all correct.
 14. Check foundation bolts, tighten nuts where necessary.
- Lantern carriage

The following procedure is to be carried out:

1. Inspect guide rollers (where fitted), lubricate and adjust if necessary.
2. Inspect interconnecting cables and junction boxes for damage.
3. Check electric supply cable anchorage, and check for physical damage to cable.
4. Check all nuts and bolts, tighten if necessary.

In order to take tension off the suspension ropes when the lamp ring is in the lowered position, a support ring shall be fitted around the mast-shaft above the door opening. Pipe support legs resting on the mast base-plate will support the mass of the lamp ring thus permitting disconnection of the suspension ropes.

- Mast corrosion protection

During the ascent in the maintenance cage, the galvanised surface of the mast is to be checked for damage to the coating and any signs of corrosion. Any affected areas are to be de-rusted and hand cleaned with a detergent. A zinc-rich paint is then to be applied to the affected areas.

Lighting Poles

- (i) Cleaning

- Cleaning inside the pole

The inside of the pole behind the access door is to be thoroughly cleaned.

- Luminaires

The procedures specified in clause C3.6.6 (i) for high masts are to be carried out.

(ii) Electrical checks

- Inside the pole

The circuit breaker inside the pole immediately behind the access door is to be checked to ensure that it is functioning efficiently. All electrical connections are to be inspected and tightened where necessary.

- Luminaires

The procedures specified in clause C3.6.6 (ii) for high masts are to be carried out.

(iii) Mechanical checks

- Canopies

The procedures specified in clause F1.2.1(iii) for high masts are to be carried out.

- Foundation bolts

All foundation bolts are to be checked, and tightened if necessary.

LT Switchgear, Mini-substations, Distribution Boards Pillars and Kiosks

(i) Housings

The interior of all boards, pillars, kiosks and mini-substations are to be cleaned. A chemical herbicide is to be applied to prevent grass growing inside the electrical housing.

All legends and wiring diagrams are to be checked and replaced if necessary.

Paintwork both on the inside and the outside the housing is to be checked. Any rust spots are to be cleaned down to bare metal by grinding, primed and a zinc chromate primer, and painted with one coat of an enamel paint of the appropriate colour.

(ii) Switchgear

All bolts and nuts on switchgear, busbars etc., are to be checked and tightened if necessary. The operation of all isolators, switches, circuit breakers, relays, contactors etc., shall be checked. Defective are to be repaired or replaced.

(iii) Photocells

The bowls of the photocells which are installed on 2,5 m poles or other suitable locations are to be cleaned, and the operation of the cell checked. If found to be defective, the cell is to be replaced.

Replacement of Minor Items of Equipment

During the preventative maintenance inspections carried out on high masts, lighting poles and switchgear, any minor items of equipment which are found to be defective or damaged are to be replaced. These items would include lamp holders, lamps, power factor correction capacitors, ballasts, igniters, circuit breakers, earth leakage relays, photocells, HRC fuses and cartridges and other similar items.

The Contractor will be required to have these items available during preventative maintenance operations. The labour involved in the replacement of these items will be deemed to be included in the rates tendered in section C3.2.3.6 of the Schedule of Quantities. The supply of the replacement items will be paid for under particular items scheduled in C3.2.3.6.6 of the Schedule of Quantities. The items supplied are to comply with the following requirements:

Lamp holders:	E40 Goliath Edison Screw (GES) porcelain with anti-vibration spring, 3kV pulse tested
Lamps:	GE or equivalent (Description: The High Pressure Sodium Lamps must be of very robust and reliable construction, and designed to meet the most demanding requirements. The sodium resistant ceramic must allow for slow voltage rise to give a rated average life of up to 35000 hours. The lamp must have a rugged monolithic arc tube for higher reliability, high xenon fill gas to deliver a high luminous efficiency up to 146 lm/W. The lamp must also be compatible with both magnetic and electronic ballasts.)
PF correction capacitors:	Bag Turgi or similar
Ballasts:	Parmar or similar
Ignitors:	Parmar or similar
	Circuit breakers: 10 -20A, single pole Merlin Gerin 5 kA,
Photocells	National plug-in type or similar
HRC fuses:	English Electric "Red Spot" or similar

C3.2.3.3 PREVENTATIVE MAINTENANCE TO BE CARRIED OUT ANNUALLY WITHIN CONTRACT DURATION

Inspection and Replacement of the Steel Wire Ropes on High Masts

1. Fit the luminaire support ring brackets to the mast.
2. Open the mast access door.
3. Fit the double drum winch to the mast and attach the winch ropes to the rope locating plates
4. Lower the luminaire carriage until it rests on the support bracket.
5. Disconnect the wire ropes from the luminaire carriage at the two lifting points.
6. Tie a length of 3 mm diameter nylon rope to the thimble end of each of the wire ropes and secure the loose end to an immovable object i.e. the luminaire carriage.

7. Carefully pull the winch ropes out through the mast access opening, laying them out neatly and ensuring that they are in a safe place there they will not get damaged during later operations.
 8. Remove the rope locating plates from the mast stainless steel wire ropes.
 9. With the use of a piece of insulation tape, mark each wire rope where the loose end meets the live (tension) portion.
 10. Remove the three stainless steel Crosby clamps from each of the wire ropes and store them with the stainless steel thimbles in a safe place.
 11. Tie the loose end of the 62 m nylon ropes to the bracket ends of the wire ropes.
 12. Now pull down the nylon ropes outside the mast and draw the stainless steel ropes out of the mast.
- Important:** Always ensure that both ends of the two ropes are held and guided as the difference in weight could let the wire rope fall down the outside of the mast unexpectedly and break the nylon rope/bracket connection.
13. Lay out the wire rope neatly for inspection.
 14. Should it be found that a wire rope is damaged and required replacement, the following steps should be taken:
 - (i) Lay out the new stainless steel wire rope next to the existing rope
 - (ii) Mark the new rope at the identical position where the old rope was marked with the insulation tape
 - (iii) Attach another piece of insulation tape to the new rope where the end of the existing rope meets the new rope
 - (iv) Remove the nylon rope from the bracket end of the existing rope and connect to the new rope.
 15. When inspected, again pull down the nylon ropes within the access door opening and let the wire ropes move up to the outside of the mast, over the pulleys and down the inside.
 16. When the ropes are back inside the mast shaft, replace the stainless steel thimble and Crosby clamps, ensuring that the thimble is in the exact position as before. This is achieved by ensuring that the end of the rope is again corresponding to the tape mark on the wire rope.
 17. Re-connect the rope locating plates to the made off thimbles of the wire ropes.
 18. Pull the nylon ropes on the outside of the mast and allow the winch ropes to move freely through the access door opening.
 19. Re-connect the thimble ends to the luminaire carriage.

20. Raise the luminaire carriage to the top of the mast.
21. When the trailing cable has stopped moving, ensure that the holes in the rope locating plates coincide with those in the rope lock assembly and make adjustments.
22. Insert the rope locking screws firmly.
23. Take the tension off the winch ropes and ensure that the ropes locating screws are properly seated
24. Re-check that all components are securely fixed and properly seated.
25. Remove the double drum winch from the mast
26. Close and lock the access door

Important: Where Nytock nuts are used, ensure that they are replaced after removal. Under no circumstances may the old nut be re-used.

The complete earthing installation of all high masts and lighting poles is to be tested.

All lamps on high masts lighting poles and underpass luminaires are to be replaced, whether operational or not.

C3.2.3.4 ANNUAL INTERIM LAMP REPLACEMENT

The Contractor will be requested to carry out interim lamp replacements on any section of the Contract when instructed to do so by the Engineer. Any such interim lamp replacement shall involve the replacement of lamps and/or poles or underpass luminaires on a particular section of the contract.

C3.2.3.5 ANNUAL GROUP LAMP REPLACEMENT

The Contractor will be requested to carry out group lamp replacements on any section of the Contract when instructed to do so by the Engineer. Any such group lamp replacement shall involve the replacement of lamps on a consecutive start point to end point and/or poles or underpass luminaires on a particular section of the contract.

C3.2.3.6 MEASUREMENT AND PAYMENT

Item	Unit
C3.2.3.6.1 Preventative maintenance to be carried out once within the 36 month contract duration	Lump Sum

The tendered lump sum for Item C3.2.3.6.1 shall include full compensation for carrying out preventative maintenance once within the 12 month contract duration as per the cycle specified in C3.2.3 of the Project Specification on all the relevant items of equipment in the particular section. The tendered lump sum shall include full compensation for all labour, tools, equipment, materials, transport and any other items necessary to complete the work as specified including the replacement of defective equipment. The tendered lump sum for the Contract is to be based on the number and type of each item of equipment listed in the Schedule of Equipment to be maintained. The tendered rate shall allow for lane closure and traffic accommodation in accordance with the South African Road Traffic Signs Manual (SARTSM), volume 2, chapter 13 of the June 1999 edition.

Item	Unit
C3.2.3.6.2 Inspection of the steel wire ropes on the high masts as Specified	Lump Sum

The tendered lump sum of Item C3.2.3.6.2 shall include full compensation for inspecting the steel wire ropes on all the high masts during the contract period according to the procedure specified in clause C.3.2.3 of the Project Specification. The tendered lump sum shall include full compensation for all labour, tools, equipment, materials, transport and any other item to complete the work as specified. The tendered lump sum is to be based on the number and type of high masts listed in the Schedule of Equipment to be maintained.

Should an inspection reveal that the steel wire ropes on any mast require to be replaced, this will be done at the same time as the inspection. No additional payment will be made for the labour involved in replacing the ropes. Payment for the provision of the new ropes will be paid under the provisional sum in item C3.2.4.4.1 of the Schedule of Quantities,

Item	Unit
C3.2.3.6.3 Testing of earthing installation for high masts and Lighting poles	Lump Sum

The tendered lump sum for C3.2.3.6.3 shall include full compensation for testing the earthing installation of all the high masts and lighting poles. The tendered lump sum shall include full compensation for all labour, tools, equipment, material, transport and any other item necessary to complete the work as specified. The tendered lump sum is to be based on the equipment listed in the Schedule of Equipment to be maintained.

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Item	Unit
C3.2.3.6.4 Group lamp replacement of all lamps on high masts, Lighting poles and in underpass luminaires as specified in C3.2.3.5 of the Project Specification (excluding the supply of the lamps)	

Lump

Sum

The tendered lump sum for C3.2.3.6.4 shall include full compensation for replacement of all the lamps on all the high masts and lighting poles and in all underpass luminaires on a particular section of the Contract once during the Contract Period according to the procedure specified in clause C3.2.3.5 of the Project Specification,

The tendered lump sum shall include full compensation for all labour and tools to complete the work as specified.

Payment for the supply of the lamps will be made under the relevant item in C3.2.3.6.6 of the Schedule of Quantities. The tendered lump sum is to be based on the lamps listed in the Schedule of Equipment to be maintained in Clause C3.2.3.2.

Item	Unit
C3.2.3.6.5 Interim replacement of lamps on high masts, lighting poles and in underpass luminaires as specified in clause C3.2.3.4 of the Project Specifications (excluding the supply of the lamps)	

(a)	40 m mast	No.
(b)	30 m mast	No.
(c)	20 m mast	No.
(d)	20m scissor in median	No.
(e)	20m mid-hinge in median	No.
(f)	12m mono-pole in median	No.
(g)	Underpass luminaire	No.
(h)	5m mono- poles	No.

The unit of measurement for item C3.2.3.6.5 shall be the number of masts, lighting poles and underpass luminaires included in an interim lamp replacement.

The tendered rate shall include full compensation for replacing defective lamps, on the type of high masts and lighting poles described and in underpass luminaires according to the procedure specified in clause C3.2.3.4 of the Project Specifications. The tendered rate shall include full compensation for all tools and transport to complete the work as specified. Payment for the supply of the lamps will be made under the relevant item in C3.2.3.6.6 of the Schedule of Quantities.

Item	Unit
C3.2.3.6.6 Supply and installation of materials and equipment for preventative maintenance work	

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- (A) Lamps for interim lamp replacement (type of lamp specified)
- (B) Lamps for group lamp replacement (type of lamp specified) No.
- (C) Power factor correction capacitors complete with mounting No. saddles and fixings (capacitance specified)
- (D) Ballasts complete with fixings for (type of lamp specified) No.
- (E) Ignitors for (type of lamp specified) No.
- (F) Circuit breakers (type specified) No.
- (G) Contactors (type specified) No.
- (H) Low voltage fuses (type specified) No.
- (I) High voltage fuses (type specified) No.
- (J) High voltage fuseholders (type specified) No.
- (K) Photocells (type specified) No.
- (L) Connector strips for luminaire wiring strip of 3 with No.
mounting bolts (area of conductor specified)

The unit of measurement shall be the number of the particular item supplied and installed.

The tendered rates shall include full compensation for the supply and installation of the item as specified for installation under items of preventive maintenance work, including all costs involved in holding an adequate supply of the items readily available during preventative maintenance inspections.

**Unit
Item**

C3.2.3.6.7 Regenerate existing oil to meet SANS 555 requirements for Litre
regenerated oil

The unit of measurement shall be the number of litres purified for a minimum of three passes through the mobile purification plant.

The rate shall include all necessary costs of the deployment of the plant, and the purification of the oil and all other costs to purify the oil.

**Unit
Item**

C3.2.3.6.8 Supply, deliver and fill new virgin oil in existing transformers Litre or switchgear

The unit of measurement shall be the number of litres supplied, delivered to site, and refilling of the affected equipment.

The rate shall include all costs to deliver, fill the new oil, and to transport and dispose of the used oil at an authorised facility.

**Unit
Item**

C3.2.3.6.9 Testing of mineral insulating oil Sample

The unit of measurement shall be the number of samples tested, including the production of a detailed report produced on the oil sample, which report shall also include an analysis of the equipment condition that can be derived from the oil analysis. The following tests shall be conducted on the oil sample:

- Moisture Content
- Dielectric strength to IEC 60156
- Dissolved gas analysis to IEC 60628
- Acidity to IEC 62021-1
- Furanic analysis to IEC 61198
- PCB content, to IEC 60619

The rate shall include all costs to extract a sample from the equipment, deliver to a laboratory, undertake the tests and produce and present a comprehensive report to the Engineer and any other related costs.

C.3.2.4 REPLACEMENT OF EQUIPMENT AND UPGRADING

C3.2.4.1 SCOPE

This section covers the work involved in replacing damaged or defective equipment, and certain items of work to upgrade the system.

C3.2.4.2 REPLACEMENT OF EQUIPMENT

- i) Any items of equipment, for example masts, poles, minisubs etc., which are damaged by vehicle collisions or any other means, or which are found to be defective, are to be replaced or repaired by the Contractor. This work excludes the minor items of equipment, which are to be replaced as part of preventative maintenance, which are scheduled in Section C3.2.3.6 of the Schedule of Quantities. The replacement of equipment will be paid for in C3.2.4.4 of the Schedule of Quantities.

C3.2.4.3 RETROFITTING AND UPGRADING

Any retrofitting and upgrade, for example installation of LED light fittings etc., shall be performed by the Contractor. This work must be instructed and specified by the electrical engineer; this can be an upgrade of equipment to latest technology as per Client's requirements. All necessary resources and material required for the upgrade shall form part of this item. An approved quote will be used to release provisional sum upon completion of works/stage to the satisfactory of the engineer and the Client and as per specification for that particular upgrade or retrofitting. The upgrade and retrofitting of equipment will be paid for in C3.2.4.4.9 of the Schedule of Quantities.

C3.2.4.4 MEASUREMENT AND PAYMENT

Unit Item

Replacement of equipment as instructed by the Engineer to replace or Provisional repair damaged or defective Equipment. sum

The provisional sum provided to cover the cost of the replacement of equipment requested by the Engineer in Terms of clause C3.2.4.2 of the Project Specification shall be expended in accordance with the provisions of Sub-Clause 13.5 of the General Conditions of Contract. This item shall allow for lane closure and traffic accommodation in accordance with the South African Road Traffic Signs Manual (SARTSM), volume 2, chapter 13 of the June 1999 edition.

Item

Unit

Number

C3.2.4.4.2 Replace mast/pole complete without luminaires (state
(No.) type of mast/pole)

Replace mast/pole complete without luminaires (state type of mast/pole and luminaires).

The unit of measurement shall be the number of each type of mast or pole delivered and erected. The tendered rates shall include full compensation for procuring, furnishing and installing the mast or pole by erecting it on the original or reconstructed foundation. The

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tendered rate shall include all costs of cranes or other equipment required to erect the mast or pole.

Item	Unit
C3.2.4.4.3 Replace complete luminaires (state type of luminaire (No.) and lamps)	Number

Replace complete luminaires (state type of luminaire and lamps).

The unit of measurement shall be the number of each type of luminaire delivered and installed on a mast or pole.

The tendered rate shall include full compensation for procuring, furnishing and installing the luminaire on the mast or pole, and the removal and disposal of the original luminaire if required.

Item	Unit
C3.2.4.4.4 Replacement of special lighting equipment at various interchanges	

The unit of measurement shall be the number of each type of special light fitting delivered and installed on a mast, pole or anywhere else.

The tendered rate shall include full compensation for procuring, furnishing and installing the special light fitting including lamp on the mast, pole or anywhere else, and the removal and disposal of the original light fitting if required.

The provisional sum provided is to cover the cost of the supply and installation of equipment instructed by the Engineer at various installations on the extent of the route shall be expended in accordance with the provisions of Sub-Clause 13.5 of the General Conditions of Contract.

Item	Unit
C3.2.4.4.5 Repaint of Poles and Masts	
a) 40m Mast	No.
b) 30m Mast	No.

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- c) 20m Mid-hinge in median No.
- d) 20m Scissor Mast No.
- e) 15m Mono-pole outside median No.
- f) 12m Mono-pole outside median No.
- g) 5m Pole No.

The unit of measurement shall be the number of each type of mast/ pole.

The tendered rate shall include full compensation for procuring the Bitumen Aluminium based paint, hiring cost of the crane / cherry picker and any other costs to comply with clause C3.6.1.12.

**Unit
Item**

C3.2.4.4.6 Standardisation of locks No.

The unit of measurement shall be the number of locks supplied and installed at various locations.

The tendered rate shall include full compensation for the supply and installation of locks at any location on the entire route of the site instructed by the Engineer. The locks shall be similar or equivalent to the "UNION" high security padlock.

**Unit
Item**

C3.2.4.4.7 Galvanizing on link poles No.

The unit of measurement shall be the number of galvanizing on link poles at various locations.

The tendered rate shall include full compensation to cover the cost of galvanizing on link poles at any location on the entire route of the site as instructed by the Engineer and shall be expended in accordance with the provisions of Sub-Clause 13.5 of the General Conditions of Contract.

**Unit
Item**

Sum	C3.2.4.4.8 (a) Maintenance of Security lighting at various Building Sites	Provisional
	The item shall is to cater for the maintenance of security lighting at various building sites. There are approximately sixty building sites. All work done will be paid for under this item using rates quoted under C3.2.6 of the Schedule of Quantities. In the event of work being required for which no rates have been quoted all labour, plant and materials actually used will be paid for on a daywork basis. A provisional sum is provided in C3.2.4.4.8 (a) of the Schedule of Quantities for this purpose, and provision is made for the submission of a percentage mark-up by the Contractor under item C3.2.4.4.8 (b) on the basic cost of labour, materials and plant pertaining to the Handling cost and profit	
	Item C3.2.4.4.8 (b) Handling cost and profit on (a) for emergency work	Unit
	for emergency work	Percentage (%)

C3.2.5 EMERGENCY WORK

C3.2.5.1 SCOPE

This section covers the work involved in rendering damaged or malfunctioning equipment safe in the case of emergency including high priority areas, where the normal operation of lighting is always required, as instructed by the Engineer.

C3.2.5.2

GENERAL REQUIREMENTS

In the event of an emergency, arising either from physical damage to the equipment, caused for example by a vehicle collision, or from a malfunction by any item of equipment, the equipment is to be restored to a safe condition by the Contractor as soon as possible. The damaged or malfunctioning equipment is to be made safe electrically, and any physical hazard to traffic, such as a fallen pole, is to be removed. **Emergency work entails work necessary to make the situation safe including high priority areas, where the normal operation of lighting is always required, as instructed by the Engineer.** Any work, which can be done at a late stage, will not be regarded as emergency work.

The Contractor shall respond immediately to emergency calls from the Traffic and Fire Departments of any of the municipalities within which the lighting installations are situated, the South African Police, the SOS control centre, officials of the Gauteng Provincial Government, South African National Roads Agency Limited and the Resident Engineer.

C3.2.5.3 REQUIREMENTS FOR THE ROUTINE PATROL AND EMERGENCY TEAM

The Contractor shall hold available a routine patrol and emergency team of personnel and plant which can respond to an emergency call at all times i.e. 24 hours per day, 7 days per week, including public holidays. The maximum response time of this team i.e. the time from when an emergency call is received until the time when the team arrives on the scene, shall be four hours.

The plant and personnel available to the team shall be capable of the following:

- (a) Making safe all damaged or malfunctioning electrical equipment. Suitably qualified and trained personnel will be required for this work, which includes the operation of the MV switchgear when MV transformers and mini-substations have to be disconnected from the system.
- (b) All work necessary to clear the roadway and obtain access to damaged electrical equipment. This will necessitate the provision of lifting equipment, and means of access to masts and poles such as hydraulic and cherry pickers. The emergency team shall also have access to raising and lowering gear for all types of masts.
- (c) Inspecting each section of the highway at least twice during the day, and twice at night, every night of the year including all public holidays and weekends.
- (d) Checking the status of the lighting during the night patrol. In instances where the lighting system is de-energised due to tripped switchgear (LV and MV) the team shall immediately re-set the affected switchgear if possible.

The type of situations the team would be expected to deal with under emergency conditions, would be vehicle collisions with masts, poles, distribution boards and pillars, minisubstations etc., as well as the malfunctioning of any item of equipment for any other reason, which creates a dangerous situation. Exact details of items of plant or personnel members required for the emergency team are not specified in detail. However, tenderers are required to provide with their tender information on the plant and personnel which would be available, and where this plant and equipment would be based. After the tender award, the Engineer shall have the right to do the following:

- (a) Instruct the Contractor at any time to provide a list of the personnel and plant which are available for the emergency team, including full details of the names, qualifications and experience of the personnel available, and a full description of the plant available.
- (b) Interview such personnel and inspect such equipment at any time.
- (c) Instruct the Contractor to hold any additional personnel or plant available for the emergency team, which the Engineer deems to be necessary.
- (d) Withhold payment to the Contractor for holding the emergency team available until the Engineer's requirements have been met.

C3.2.5.4 ACCOMMODATION OF TRAFFIC

The Contractor will be responsible for the accommodation of traffic while carrying out emergency work. The necessary traffic control devices such as signs, cones, etc. shall be supplied by the Contractor. The Contractor will be required to have all these available at all times for use during emergency work. All vehicles used in carrying out emergency work are to be equipped with flashing amber lights. All personnel engaged in emergency work are to wear high visibility clothing, with both fluorescent material for day-time visibility and reflective material for night-time visibility. During the execution of emergency work, the Contractor will be required to comply with the instructions of the traffic authorities at the scene.

C3.2.5.5 MEASUREMENT AND PAYMENT

Item	Unit
C3.2.5.5.1 Holding routine patrol and emergency team available	Lump sum

The tendered lump sum shall provide full compensation for holding the emergency team as specified available for emergency work and weekly routine patrol, including all costs involved in making the necessary personnel and plant available at all times. Contractor shall price for all risks.

The tendered rate shall allow for lane closure and traffic accommodation in accordance with the South African Road Traffic Signs Manual (SARTSM), volume 2, chapter 13 of the June 1999 edition.

Item	Unit
Provisional Sum	
C3.2.5.5.2 Plant and Materials used during call-outs for emergency work	
All work done on an emergency call-out will be paid for under rates quoted in C3.2.6 of the Schedule of Quantities. A provisional sum is provided for this purpose under C.3.2.5.5.2.	
Item	Unit
C3.2.5.5.3 Contractor's mark-up on day works undertaken on emergency call-outs	
Percentage (%)	

for emergency work

Provision is made for the submission of a percentage mark-up by the Contractor on the cost of labour, materials and plant over and above the rates quoted under C3.2.6 used during the emergency call-out .

C3.2.6 EXTRA WORK AND DAYWORKS

C3.2.6.1 SCOPE

This section covers the extra work that is expected to be required during the period but, because of its diverse and unpredictable nature, cannot be itemised at this time as well as the provision of a schedule of day works items which will also be used to undertake work which has been itemised at a high level in the Schedule of Quantities, particularly extra work.

C3.2.6.2 RATES FOR ITEMS OF EXTRA WORK

The items include in the schedule of extra works items in C3.2.6.4 are generally for the supply and installation of cables and accessories. Most of the items listed are rate only items, the rates inserted will however be taken into consideration when the tenders are adjudicated.

C3.2.6.3 DAYWORKS

The day works schedule includes labour and plant that could be required at various times to undertake work on the contract that is not individually itemised and in particular items of extra works. The Contractor is to price each of the items in the Schedule of Quantities.

C3.2.6.4 MEASUREMENT AND PAYMENT

Item	Unit
Provisional	
C3.2.6.4.1 Provisional sum to be expended at the discretion of the Engineer for any sum extra work and dayworks.	
The provisional sum provided to cover the cost for any extra work and dayworks requested by the Engineer and shall be expended in accordance with the provisions of Sub-Clause 13.5 of the General Conditions of Contract. This item shall also allow for lane closure and traffic accommodation in accordance with the South African Road Traffic Signs Manual (SARTSM), volume 2, chapter 13 of the June 1999 edition.	

Item	Unit
Extra Work	

C3.2.6.4.2 Supply, deliver, install, test and commission:

- (a) LV Power cables: PVC insulated PVC bedded *SWA PVC sheathed 600/1000 V
Metre (m)
cables to SANS 1507 (cable type and number of cores specified)
- (b) Aerial Bundled Conductor (ABC): XLPE, UV Protection, 600/1000 V
Metre (m) cables to SANS 1418 (cable type and number of cores specified)
- (c) MV cables, 6.65/11kV XLPE insulated, copper tape screened, PVC bedded, SWA, Metre
(m)
PVC sheathed MV cables to SANS 1339 (cable type and number of cores specified)
- (d) LV cable & ABC terminations, glands, shrouds, lugs etc. (cable type and number Set (set) of cores
specified)
- (e) MV cable terminations, glands, shrouds, lugs etc. (cable type and number of cores Set (set)
specified)
- (f) LV cable joints (shall be scotch cast joints), sleeves, ferrules etc. (cable type and Number number of
cores specified) (No.)
- (g) MV cable joints, sleeves, ferrules etc. for 11kV XLPE MV cable (SWA) (cable type Number
and number of cores specified) (No.)
- (h) Galvanised, screwed conduit (size specified) Metre (m)
- (i) Galvanised bosal conduit (size specified) Metre (m)
- (j) Conduit end (bush and lockouts) (size specified) Number
(No.)
- (k) Conduit and (round conduit box 1, 2, 3 & 4 way) (size specified) Number
(No.)
- (l) PVC insulated copper conductors (cable size specified) Metre (m)
- (m) Bare copper earthwire (cable size specified) Metre (m)
- (n) Trailing cable neoprene (cable size specified) Metre (m)

The unit of measure shall be the net length of cable installed in the works as instructed by the Engineer.

The tendered rate shall Include full compensation for procuring, furnishing, delivering and laying the cable in a trench or where directed by the Engineer.

The tendered rates for accessories shall include full compensation for all consumables and sundries necessary for the proper installation of the accessory.

“CSA” refers to cross sectional area which is the cable size in mm²

Item	Unit
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Dayworks

Note that rates for this schedule will apply on extra work and emergency work for material that are not itemised only.

C3.2.6.4.3

(a) Labour for:

- (i) Foreman Hour (hr)
- (ii) Artisan Hour (hr)
- (iii) Apprentice Hour (hr)
- (iv) Semi-skilled labourer Hour (hr)
- (v) Labourer Hour (hr)
- (vi) Student Hour (hr)

Item	Unit
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(b) Transport for:

- (i) Vehicles up to and including 1500 kg km
- (ii) Vehicles over 1500 kg up to 3000 kg km
- (iii) Vehicles over 3000 kg km
- (iv) Vehicles over 3000 kg with high up crane km
- (v) Vehicles over 3000 kg with high up crane including hydraulic personnel lift km
- (vi) Vehicles over 3000 kg with Attenuator safety truck km

Item	Unit
-------------	-------------

(c) Special vehicles and equipment *:

- (i) 4-10 ton mobile crane truck Hour (hr)
- (ii) 4-10 ton mobile crane truck with hydraulic personnel lift Hour (hr)
- (iii) 30 ton mobile crane truck Hour (hr)
- (iv) Mobile hydraulic personnel lift Hour (hr)
- (v) Attenuator safety truck Hour (hr)

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Item	Unit
(d) Ancillary equipment *:	
(i) Pump (100 litres per minute)	Hour (hr)
(ii) Mobile air compressor including hoses and tools (260cfm)	Hour (hr)
(iii) Generator 250kVA	Hour (hr)
(iv) Generator 7.5kVA	Hour (hr)

Item	Unit
(e) Locating Cable Fault*:	
	Hour (hr)

The tendered rate shall Include full compensation for procuring, furnishing, consumables, sundries, delivering and any other risks to ensure a functional working solution or where directed by the Engineer.

* **ITEMS MARKED HERE ARE SUBJECT TO A MINIMUM CHARGE OF 4 HOURS**

C3.2.7 REQUIREMENTS FOR PROVISION OF SECURITY

C3.2.7.1 SECURITY TO BE PROVIDED BY THE CONTRACTOR

The Tenderer shall provide Grade “C” security guards, to be used at the discretion of the Employer. The Grade “C” shall be strictly as defined by the Private Security Industry Regulatory Authority (PSIRA), and all guards shall be registered by PSIRA in full accordance to their regulations. Unregistered guards shall not be accepted under any circumstance.

The Contractor is to further note that these guards will **NOT** form part of the Contractor’s general security of his site, or plant. The Contractor’s own security must be priced for separately under the Preliminary and General items.

C3.2.7.2 MEASUREMENT AND PAYMENT

<u>Item</u>	<u>Unit</u>
C3.2.7.2.1 Provide Grade “C” security guards	Unit per Month

The unit of measurement shall be the number of security guards provided per month. Tenderer to note that 1 unit = 6 guards.

The rate shall include full compensation for the hiring of the guards, all necessary logistics and transport to deploy them on any location along the entire route, supervision and all other costs related to the provision of the guards. Areas to be guarded 24hrs/day.

Unit

Item

C3.2.7.2.2 Routine patrol vehicle
Lump sum a) Monthly running costs per month

The tendered rate shall allow for the monthly running costs to operate the routine patrol vehicle on a daily basis, including fuels, insurance, and all other costs.

Unit

Item

C3.2.7.2.3 Security Cages

- | | |
|---|-----|
| a) Security cage for mini-substation with existing palisade
(incl. support structure) | No. |
| b) Security cage for mini-substation without existing palisade
(incl. support structure and foundations) | No. |
| c) Security cage for 100kVA Transformer with existing palisade | No. |
| d) Security cage for 100kVA Transformer without existing palisade | No. |
| e) Security cage for Distribution Kiosk with existing palisade | No. |

The tendered rate shall allow for the supply, delivery, installation including bolts, foundations, support structures and any other costs to ensure a functional working solution.

Unit

Item

Lump sum

C3.2.7.2.4 Manning of base-station for alarms
per month

The tendered rate shall allow for the monthly costs for the Manning of base-station for alarms for the entire project including fuels, insurance, labour, vehicles, and all other costs to ensure a functional working solution. Tenderer shall price for all risks.

C3.2.8 TECHNICAL SPECIFICATIONS

C3.2.8.1 POWER AND CONTROL CABLES

The cable types to be used shall be as follows:

- 11, 6,6 or 3,3 kV grade (as applicable) general purpose paper insulated, lead covered, double steel tape armoured, jute served, with copper conductors in accordance with the latest edition of SABS 97.
- 11, 6,6 or 3,3 kV grade (as applies) general purpose, cross linked polyethylene covered, cross linked polyethylene insulated, with common screen and earth continuity conductor, steel tape or steel wire armoured and PVC sheathed with copper conductors.

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- MV cables shall be 60Q/1 000 V grade general purpose PVC insulated, PVC bedded, steel wire armoured and PVC sheathed, with copper conductors in accordance with the latest edition of SABS 150.
- Multi-pair general purpose, PVC covered, steel wire armoured, PVC sheathed, PVC insulated with multistrand copper conductor of 0,6 mm diameter shall be used for all ELV applications and a separate twisted pair shall be used for each device and common wires shall be linked only on the terminal strip at the control panel.
- 1,5 mm² Multicore Metaflex or copex with wires shall be used between junction boxes and limit switched.

The cabling installation shall comply with the following specification:

- Only cables with copper and aluminium conductors will be acceptable, unless otherwise indicated in the detailed specification.
- All cables shall be marked by means of suitable, permanently legible identification strips.
- Cables with one to seven cores shall be identified in accordance with the colour chart in BS 6346.
- Cables with more than seven cores shall also be identified in accordance with the colour code, but where a colour is repeated such cores shall, in addition to the colour, be identified with a clear black tracer.
- All motor cables not exceeding 4 mm² shall be 4 core. Three cores shall be used for power and the fourth core for earth.
- As an alternative to the above, 3 core cables with copper earth continuity strands in the armouring may be used provided that the appropriate terminating glands and earth connections are used at each end.
- Where motor cables exceed 4 mm² shall be 4 core. Three cores shall be used for power and the fourth core for earth.

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- As an alternative to the above, 3 core cables with copper earth continuity strands in the armouring may be used provided that the appropriate terminating glands and earth connections are used at each end.
- Where motor cables exceed 4mm², a separate bare copper wire not less than VA the cross sectional area of the cable shall be run from the motor earth terminal onto the nearest main earth conductor, within the range 10 -70sq/mm.
- Joints in cables are unacceptable except with the prior written approval of the Engineer.

Ratings

Cables which are not protected by fuses or circuit-breakers with instantaneous over-current protection, shall be rated for the maximum short circuit current and duration permitted by the protective device.

Cables shall be sized for a maximum voltage drop at equipment terminals, during full load operation, of 5% of the nominal system voltage. Interconnectors between switchboards shall be sized for a maximum voltage drop of 2Y₂ % of the nominal system voltage.

Motor feeder cables shall be sized for a maximum voltage drop during motor starting of 20% of the nominal system voltage.

Cables to rotor resistors, with intermittent duty shall be rated for half the maximum rotor current.

Cable Terminations

Types of cable terminations to be used shall be as follows:

- Terminations shall consist of a cable box where the three conductors are made up and taped. The box shall then be filled with a suitable insulating compound.
- Cable terminations shall consist of suitable mechanical gland and suitable kit for the encapsulation and taping of the cable end.
- All HV cable terminations must be carried out by experienced personnel in accordance with the instructions received from the cable manufacturer,
- PVC/PVC/SWA/PVC cables shall be terminated in armour grip type mechanical glands complete with neoprene shrouds.
- Terminations shall consist of a suitable mechanical gland complete with shroud.

The tails of all cables shall be of sufficient length to facilitate disconnecting and testing, and to allow any two tails of any cable to be interchanged (for phase reversal).

All copper conductors shall be terminated with suitable tinned and annealed copper crimp lugs and a hexagon type crimping tool and compatible lugs shall be used for all stranded conductors of 35 mm² and larger.

C3.2.8.2 CABLE TRENCHES, DUCTS, TUNNELS AND RACKS

General

All cabling shall be protected, as far as is practicable, by being run in tunnels, ducts, trenches or on cable racks. The use of conduit shall be avoided. All cables shall enter buildings below ground level. All trenching to include labour, transport and any other equipment or plant to perform the work in an acceptable manner.

Cable Trenches

Cables in main cable runs in excavated ground shall be buried at depths as prescribed but minimum depths shall not be less than 1500 mm for HV cables or 1500 mm for MV & LV cables.

Once trenching is completed, the bottom of each trench shall be cleaned of all stones, steel cuttings, bricks or any other sharp or large object with could damage the cable laid.

The cable shall be laid on top of a compacted layer of 50 mm (min) of sifted sand and then covered with a layer of at least 75 mm of sifted sand to be thoroughly compacted before being covered with reinforced concrete slabs (in areas as instructed by the Engineer) of 300 – 400 mm in width, 450 -1 000 mm in length and approx 50 mm in thickness. The reinforced concrete slabs shall

Backfilling shall be done in layers of 150 to 200 mm thoroughly cleaned of all large or sharp objects and each layer of soil properly compacted to at least 93%.

At approximately 300 mm below ground level a cable marking tape of yellow colour bearing warning signs and the inscription " DANGER - CABLE" shall be laid along entire length of the trench.

The trench routes shall be clearly designated with warning signs and/or cable route markers at each turning point and in any event not further than 25 m apart.

A 'turning point' is considered to be any point in the cable route which deviates from a straight line.

Cable Ducts

Cable ducts shall be of sufficient size to provide protection from mechanical damage and shall be self-draining into a waste water reticulation system.

Cable ducts in Substations, Control and Switch Rooms shall be covered with chequerplating suitably reinforced.

Cable ducts in all other locations shall be backfilled with sifted sand of a maximum particle size of 25 mm and covered with a minimum of 50 mm weak mix concrete screed, and the joint with the edge of the screed shall be ruled.

Where justified, cables shall be laid on side mounted trays in ducts 1 m wide by 1 m deep.

Cable Tunnels

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Where the number of cables used or circumstances justify the use of cable tunnels, these shall be designed for ample capacity.

Tray work shall be on one side only and shall not impede the walkway.

The floors of cable tunnels shall be designed with a gradient of 1:100 lengthwise to provide for natural drainage into a wastewater reticulation system.

Cable Racks

Cable racks and supporting brackets will be of substantial design and shall allow for a 25% spare width capacity.

Cable racks shall be installed vertically.

Cable trays and supporting brackets shall be made of galvanised steel or other noncorrosive material.

Where saline laden air or industrial fumes present a corrosion hazard, all racks, trays and supports shall be galvanised, painted and epoxy-coated.

Painting and epoxy coating shall only be carried out on cable racks, which are completely installed, but before actual cable installation.

Galvanised ladder type cable racking shall be used for supporting all cables of 50 mm², 3 core and larger and the cable shall be clamped by means of proprietary galvanised clamps designed for the racking.

Galvanised, perforated cable trays shall be used for supporting all cables of 35 mm² and smaller. The tray shall be securely fixed on stand-off supports and the cables be secured to the tray by means of 'Colsen' or equal strapping at approved intervals.

Grouping of cables and spacing shall be in accordance with the SABS Code of Practice for the Wiring of Premises (SABS 0142 - 1978) and not more than 3 cables may be secured by a single strap.

The inside radius of bends in cable trays measured from the centre of the axis of the bend shall not be less than 450 mm and in every case be suitable for the cable supported.

The racks shall be designed to withstand both the mass and the stresses imposed by the installation of the cables.

Special attention shall be paid to the clamping of heavy cables on vertical runs.

Cable trays shall be bolted in mild steel plates, welded to structural columns, or secured to concrete and brick walls by means of suitable fasteners.

Cable racks shall be of proprietary manufacture, factory made, ladder type, galvanised, sectional construction and clamped to steelwork by hook-bolts.

Power cables up to 16 mm² and control cables and racks may be run double banked. Cables above this size shall be run in single layers and clamped singly.

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Single cable runs shall not be clamped to structural steelwork. Suitable flat bars shall be welded to steelwork and cable shall be fixed by means of galvanised or approved plastic strapping.

Cable drop-cuts to equipment shall be provided with substantial angle iron supports.

PVC cables run overhead of outside shall be run so as to avoid direct sunlight as far as possible.

Cables shall enter at the bottom of all equipment, remote control switches, plugs, substations, light switches, motors, etc.

Care shall be exercised by the Contractor to ensure that cable tray or supports do not obstruct access to or the flow of light from a light fitting.

The strapping of all cables, including all cable saddle supports of cables, shall be done in a manner so that no 'sagging' occurs on a horizontal run after completed installation.

Although the clamping of cables to structural steelwork is not permissible, individual cables may be saddled directly onto existing concrete and steel structures in accordance with acceptable and approved practices. Cable saddles shall be approved by the Engineer and shall be fixed at not more than 1 000 mm intervals on vertical runs and not more than 50 mm intervals on horizontal runs.

C3.2.8.3 SCISSOR MAST SPECIFICATION

Scope

The lighting mast shall be the 20m SCISSOR type.

Construction

The masts shall be octagonal in cross section and tapering uniformly to the top. The masts shall be assembled on site by means of one taper swage

The lower half of the masts shall be divided into two fully enclosed half sections, which shall form an octagonal section in the operating position with no unsightly steps or protrusions.

The pivoting shall be located approximately at the mid-point of the (fulcrum) mast and shall consist of two full-length stainless steel sleeves and NOT of a shaft and hinge plates.

The pivoting half of the mast shall be securely bolted to the base plate by means of an adequately designed vandal proof securing system. A special socket type spanner shall be provided for this securing system.

A vandal-proof automatic locking device shall be incorporated, requiring special tools for unlatching.

A suitable ring framework for the mounting of 4 x 300W LED Floodlight fittings in a 360° symmetrical arrangement on top of the mast.

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The pivoting half of the mast shall permit the accurate balancing of the top load in such a manner that one person using a Nylon roper only can perform the lowering operation.

It shall not be necessary to use a winch or powertool to lower the pivoting section of the mast.

Changes in the top load of the mast shall be accommodated by changes in the counterweights at the base of the pivoting section of the mast.

A safety chain shall connect the pivoting half with the fixed half to prevent accidental lowering or damage to the trailing cable.

The fixed part shall have sufficient space to permit the mounting of electrical equipment such as Distribution board and a multi-pin socket.

Proof must be supplied that the manufacturer is ISO 9001:2008 accredited.

Design

The mast shall be designed to carry the specified quantity of luminaires on top in strict accordance with SANS 10225 1991-1 Code of Practice for the Design and Construction of Lighting Masts.

The following site factors shall be considered:

Design wind speed	=	40m/s
Category of terrain	=	3
Altitude of site	=	1350 m

The following design calculations shall be submitted:

- The mast in wind conditions
- The mast during lowering

Material and corrosion protection

All material used in the pivot construction shall be of AISI grade 316 stainless steel

Steel used in the construction of the mast shall have an ultimate tensile strength of between 460 and 680MPa and identical to SABS 1431 grade 355WA.

All parts of the masts shall be hot dip galvanized to ISO 1461 and SANS 121-2000-1 specifications and test certificates shall be provided if required.

All manufacturing will be compliant to SANS 10214-1987-1 specifications.

No drilling, machining or welding shall be performed on the masts after galvanizing.

Electrical connection to the luminaires

A flexible, heavy-duty 5-core trailing cable shall be provided. The trailing cable shall be firmly connected to the luminaire carriage. Suitable connectors of the CEE type or connectors meeting IP44 within DIN 40-050 shall be provided.

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A fully enclosed IP30 distribution board shall be provided for mounting on the inside of the mast, containing:

- 1 – 3 pole isolator (main switch) 3 – Single pole MCB's (lights)
- 1 – 5 pin CEE plug and coupler 1 – Adequately rated contactor
- 1 – Single pole MCB acting as by-pass switch 1 – Single pole MCB protecting the contactor 1 – Rated photocell

The modular photocell of the Waco type or similar shall be mounted 4m above ground level on the outside of the mast behind a vandal proof cover.

A splitterbox with a IP65 rating shall be mounted on top of the mast, fitted with a test socket of the CEE type with at least IP44 rating at the bottom of the box.

All circuit breakers and isolators shall have a rupturing capacity of 5kA and shall bear the mark of the S.A.B.S. and shall be accessible through cut outs in the cover without having to remove the cover.

All equipment shall be clearly marked with engraved labels. No stick-on embossed tape shall be used.

The distribution board shall be fully wired and ready for connection to the incoming supply cables.

Foundation

Each mast shall be supplied with foundation bolts and templates. The bolts shall be hot dip galvanised over their entire length in compliance with SANS (ISO 1461) 2000-1. Three galvanised nuts, two washers and one spring washer shall be supplied for each bolt. The number of foundation bolts shall be determined according to the design of 3.1 above. Calculations shall be submitted upon request.

A foundation plan, adequately designed for the conditions as per 3.1 of this specification, and based on a soil bearing capacity of 150kPa, giving details of the reinforcing required shall be submitted. Soil pressure and overturning safety factor shall be stated.

All reinforcing and foundation bolts shall have a minimum of 100mm concrete cover. The 28 days cube strength of the concrete shall be 25 MPa.

All foundations shall have a circular flat base from which a square plinth shall rise to above the surrounding ground level.

One or two PVC, Class B cable sleeves shall be provided from the centre of the top of the foundation plinth, through the concrete to a point below ground level on the side of the plinth.

After casting of the foundation, the slab shall be covered by earth, properly compacted. The area around the plinth shall be brought to the original level and shall be left neat and tidy.

Earthing of mast

Sectional Poles standard system consisting of 2 x 1.2m earth spikes, installed under foundation and connected to foundation bolts via 70mm² copper conductors with brass clamps.

C3.2.8.4 LED LUMINAIRES

4.1 General

4.1.1 All poles shall comply fully with the requirements of SANS 0225 and this specification.

4.1.2 The poles shall be suitable for use at a mean altitude of 1 800 m above sea level in an environment subject to heavy industrial pollution at ambient temperatures of -15°C to 65°C.

4.1.3 The poles will be installed in locations subject to high wind loading (as detailed in clause 4.2 below) and high lightning ground flash density (> 10 flashes/km²/year).

4.1.4 The poles shall be designed and approved and certified by an individual who is professionally registered with the Engineering Council as a structural engineer in accordance with SANS 0225 and manufactured from new materials.

4.2 Design

4.2.1 The steel tubes used shall comply fully with SANS 657-1.

4.2.2 The poles shall be manufactured of grade 300W steel, with a minimum yield stress of 300 MPa and a minimum tensile strength of 450 MPa, in accordance with SANS 657.

4.2.3 The poles shall be designed in accordance with SANS 0225 to support luminaires, the maximum number, mass and projected area of which are given in Annex A, as well as the loading detailed on Drawing CP_TSDRAW_004 Sheet 9 and in clause 4.4 of this specification.

4.2.4 In addition, the poles shall be designed to support advertising signboards and the additional cantilever loading that will be imposed on these masts. The boards measure approximately 1225 mm (H) × 900 mm (B) and are mounted approximately 3,0 m from ground level (measured to the lower edge of the board) in most areas. In exceptional circumstances, mainly in CBD areas, they may be mounted at a height of up to 4,0 m in order to avoid being damaged by road users.

4.2.5 The steel poles, when loaded as detailed above, shall be capable of withstanding a fluctuating wind load in accordance with the requirements of SANS 0225. The terrain category shall be Category 3, and the wind velocity shall be 40ms⁻¹. Other information required (including force coefficients C_f) is given in Annex A.

4.2.6 Under the conditions detailed in SANS 0225 and those given above, the horizontal and vertical deflections shall not exceed the requirements of SANS 0225.

4.2.7 The design for all earth mount poles shall include sub-surface fins, the purpose of which is to prevent the pole from rotating about its own axis as a result of wind loading exceeding the soil bearing pressure. The size of the fins shall be determined by the structural engineer, taking into account terrain category, wind velocity, outreach, pole and attachment areas, projected luminaire

areas, force coefficients and other relevant data.

4.2.8 Poles may be of any hollow cross section and vertical profile meeting the requirements of this specification and SANS 0225, but Gauteng Department of Roads and Transport may, at its sole discretion, reject any tender which it considers unsuitable for any reason.

4.2.9 Poles must have a minimum outside diameter (at the ground line) as detailed in Annex A. Designs using smaller diameters will not be considered under any circumstances.

4.2.10 The design of each pole shall be accompanied by comprehensive strength calculations certified by a qualified professional structural engineer. As this structural engineer will take full responsibility for the design of the masts, he or she is free to deviate from the drawings for structural reasons. For instance, the structural engineer may feel that the strength of a particular pole is inadequate, and he or she is therefore at liberty to increase the pole thickness or diameter, etc. These changes must be detailed in the strength calculations as well as in the Deviation Schedules, found in the A and B Schedules.

4.3 Construction

4.3.1 All poles shall be supplied as a unitary construction (i.e. in one piece).

4.3.2 All changes in diameter shall be by means of swaging or continuous tapering. Under no circumstances will welded pieces (pipe reducers) inserted into the poles be accepted.

4.3.3 All joints shall be bevelled prior to welding and shall present a symmetrical appearance after welding. In addition, all joints (other than those designed for later assembly) shall be designed and manufactured to ensure that there is no ingress of water into the interior of the pole.

4.3.4 All poles require a sacrificial steel corrosion protection sleeve. These sleeves shall be at least 3mm thick and conform to Drawing CP_TSDRAW_004 Sheet 8. The sleeve shall be welded to the pole prior to galvanising with a continuous seal weld at the top and bottom of the sleeve. The second weld shall be carried out immediately after, or simultaneously with, the first weld.

4.3.5 All poles shall have an M10 nut welded to the pole at a height of 1,5 m from the top of the poles. This is to provide a point for earthing the pole when it is carrying overhead conductors or ABC. The corresponding full-thread M10 bolt shall be supplied fitted into the nut. The arrangement shall be such that the full length of the bolt is able to enter the nut.

4.3.6 All earth mount poles shall have a 60 × 6 mm anti-sink flat bar (with a minimum thickness of 3,5mm) roughly shaped to the inside base diameter, welded symmetrically across the base opening, with the flat surface at 90° to the pole axis.

4.3.7 All earth mount poles shall have fins in accordance with clause 4.2.7 welded to the pole below ground level (at 90° to the cable entries) to avoid the pole rotating about its own axis as a result of the wind loading exceeding the bearing pressure of the soil. As a rough guide, the size of the fins should not be less than 450 × 125 × 6 mm.

4.3.8 All welding shall be continuous and in compliance with SANS 044, Parts 1 to 4. All welds shall be dressed where necessary.

4.3.9 After manufacturing is complete, but before galvanising may commence, poles shall have all weld slag removed by shot- or sand-blasting and a visual inspection shall be carried out to ensure the efficiency of this operation. In addition, the poles shall be internally and externally degreased and all grit, loose rust, welding flux and spatter, rough edges and burrs shall be removed.

4.3.10 All poles shall be hot-dip galvanised in accordance with SANS ISO 1461. The minimum thickness of the zinc layer shall be 90 µm. The process used shall comply completely with the requirements of SANS ISO 1461.

4.3.11 No material may be removed from the pole either mechanically or chemically after galvanizing has been carried out.

4.3.12 All items shall be protected against corrosion by either hot-dip galvanising as detailed above or by being manufactured of stainless steel. All possibility of galvanic action shall be avoided.

4.3.13 All threaded articles shall use standard metric threads. External threads may not be undercut.

4.4 Specific requirements

4.4.1 Dis series masts

4.4.1.1 The Dis series masts shall be manufactured in such a way that the top is completely closed and permanently sealed.

4.4.1.2 In addition to the requirements of SANS 0225 and this document, the Dis series masts shall be designed to carry the items and loadings

4.4.1.3 In addition to the above, the poles are expected to carry low voltage aerial bundled conductor (ABC) in accordance with SANS 1418 or low voltage hard drawn bare copper (HDBC) conductor in accordance with SANS 182-1. Tenderers are required to consult these documents for accurate information concerning the characteristics of the conductors, as the information given below is for information only.

4.4.1.4 The ABC will be in following configuration: 3 × 120 mm² phase conductors, 1 × 70 mm² neutral supporting conductor and 1 × 25 mm² auxiliary conductor. The approximate mass per metre of the bundle is 1,51 kg and the design load (UTS /2,5) is approximately 8,0 kN.

4.4.1.5 The HDBC conductor will be in the following configuration: 3 × 120 mm² phase conductors, 1 × 120 mm² neutral conductor and 1 × 16 mm² auxiliary conductor. The approximate mass per metre per conductor is 1,04 kg and the design load (UTS /2,5) is approximately 20,0 kN.

4.4.1.6 In addition to 4.4.1.2 to 4.4.1.5 above, the Dis series masts shall be designed and manufactured to carry an additional radial tip loading of 6,0 kN in any direction.

4.4.2 Stay pedestals

4.4.2.1 The stay pedestals shall be manufactured in such a way that the top is completely closed and permanently sealed.

4.4.2.2 In addition to the requirements of SANS 0225 and this document, the stay pedestals shall be designed to stay poles carrying the items and loadings

4.4.2.3 The stay pedestals shall have a diameter of not less than 190 mm and a length of 4,3 m. The thickness shall be in accordance with the loading but 6,0 mm is preferred.

4.4.2.4 The stay pedestals shall have a suitable facility near the top to attach one end of a stay wire, the other end being attached to a pole.

4.5 Inspection and testing

4.5.1 In addition to the requirements listed below, all poles shall comply with the test requirements of SANS 0225.

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4.5.2 Gauteng Department of Roads and Transport reserves the right to inspect the manufacture's place of production.

4.5.3 All tests shall be done in accordance with SANS 0198, SANS 0225 and SANS ISO 1461.

4.5.4 The authority may also require the welding on 10% of the poles to be radio-graphed and evaluated. The maximum width of any isolated slag inclusion shall not exceed 3 mm, and the total length of isolated slag inclusions in any continuous length of weld shall not exceed 4% of the length of that weld. In addition, no more than four isolated slag inclusions of a maximum width of 3 mm in this length shall be permitted.

4.5.5 In addition to the above, no cracks shall be permitted, and penetration, lack of fusion, undercutting and porosity shall receive attention.

4.5.6 In the event of poles failing to perform on site (Gauteng Department of Roads and Transport) the entire consignment of poles shall be replaced at the tenderer's expense.

4.6 Packing and marking

4.6.1 A metal name plate, at least 80 × 40 mm in size and using letters at least 10 mm high, shall be permanently fixed 2,0 m from the top of each pole. The name plate shall preferably use raised coloured lettering, although other permanent and robust lettering will be considered, provided full details are supplied.

4.6.2 The name plate and method of fixing shall have a service life at least equal to that of the pole, and shall remain in place and legible even if the pole suffers serious structural damage of any sort.

4.6.3 The name plate shall include the following information: manufacturer's name, month and year of manufacture, and the user reference number as detailed in Annex A.

4.6.4 All poles shall be weld marked with the user reference 1,0 m above the ground line. The weld mark, which shall be carried out before galvanising preparation, shall consist of a neat raised weld run on the exterior of the pole, with letters approximately 100 mm high.

4.6.5 Masts shall be bundled with stainless steel strapping for delivery.

4.6.6 Gauteng Department of Roads and Transport shall off-load, at its own cost, any poles delivered to any Gauteng Department of Roads and Transport store. Any items delivered elsewhere shall be off-loaded at the contractor's own cost, and Gauteng Department of Roads and Transport shall not assist in any way whatsoever.

4.7 Drawings and documentation

4.7.1. If there are discrepancies between this written specification and the drawings, the written specification shall take precedence.

4.7.2 The design of each pole shall be accompanied by comprehensive strength calculations certified by a qualified professional structural engineer. In addition, detailed drawings and documentation as required as per SANS 0225.

5 QUALITY MANAGEMENT

A quality management plan shall be set up in order to assure the proper quality management of the steel distribution poles during design, development, production, installation and servicing phases. Guidance

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on the requirements for a quality management plan may be found in the ISO 9001:2015. The details shall be subject to agreement between Gauteng Department of Roads and Transport and the Supplier.

6 HEALTH AND SAFETY MANAGEMENT

A health and safety plan shall be set up in order to ensure proper management and compliance of the steel distribution poles during installation, operation, maintenance, and decommissioning phases. Guidance on the requirements of a health and safety plan may be found in OHSAS 18001:2007 standards. This is to ensure that the asset conforms to standard operating procedures and Gauteng Department of Roads and Transport and SHERQ Policy. The details shall be subject to agreement between Gauteng Department of Roads and Transport and

the Supplier.

7 ENVIRONMENTAL MANAGEMENT

An environmental management plan shall be set up in order to assure the proper environmental management of the steel distribution poles throughout its entire life cycle (i.e. during design, development, production, installation, operation and maintenance, decommissioning and disposal phases). Guidance on the requirements for an environmental management system may be found in ISO 14001:2015 standards. The details shall be subject to agreement between Gauteng Department of Roads and Transport and the Supplier. This is to ensure that the asset created conforms to environmental standards and Gauteng Department of Roads and Transport and SHERQ Policy.

Annex A – Mast requirements table

Description	User Reference	Overall Height	Mounting Height	Mounting Type	Minimum Outside Diameter	Maximum mass per luminaire	Maximum projected area of luminaire	Maximum number of luminaires per pole	Cf	Drawing
Plain Mast	Dis1	9,2 m	8 m	1,2 m earth	140 mm	25 kg	0,225 m ²	1	1,5	32659.9
Plain Mast	Dis3	10,7 m	9,5 m	1,2 m earth	165 mm	25kg	0,225 m ²	1	1,5	32659.9
Stay Pedestal	-	4,3 m	-	Direct burial	190 mm	-	-	-	-	32659.9



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Annex C - Technical schedules A and B For Plain Mast Dis1

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause	Description	Schedule A	Schedule B
1		Name of manufacturer	XXXX	
2		Place of manufacture	XXXX	
3		Manufacturer's identification reference	Dis1	
4	4.1.1	Standard to which mast complies	SANS 0225	
5	4.1.1	Does the design of the mast comply with all the requirements of SABS 0225 and this specification?	Yes	
6	4.1.4	Is the mast design approved and certified by a qualified professional structural engineer?	Yes	
7	4.2.1	Standard to which steel tubes comply	SANS 657-1	
8	4.2.2	Material of mast	Grade 300W steel	
9	4.2.10	Is the mast design accompanied by comprehensive strength calculations?	Yes	
10	4.3.8	Standard to which welding complies	SANS 044	
11	4.3.10	Standard to which galvanising complies	SANS ISO 1461	
12		Mass of mast kg	XXXX	
13	4.6	Is the mast marked in accordance with the requirements of 4.6?	Yes	
14	4.7.2	Is all the information requested in 4.7.2 supplied?	Yes	
15		Calculated natural frequency of mast Hz	XXXX	
16		Expected service life of mast years	30 (min)	

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____



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REPUBLIC OF SOUTH AFRICA

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Technical schedules A and B For Plain Mast Dis1

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified		
Item	Clause	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____



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Technical schedules A and B For Plain Mast Dis3

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause	Description	Schedule A	Schedule B
1		Name of manufacturer	XXXX	
2		Place of manufacture	XXXX	
3		Manufacturer's identification reference	Dis1	
4	4.1.1	Standard to which mast complies	SANS 0225	
5	4.1.1	Does the design of the mast comply with all the requirements of SABS 0225 and this specification?	Yes	
6	4.1.4	Is the mast design approved and certified by a qualified professional structural engineer?	Yes	
7	4.2.1	Standard to which steel tubes comply	SANS 657-1	
8	4.2.2	Material of mast	Grade 300W steel	
9	4.2.10	Is the mast design accompanied by comprehensive strength calculations?	Yes	
10	4.3.8	Standard to which welding complies	SANS 044	
11	4.3.10	Standard to which galvanising complies	SANS ISO 1461	
12		Mass of mast kg	XXXX	
13	4.6	Is the mast marked in accordance with the requirements of 4.6?	Yes	
14	4.7.2	Is all the information requested in 4.7.2 supplied?	Yes	
15		Calculated natural frequency of mast Hz	XXXX	
16		Expected service life of mast years	30 (min)	

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____



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Technical schedules A and B For Plain Mast Dis3

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified		
Item	Clause	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____



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Technical schedules A and B For Stay Pedestal

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause	Description	Schedule A	Schedule B
1		Name of manufacturer	XXXX	
2		Place of manufacture	XXXX	
3		Manufacturer's identification reference	Dis1	
4	4.1.1	Standard to which mast complies	SANS 0225	
5	4.1.1	Does the design of the mast comply with all the requirements of SABS 0225 and this specification? Yes/No	Yes	
6	4.1.4	Is the mast design approved and certified by a qualified professional structural engineer? Yes/No	Yes	
7	4.2.1	Standard to which steel tubes comply	SANS 657-1	
8	4.2.2	Material of mast	Grade 300W steel	
9	4.2.10	Is the mast design accompanied by comprehensive strength calculations? Yes/No	Yes	
10	4.3.8	Standard to which welding complies	SANS 044	
11	4.3.10	Standard to which galvanising complies	SANS ISO 1461	
12		Mass of mast kg	XXXX	
13	4.6	Is the mast marked in accordance with the requirements of 4.6? Yes/No	Yes	
14	4.7.2	Is all the information requested in 4.7.2 supplied? Yes/No	Yes	
15		Calculated natural frequency of mast Hz	XXXX	
16		Expected service life of mast years	30 (min)	

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____



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Technical schedules A and B For Stay Pedestal

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified		
Item	Clause	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

C3.2.8.5 LED LUMINAIRES

Scope

This specification covers the requirements for manufacturing, testing, supply, and delivery of light emitting diode (LED) street light luminaires.

General requirements

Compliance to the below mentioned requirements shall be judged by documented evidence. Any document/test report presented shall be specific to the luminaire in question or the full luminaire product family.

All test reports/measurements and statements must be traceable to international measurements standards.

The luminaire must be designed in South Africa by a suitably accredited ISO9001 company.

The luminaire must be designed, manufactured, and assembled by a suitably accredited South African company.

The luminaire shall be supplied completely assembled as a single unit with housing, driver, LED module, and diffuser without the need for any site assembly.

Operating conditions

The luminaire shall be designed to operate in the following conditions without any impact on performance and life time

Climate	South African Inland and Coastal climate
Altitude	From MSL to 1600m
Ambient temperature	From -5°C to +35°C
Maximum relative humidity	98%
Mean annual value of solar radiation	1.0 kW/m ²
Average total annual rainfall	1000 mm
Pollution	Heavy atmospheric pollution levels
Lightning ground flash density	up to 5 flashes/km ² /year
System phase voltage	198V to 254Vac
System frequency	50Hz
System neutral earthing	Solidly

Table 1: Operating Condition

Construction requirements

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The luminaire shall be of a durable and robust design and construction.

The luminaire shall be made from high pressure die cast LM6 marine grade aluminium and shall be available with and without epoxy powder coating.

The luminaire shall be a fully enclosed type and designated a Class 1 as per SANS 60598-1.

The LED module and luminaire control gear chambers shall be sealed to IP66 rating.

The luminaire must allow sufficient space for repairs, replacements and general maintenance of components while the luminaire is fixed on the pole.

Auxiliary components to the luminaire such as clips, screws, nuts, bolts, and washers must be manufactured from stainless steel grade 304 or better.

The luminaire shall withstand wind speeds up to 150 km/h on the largest projected area.

Power requirements

The luminaire must operate within the range of 198 – 254Vac supply at 50Hz frequency.

The luminaire must operate at a power factor of 0.95 or higher.

The luminaire shall at minimum achieve 50% energy saving when compared to the HID luminaire they are designed to replace.

The luminaire shall at maximum be rated at 177W and 107W.

The LED modules must be powered through a constant current driver with a life time of 100 000 hours or more.

The luminaire driver must be designed to operate up to the rated life time between the above-mentioned atmospheric conditions.

The luminaire driver shall have a minimum power factor of 0.95 at full load.

The luminaire driver shall have a minimum power factor of 0.95 while operating below full load.

The luminaire driver must be rated to withstand electrical surges of up to 10kV.

The luminaire must incorporate a separate surge protection device of up to 10kV / 10kA in addition to the surge protection offered by the driver.

The dedicated surge protection device must be mounted internally to the luminaire and must be easily replaceable for maintenance purposes.

The control gear of the luminaire shall be assembled internally, in a separate chamber to the LED modules.

The luminaire design should allow the ease of maintenance and replacement onsite of the control gear through the use of a gear tray.

All internal interconnecting wiring must be ETFE insulated solid core copper wire compliant to EN 60228 (VDE 0295):2005-09 and VDE 0207 part 6:2004-10.

The luminaire shall be earthed in accordance to clause 13 of the Electrical Machinery Regulations of the OSH Act (Act 85 of 1993).

The earthing of the luminaire shall comply with sub clause 7.2 of IEC 60598 – 1. All parts of an earth terminal shall be made of brass or other corrosion resistant metal and the contact surface shall be bare metal and not be painted or varnished surfaces.

Metal parts of luminaires which may become alive in the event of an insulation fault and which are not accessible when the luminaire is mounted but liable to come into contact with the supporting surface shall be permanently and reliably connected to an earthing terminal.

Luminaire with detachable parts provided with connectors and similar connection devices, the earth connection shall be made before the current-carrying contacts are made and the current-carrying contacts shall separate before the earth connection is broken.

All earth connections shall be fixed by means of suitable lugs appropriately made to avoid all possibility of electrolytic corrosion.

An earth connection shall be provided in all instances, even if the luminaire is fully insulated and even if all conductive parts, which could become alive in the event of insulation fault, are not accessible.

Protection against electric shock shall be provided for all methods and positions of installation in normal use. Protection shall also be maintained after removal of all parts which can be removed by hand, except those parts of lamp holders specified in SANS/ IEC 60598 – 1.

The internal wiring of the luminaire shall be flexible and suitably insulated to withstand the voltage and maximum temperature to which is subjected to in service. Wiring shall comply with the requirements stipulated in SANS/ IEC 60598-1.

Wiring to the LED module shall be suitably sealed to prevent ingress of insects into the LED module compartment.

Thermal requirements

The LED luminaire must dissipate all the heat generated by passive means.

No active cooling devices may be incorporated into the luminaire.

The thermal design must ensure that all internal components are always within the permissible operating temperature range of the component.

The LED modules must incorporate active temperature measurement of the LED modules and action must be taken to regulate the module power to prevent overheating.

The LED driver must incorporate overtemperature protection measures to ensure maximum lifetime of the component.

Light source requirements

The LED manufacturer must supply test reports in accordance with LM80 – 15.

The LED lumen depreciation data may be extrapolated in accordance with TM-21-11.

The LED modules must conform to the latest ZHAGA consortium Book 15 specifications.

The secondary optics shall be compatible with LED modules designed according to the latest ZHAGA consortium Book 15 specifications.

The luminaire must have a minimum effective lumen output of 23950lm @ a maximum wattage of 177W and 13250lm @ a maximum wattage of 107W.

The LED module must have a minimum efficacy of 170 lm/W.

The luminaire must have a minimum effective system efficacy of 125 lm/W.

The LED modules must have a lumen flux depreciation factor of 90%.

The LED modules must have a maximum chip mortality factor of 10%.

The LED LxxBxx rating must be specified at the rated operating ambient temperature with a rated life time of at least 100 000 hours.

The LED rating must be L90B10 @ 100 000-hour 25°C.

The colour rendering index (CRI) of the LED modules shall be of a minimum value of 70.

The correlated colour temperature (CCT) of the LED modules shall be 4000 K.

The LED module must have a Standard Deviation Colour Matching (SDCM) rating of 4 or less.

The secondary optics used shall be manufactured from high quality optical grade PMMA “Plexiglass” or Silicone or polycarbonate.

The secondary optics shall be mechanically secured through the LED module to the main luminaire housing via a suitable machine screw manufactured from 304 grade stainless steel or higher.

The secondary optics shall be protected by a tempered glass diffuser with a minimum thickness of 4mm.

The tempered glass diffuser must be mechanically secured to the main luminaire housing ensuring IP66 rated protection.

The tempered glass diffuser must be bearing a minimum impact protection rating of IK08.

Street light luminaire specific requirements

The street light luminaire must be tested and be in compliance with the latest revision of IEC/SANS 60598-1.

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The street light luminaire must be tested and be in compliance with the latest revision of IEC/SANS 60598-2-3.

The street light luminaire must be able to accommodate a NEMA (ANSI) 3, 5, and 7 pin node receptacles without compromising on the IP rating of the full luminaire.

The street light luminaire control gear compartment shall be able to accommodate the fitment of a standard 6A single pole DIN rail circuit breaker whilst retaining IP66 rating

The street light luminaire shall allow for the side entry of a 42 mm diameter pole with an entry length of 125 mm.

Photometric requirements

The design simulations shall be submitted based on ARP035 and SANS 10098-1. The maintenance factor used on the simulation shall be 0.9.

The luminaire offered shall comply to SANS 10098-1 A2 road classification.

Actual design data and results and luminaire photometric data shall be supplied in an electronic form.

Luminaire data files supplied must be in IES and/or LDT format, suitable for use with any commercially available lighting design software such as Dialux and Relux.

Testing requirements

The supplier must provide a test report to prove the luminaire is compliant to IEC / SANS 60598-1

The supplier must provide a test report to prove the street light luminaire is compliant to IEC / SANS 60598-2-3.

The supplier must provide a test report to prove the luminaire is compliant to SANS 475.

All submitted test reports must be issued by SABS or a test authority accredited by SANAS, no test reports issued by international testing bodies may be accepted.

Marking and Packaging

Each luminaire shall be marked using a method that complies with IEC / SANS 60598-1.

Each luminaire shall be individually packed in a sturdy cardboard box in order to prevent damage during handling, transportation and storage. The cartons shall be clearly marked with the appropriate identification codes of the luminaire contained therein.

Each luminaire shall be marked, by means of a suitable sticker with the rated wattage of the luminaire

Bulkhead General Technical Specification

Item Description	Metric
Typical applications	Industrial application Passage lighting
Light source	LED
Colour temperature	3000K 4000K 5000K
Operating temperature range	-30°C to 55°C
Design life	50 000 hours
Typical lumen maintenance	L80 @ 50 000 hours
IP Rating	IP 66
Luminaire housing	High-pressure die-cast LM6 aluminium
Fasteners	304 Grade stainless steel 316 Grade stainless steel
Diffuser	Injection moulded high-impact acrylic diffuser with internal prisms
Weight	4.5kg
Power supply	220V to 240V AC 50/60 Hz
Power factor	0.98
Insulation classification	Class 1
Compliance standard	SANS 60598-2-1 39
Warranty	5 year warranty

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Highbay

Item Description	Metric
Typical applications	Workshop
Light source	High powered LED Modules
Colour temperature	4000K 5700K
Operating temperature range	-30°C to 55°C
Relative humidity	5% to 95%
Design life	50 000 hours
Typical lumen maintenance	L70 @ 50 000 hours
IP Rating	IP 65
Luminaire housing	High-pressure die-cast LM6 aluminium
Fasteners	304 Grade stainless steel 316 Grade stainless steel
Diffuser	Clear tempered glass diffuser
Weight	4.5kg
Mounting Options	Strain cable or chain suspended
Power supply	220V to 240V AC 50/60 Hz
Power factor	0.98
Insulation classification	Class 1
Compliance standard	IEC 60598-2-1
Warranty	5 year warranty

C3.2.8.6 TECHNICAL SPECIFICATION FOR LED LUMINAIRE WITH TRACKING

Category	Relevant Standards/Regulations	Description
ICASA Compliance	ICASA Type Approval	Ensures compliance with radio frequency spectrum and telecommunications equipment regulations.
Electromagnetic Compatibility (EMC)	SANS 214-1/IEC 61000	Prevents interference with other electronic equipment.
Battery and Power	SANS 62281	Ensures safety of lithium-ion and other rechargeable batteries.
Environmental Compliance	SANS 60529/IEC 60529 (IP Ratings), SANS 14001	Ensures resistance to dust and water, and adherence to environmental management standards.
Health and Safety	ICNIRP Standards, SANS 62209-1	Ensures RF emissions comply with health and safety guidelines, including SAR limits.
Electronic Waste	National Environmental Management: Waste Act, 2008	Regulates disposal and recycling of electronic components.
Consumer Protection	Consumer Protection Act (CPA)	Ensures quality, safety, and proper labeling of products sold.
Customs and Imports	SARS Customs Regulations	Ensures proper declaration and compliance for imported devices.
IoT and Telecommunications	Electronic Communications Act (ECA), POPIA	Regulates data communication and protection of personal information.
Industry-Specific Standards	SANS 1517 (Mining), SANS 10142 (Electrical Installations)	Applies additional standards for specific industries such as mining and transportation.
Security Applications	PSIRA Compliance	Ensures devices used in security adhere to private security regulations.

1. Technical Specifications
1.1. GPS Module
1.1.1. The device must include a high-sensitivity GNSS receiver.
1.1.2. The GPS receiver must support multiple GNSS (Global Navigation Satellite Systems), and include GPS and GLONASS.



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1.1.3. The GPS module should provide location accuracy of up to 5 meters under open sky conditions.
1.1.4. The GPS data should be updated at configurable intervals of between five and twenty minutes.

1.2. Battery
1.2.1. The device must be equipped with a battery, 5 year life
1.2.2. The battery capacity should be sufficient to support continuous operation for a minimum of 5 years, with the ability to report its location periodically for at least once a day over the 5 years.
1.2.3. The device should include a battery status monitoring system.
1.3. Communication
1.3.1. The device should support the wireless communication protocol LP-WAN for data transmission. The device must be non-jammable.
1.3.2. The device must support data encryption to ensure secure transmission of location data.

1.4. Hardware
1.4.1. The device casing should be made of durable, impact-resistant material.
1.4.2. The device should be IP67 rated for dust and water resistance.
1.4.3. The device should include mounting hardware for easy attachment to the LED lights.
1.4.4. The device must be able to detect tampering and provide an alert.
1.4.5. Antenna must be internal to the luminaire housing with no external antenna protruding from the luminaire body.

1.5. Software
1.5.1. The device must be accompanied by a user-friendly mobile application for commissioning and configuration as well as software for monitoring.
1.5.2. The software should support both desktop and mobile platforms.
1.5.3. The software should provide features such as real-time tracking, geofencing, and historical route playback.
1.5.4. The software should support multiple devices and provide device management capabilities.
1.5.5. The software should support user access with multiple roles for example device admin, account admin, device viewer.
1.5.6. Support geo-fence management.

1.6. Integration Capabilities:
1.6.1. Full API support for integration with existing systems.
1.6.2. Compatibility with maintenance scheduling tools and automated workflows
1.7. Power Management
1.7.1. The device should include power-saving modes to extend battery life.
1.7.2. The device should automatically switch to power-saving mode when stationary for prolonged periods.

2. Environmental Conditions
2.1. The device must operate within a temperature range of -20°C to 80°C.
2.2. The device must withstand humidity levels of up to 95% non-condensing.
2.3. The device should be resistant to shock and vibration.

3. Certifications and Compliance
3.1. The device must be certified for use in South Africa. (As per point 1.5)
3.2. The device must comply with local regulations for wireless communication and GPS tracking devices.

4. Warranty and Support
4.1. The device must come with a minimum one-year warranty.
4.2. The supplier must provide technical support and after-sales service and be the OEM.
4.3. The design, manufacturing, assembly, support and technical support personnel must be from a South African owned company and must be based in South Africa.
4.4. The supplier must provide firmware and software updates as necessary. The firmware updates should be OTA (Over-the-Air).
5. Documentation
5.1. The device must be supplied with comprehensive user manuals and installation guides.
5.2. The supplier should provide a detailed datasheet with technical specifications.
5.3. NOTE: The device must be installed and activated within a 3 month period from date of supply to ensure maximal battery efficiency.

C3.3 ENVIRONMENTAL MANAGEMENT PLAN

• C3.3.1 SCOPE

The Employer recognises environmental management as a key component of road infrastructure development and as part of its environmental policy has developed this Environmental Management Plan (EMP) as a tool for continual improvement in environmental performance.

This EMP prescribes the methods by which proper environmental controls are to be implemented by the contractor. The duration over which the contractor's controls shall be in place cover the construction period of the project as well as the limited time after contract completion defined by the Conditions of Contract as the defects notification period (maintenance period).

The provisions of this EMP are binding on the contractor during the life of the contract. They are to be read in conjunction with all the documents that comprise the suite of documents for this contract, particularly the conditions of any environmental authorisation and associated Environmental Management Programme (EMPr). In the event that any conflict occurs between

the terms of the EMP and the project specifications or environmental authorisation, the terms herein shall be subordinate.

The EMP is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specifications. Any changes to the EMP and/or environmental authorisation cannot occur without being submitted to the Employer who will manage the process of seeking approval of the change from the relevant authority .

The EMP identifies the following:

- (a) relevant parties and their responsibilities;
- (b) construction activities that will impact on the environment.;
- (c) specifications with which the contractor shall comply in order to protect the environment from the identified impacts; and
- (d) actions that shall be taken in the event of non-compliance.

• **C3.3.2 DEFINITIONS**

C3.3.2.1 Alien Vegetation: undesirable plant growth which shall include, but is not limited to, all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA), 1983 Regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable.

C3.3.2.2 Construction Activity: any action taken by the contractor, his subcontractors, suppliers or personnel during the construction process as defined in the contract documents.

C3.3.2.3 Environment: the surroundings within which the contract exists and comprises land, water, atmosphere, micro-organisms, plant and animal life (including humans) in any part or combination thereof as well as any physical, chemical, aesthetic or cultural inter-relationship among and between them.

C3.3.2.4 Environmental Aspect: any component of a contractor's construction activity that is likely to interact with the environment.

C3.3.2.5 Environmental authorisation: a written statement from the National Department of Environmental Affairs (DEA), with the general and specific conditions and the EMP recording its approval of an application for a planned undertaking that triggers listed activities in the Environmental Impact Assessment (EIA) regulations of the National Environmental Management Act (NEMA).

C3.3.2.6 Environmental Impact: any change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

C3.3.2.7 Road Reserve: a corridor of land, defined by co-ordinates and/or proclamation, within which the road, including access intersections or interchanges, is situated. A road reserve may, or may not, be bounded by a fence.

C3.3.2.8 Site: defined in the Conditions of Contract and in the scope of work. It is bound by the limits of construction as shown in the drawings or the title of the project and extends to also include the following:

- areas outside the construction zones where accommodation of traffic is placed;

- all borrow pits defined in the applications approved by the relevant Department of Mineral Resources (DMR);
- all haul roads constructed by the contractor for purposes of access;
- any non-adjacent sites specified in the contract documentation;
- the contractor's and his subcontractors' camp sites; and
- for the purposes of this EMP includes areas outside of, but adjacent to, the road reserve that may be affected by construction activities.

C3.3.2.9 Spoil material: material unsuitable for construction of the road pavement and for which no other useful purpose can be found in appurtenant works on the project (e.g. for the provision of protection berms). Such material is considered as waste material that requires spoiling at convenient areas to be identified by the engineer and/or contractor within the Site. Spoil material does not require removal to a designated landfill site unless it contains identifiable hazardous contaminants.

• C3.3.3 LEGAL REQUIREMENTS

C3.3.3.1 General

Construction shall be according to the best industry practices, as identified in the project documents. This EMP, which forms an integral part of the contract documents, informs the contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The contractor should note that obligations imposed by the EMP are legally binding in terms of this contract. In the event that any rights and obligations contained in this EMP contradict those specified in the standard or project specifications then the latter shall prevail.

C3.3.3.2 Statutory and other applicable legislation

The contractor is deemed to have made himself conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract.

Major environmental legislation, as amended from time to time, includes but is not limited to the following:

- (i) Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983)

This act provides for control over the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of soil, water sources and vegetation, as well as combating weeds and invader plants.

- (ii) Constitution of the Republic of South Africa, 1996 (Act No 108 of 1996)

The Constitution states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected through reasonable legislative and other measures to prevent pollution and ecological degradation; promote conservation and ensure ecologically sustainable development and use of natural resources.

(iii) Mineral and Petroleum Resources Development Act, 2002 (Act No 28 of 2002)

This act makes provision for equitable access to, and sustainable development of, minerals and petroleum resources.

(iv) National Environmental Management Act (NEMA), 1998 (Act No 107 of 1998)

This act supports the Bill of Rights within the Constitution and highlights principles of sustainable development including preservation of ecosystems and biological diversity and avoidance, minimisation and remediation of pollution and environmental degradation. It also sets the stage for the EIA Regulations.

(v) National Environmental Management: Air Quality Act, 2004 (Act No 39 of 2004)

This act provides reasonable measures for the prevention of pollution and ecological degradation; and provides for specific air quality measures; for national norms and standards regulating air quality monitoring, management and control by all spheres of government.

(vi) National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004)

This act makes provisions to accomplish the objectives of the United Nations' Convention on Biological Diversity. The Employer may be required to apply for permits to conduct certain listed activities which, together with the listed threatened or protected species, may be identified by the Minister.

Section 73 (3) of this act empowers a competent authority to direct a person to take steps to remedy any harm to biodiversity resulting from the actions of that person or as a result of occurrence of listed invasive species occurring on land on which that person is the owner. Thus the Employer may be directed to remedy harm caused by listed invasive species.

(vii) National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003)

This act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes.

(viii) National Environmental Management: Waste Act, 2008 (Act No 59 of 2008)

This act aims to regulate waste management practices through provision of national norms and standards, specific waste measures, licensing and control of waste activities, remediation of contaminated land as well as providing for compliance and law enforcement.

(ix) National Forests Act, 1998 (Act No 84 of 1998)

This act makes provision for promoting the sustainable management and development of forests, and for the protection of certain forests and trees for environmental, economic, educational, recreational, cultural, health and spiritual purposes.

(x) National Heritage Resources Act, 1999 (Act No 25 of 1999)

This act provides for an integrated and interactive system for identification, assessment and management of South Africa's heritage resources, and empowers civil society to nurture and conserve their heritage resources.

(xi) National Water Act, 1998 (Act No 36 of 1998)

This act makes provision for the protection of surface water and groundwater and their sustainable management for the prevention and remediation of the effects of pollution, as well as for the management of emergency situations.

• **C3.3.4 ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS**

Copies of this EMP shall be kept at the site office and must be distributed to all senior contract personnel who shall familiarise themselves with its contents.

Implementation of this EMP requires the involvement of several stakeholders, each fulfilling a different but vital role as outlined herein, to ensure sound environmental management during the construction phase of a project.

C3.3.4.1 The Employer

The Employer is the holder of authorisations issued by the relevant environmental regulating authorities responsible for authorising and enforcing environmental compliance. The Employer and anyone acting on the Employer's behalf is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts.

C3.3.4.2 The Engineer

The engineer has been appointed by, and acts for, the Employer as its on-site implementing agent and carries the responsibility to ensure that the contractor undertakes its construction activities in such a way that the Employer's environmental responsibilities are not compromised.

The engineer will, within seven days of receiving a contractor's request for approval of a nominated Designated Environmental Officer (DEO), approve, reject or call for more information on the nomination. The engineer will be responsible for issuing instructions to the DEO where environmental considerations call for action to be taken.

If in the opinion of the engineer the DEO is not fulfilling his duties in terms of this EMP, the engineer may, in writing and clearly setting out reasons, exercise his powers under FIDIC Condition of Contract sub-clause 6.9 and instruct replacement of the DEO in writing and with stated reasons.

C3.3.4.3 The Contractor

The contractor is responsible for project delivery in accordance with the prescribed specifications, among which this EMP shall be included.

The contractor shall receive and implement any instruction issued by the engineer relating to compliance with the EMP including the removal of personnel or equipment.

Compliance with the provisions contained herein or any condition imposed by the environmental approvals shall become the responsibility of the contractor through an approved Designated Environmental Officer (DEO). The contractor shall nominate a person from among his site personnel to fulfil this function and submit to the engineer for his approval the curriculum vitae of the proposed DEO. This request for approval shall be given, in writing, at least fourteen days before the commencement of any construction activity clearly setting out reasons for the nomination, and with sufficient detail to enable the engineer to make a decision.

C3.3.4.4 The Designated Environmental Officer (DEO)

Once a nominated representative of the contractor has been approved he shall become the DEO and shall be the responsible person for ensuring that the provisions of this EMP are complied with during the life of the contract. The DEO shall submit regular written reports to the engineer, but not less frequently than once a month.

The DEO may undertake other construction duties unless the project specifications prescribe this position as 'dedicated' as opposed to the standard position being 'designated'. However, the DEO's environmental duties shall hold primacy over other contractual duties and the engineer has the authority to instruct the contractor to reduce the DEO's other duties or to replace the DEO if, in the engineer's opinion, he is not fulfilling his duties in terms of the requirements of this EMP. Such instruction will be in writing clearly setting out the reasons why a replacement is required.

As a minimum the DEO shall have an accredited diploma qualification in environmental or natural sciences or equivalent. Alternatively, the DEO shall have a minimum of 2 years' experience in a similar role in construction or other environmental regulatory field.

In addition to the compliance duties relating to the EMP the DEO shall also provide full cooperation whenever the contractor is subjected to regular environmental audits.

C3.3.4.5 Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) is an independent environmental specialist appointed by the engineer to objectively and regularly monitor the contractor's implementation of this EMP and the EMP as may be determined by the sensitivity of the project or by conditions of authorisations. These are 'internal' audits and the regularity determined by the environmental approvals, usually once a month. Other ad hoc or 'external' audits ordered by the Employer will be conducted by other environmental specialists. The appointed/nominated environmental specialist must be registered with the Environmental Assessment Practitioners Association of South Africa, and the company must be licensed for waste management activities by the council.

• C3.3.5 TRAINING

C3.3.5.1 Qualifications

The (DEO) shall have the minimum qualifications as prescribed above, and must be conversant with all legislation pertaining to the environment applicable to the contract. He must be appropriately trained in environmental management and possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

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The contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees.

C3.3.5.2 Content

Apart from induction, environmental training should, as a minimum, include the course content below and no induction or course should be given until the engineer has been afforded the opportunity to appraise it and provide comment:

- (a) importance of conformance with all environmental policies and the consequences of departure from standard operating procedures;
- (b) environmental impacts, actual or potential, caused by work activities, prevention measures to avoid them and mitigation measures where they occur;
- (c) work force roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Employer's environmental management systems, including emergency preparedness and response requirements; and
- (e) the environmental benefits of improved personal performance.

C3.3.5.3 Induction

In the case of permanent staff the contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the contractor shall inform the engineer when and how he intends concluding its environmental training obligations.

• C3.3.6 ACTIVITIES/ASPECTS CAUSING IMPACTS

Typical environmental aspects and impacts associated with road construction are listed in Table 1: Aspects and Impacts Associated with Road Construction. Actual impacts will differ from project to project and, therefore, so may the mitigation measures employed. The commonest aspects and impacts are addressed separately and typical avoidance and/or mitigation measures described. The list and descriptions are not by any means exhaustive and they shall be used for guideline purposes only.

TABLE 1: ASPECTS AND IMPACTS ASSOCIATED WITH ROAD CONSTRUCTION

Aspect	Impact
Waste generation/storage	Water pollution; nuisance; visual impact
Water use and stormwater discharge	Change in flow regime and/or reduction in downstream availability; soil erosion; water pollution
Vehicle use and maintenance	Air pollution; noise
Chemical/fuel storage	Water/air/soil pollution; health impacts; accidents e.g. slips, fire
Site clearing; earthworks; layer-works; seal works	Change in landform; impact on heritage resources; noise; soil erosion; air pollution
River bridges; installing drainage structures	Water pollution; impact on river flows; noise
Land acquisition	Loss of land &/or livelihood; change in land use;

Acquisition of building material from borrow pits	Change in landform and use
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C3.3.6.1 General approach

The role of the DEO cannot be underestimated and once approved he shall be on the site at all times, and before the contractor begins each construction activity he shall give to the engineer a written statement setting out the following:

- (i) type of construction activity about to be started;
- (ii) locality where the activity will take place;
- (iii) identification of the environmental aspects and impacts that might result from the activity;
- (iv) methodology of impact prevention for each activity or aspect;
- (v) methodology of impact containment for each activity or aspect;
- (vi) identification of the emergency/disaster potential for each activity (if any) and the reaction procedures necessary to mitigate impact severity; and
- (vii) treatment and continued maintenance of impacted environment.

The contractor shall programme his work in such a way that each cause and effect of a construction activity is also identified and the activity planned so as to prevent any impact from happening and shall demonstrate that he is capable of carrying out any repair and reinstatement of the damaged environment. These requirements shall be concurrent with the time constraints to produce method statements for each construction activity in compliance with the provisions of the project specifications.

The contractor shall provide such information in advance of any or all construction activities provided that new submissions shall be given to the engineer whenever there is a change or variation to the original.

The engineer may provide comment on the methodology and procedures proposed by the DEO, but he shall not be responsible for the contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

C3.3.6.2 Spillages

Streams, rivers and dams shall be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products. In the event of a spillage, the contractor shall be liable to arrange for professional service providers to clear the affected area.

Responsibility for spill containment and treatment (whether hazardous or not) lies with the contractor. The individual causing a spill, or who discovers a spill, must report the incident to his/her DEO or to the engineer. The DEO will assess the situation in consultation with the engineer and act as required. In all cases, the immediate response shall be to contain the spill. The exact treatment of polluted soil / water shall be determined by the contractor in consultation with the DEO and the engineer. Areas cleared of hazardous waste shall be re-vegetated according to the engineer's instructions.

Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the engineer. The costs of containment and rehabilitation shall be for the contractor's account, including the costs of specialist input as well as the sampling and testing of the water quality upstream and downstream of the spill. Water quality sampling and testing, and further treatment shall continue until upstream and downstream results correspond with each other.

C3.3.6.3 Water use and control

The contractor's use of water shall take into consideration that it is a scarce commodity, and shall be optimised. Where applicable, authorisation shall be obtained from the Department of Water and Sanitation (DWS) before water is drawn from streams or new boreholes developed.

The contractor shall also ensure that any stream deviations or diversions are undertaken in such a manner that the impact on the environment is minimised. Method statements shall be submitted to the engineer for comment, detailing how the work will be undertaken, what risks are foreseen and what measures will be employed to minimise such risks. Notwithstanding any comments by the engineer, no work on stream deviations or diversions can commence without written approval from DWA.

The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all construction activities. Before a site is developed or expanded, it shall be established how this development or expansion will affect the drainage pattern. Recognised water users / receivers shall not be adversely affected by the expansion or re-development. No water source shall be polluted in any way due to proposed changes.

Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion and from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products.

The contractor shall submit to the engineer his proposals for prevention, containment and rehabilitation measures against environmental damage of the identified water and drainage systems that occur on the site. Consideration shall be given to the placement of sedimentation ponds or barriers where the soils are of a dispersive nature or where toxic fluids are used in the construction process. The sedimentation ponds must be large enough to contain runoff so that they function properly under heavy rain conditions up to a 1:5 year severity.

C3.3.6.4 Vegetation management

The contractor shall be responsible for the management of vegetation by protection of indigenous vegetation, especially identified protected species, and the prevention of alien vegetation germinating in areas disturbed by road construction activities within and outside the road reserve. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for or from road construction has been stored temporarily. This responsibility shall continue for the duration of the defects notification period. CARA-listed

category 1 and 2 alien species will be removed and replaced with the planting of specified indigenous species.

C3.3.6.5 Dust control

Dust caused by construction activities shall be controlled by means such as water spray vehicles and applied at sufficient frequency so as not to cause nuisance to adjacent habitation or affect farming activities or natural vegetation. Vegetation cover should also be kept for as long as possible to reduce the area of exposed surfaces. Dust emissions from batching and screening plants shall be subject to the relevant legislation and shall be the subject of inspection by the relevant authorities.

C3.3.6.6 Noise control

The contractor shall endeavour to keep noise generating activities to a minimum. Noises that could cause a major disturbance, for instance blasting and crushing activities, should only be carried out during the hours prescribed by the conditions of contract (i.e. normal hours). Should such noise generating activities have to occur at any time outside normal hours the people in the vicinity of the noise-generating activity shall be warned about the noise well in advance and the activities kept to a minimum. Relevant legislation shall also be taken into consideration, and any practical mitigation measures adopted. No noise generating activity outside of normal hours, regardless of its proximity to residences, can take place without application to the engineer for approval. The application shall be accompanied by the noise containment measures proposed.

C3.3.6.7 Energy consumption

The contractor shall take into consideration the impacts of high energy consumption, both from a cost and emissions point of view. Energy use shall be minimised, and where possible, alternative energy sources such as solar utilised.

Furthermore, the contractor shall undertake a study of the consumption of carbon units his chosen method of construction produces in the execution of his programme. In conjunction with the engineer who will provide complete cooperation in this study, a month by month output shall be compiled and efforts made to see how these outputs can be curtailed and reduced.

• C3.3.7 ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES

In managing the construction activities, there are mitigating measures which can be implemented to minimise the cost and impacts. These measures are detailed in Table C3.3.7/1 at the end of this section of the specifications.

The contractor shall undertake “good housekeeping” practices during construction as stated in the Standard Specifications and Conditions of Contract. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

The construction activities addressed below shall become part of the contractor's obligations regarding his programme of work and incorporated into the required method statements for workmanship and quality control.

C3.3.7.1 Site establishment

(a) Site Plan

The contractor shall establish his construction camps, offices, workshops, staff accommodation and testing facilities on the site in a manner that does not adversely affect the environment. However, before construction can begin, the contractor shall submit to the ECO for his comments and to the engineer for his approval, plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the contractor proposes to put in place.

The plans shall detail the locality as well as the layout of the waste treatment facilities for litter, kitchen refuse, sewage and workshop-derived effluents. The site offices should not be sited in close proximity to steep areas, as this will increase soil erosion. Preferred locations would be flat areas along the route. If the route traverses water courses, streams and rivers, it is recommended that the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles are located as far away as possible from any water course as possible. No camp establishment, including satellite camps, can be placed within 32 metres of an identified wetland unless the contractor has applied to DWA and DEA and received authorisation to do so. Regardless of the chosen site, the contractor's intended mitigation measures shall be indicated on the plan. The site plan shall be submitted not later than the first site meeting. Detailed, electronic colour photographs shall be taken of the proposed site before any clearing may commence. These records are to be kept by the ECO and the engineer for consultation during rehabilitation of the site.

(b) Vegetation

The contractor has a responsibility to inform his staff of the need to be vigilant against any practice that will have a harmful effect on vegetation.

The natural vegetation encountered on the site is to be conserved and left as intact as possible. Vegetation planted at the site shall be indigenous and in accordance with instructions issued by the engineer. Only trees and shrubs directly affected by the works, and such others as may be indicated by the engineer in writing, may be felled or cleared. In wooded areas where natural vegetation has been cleared out of necessity, same specie indigenous trees as were occurring shall be re-established. Protected trees may not be removed without a permit from the Department of Agriculture, Forestry and Fisheries.

Contravention of a notice of listed protected tree species under the National Forests Act, 1998 is regarded as a first category offence that may result in a fine or imprisonment for a period up to three years, or to both a fine and imprisonment.

Rehabilitation shall be undertaken using only indigenous tree, shrub and grass species. Special attention shall be given to any search and rescue operation identified during the environmental application process, removal to an on-site nursery for continuous nurturing and protection and later replanting. The contractor should be alert to this procedure and apply to the engineer to approve it even though no allowance has been made in the contract documents. Any proclaimed weed or alien species that propagates during the contract period shall be cleared by hand before seeding.

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Fires shall only be allowed in facilities or equipment specially constructed for this purpose. The need for a firebreak shall be determined in consultation with the engineer and the relevant authorities, and if required a firebreak shall be cleared and maintained around the perimeter of the camp and office sites. The contractor's staff shall at no time make fires for purposes of keeping out the cold unless they are contained in purposebuilt containers capable of preventing runaway fires if knocked over and the ashes collected and safely and environmentally disposed of on a daily basis.

(c) Water management

Water for human consumption shall be available at the site offices and at other convenient locations on site.

All effluent water from the camp / office sites shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water sources (inter alia, streams, rivers, pans and dams). Only domestic type wastewater shall be allowed to enter this drain.

(e) Heating and cooking fuel

The contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes.

C3.3.7.2 Sewage treatment

Particular reference in the site establishment plan shall be given to the treatment of sewage generated at the site offices, site laboratory and staff accommodation and at all localities on the site where there will be a concentration of labour. Sanitary arrangements should be to the satisfaction of project management, the local authorities and legal requirements.

Safe and effective sewage treatment will require one of the following sewage handling methods: septic tanks and soak-aways, dry-composting toilets such as "enviro loos", or the use of chemical toilets which are supplied and maintained by a subcontractor. The type of sewage treatment will depend on the geology of the area selected, the duration of the contract and proximity (availability) of providers of chemical toilets. Should a soak-away system be used, it shall not be closer than 800 metres from any natural water course or water retention system. The waste material generated from these facilities shall be serviced on a regular basis. The positioning of the chemical toilets shall be done in consultation with the engineer.

Toilets and latrines shall be easily accessible and shall be positioned within walking distance from wherever employees are employed on the works. Use of the veld for this purpose shall not, under any circumstances, be allowed.

Outside toilets shall be provided with locks and doors and shall be secured to prevent them from blowing over. The toilets shall also be placed outside areas susceptible to flooding. The contractor shall arrange for regular emptying of toilets and shall be entirely responsible for enforcing their use and for maintaining such latrines in a clean, orderly and sanitary condition to the satisfaction of the engineer.

C3.3.7.3 Waste management

The contractor's intended methods for waste management and waste minimisation shall be implemented at the outset of the contract. All personnel shall be instructed to dispose of all waste in the proper manner.

(a) Solid waste

Solid waste shall be stored in an appointed area in covered, tip proof metal drums for collection and disposal. A refuse control system shall be established for the collection and removal of refuse to the satisfaction of the engineer. Disposal of solid waste shall be at a Department of Water and Sanitation (DWS) licensed landfill site or at a site approved by DWS in the event that an existing operating landfill site is not within reasonable distance from the site offices and staff accommodation. No waste shall be burned or buried at or near the site offices, nor anywhere else on the site, including the approved solid waste disposal site.

(b) Litter

No littering by construction workers shall be allowed. During the construction period, the facilities shall be maintained in a neat and tidy condition and the site shall be kept free of litter. Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work the contractor shall provide litter collection facilities for later safe disposal at approved sites.

(c) Hazardous waste

Hazardous waste such as bitumen, tar and oil, shall be disposed of in a Department of Water and Sanitation approved landfill site. Special care shall be taken to avoid spillage of tar or bitumen products such as binders or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating water.

Under no circumstances shall the spoiling of tar or bituminous products on the site, over embankments, in borrow pits or any burying, be allowed. Unused or rejected tar or bituminous products shall be returned to the supplier's production plant. No spillage of tar or bituminous products shall be allowed on site. Affected areas shall be promptly reinstated to the satisfaction of the engineer.

(d) Construction and demolition waste

The opportunity for recycling and reuse of construction and demolition waste as fill for road embankments, land reclamation and drainage control must first be explored and take priority before the option of declaring these materials a 'waste'.

The contractor is encouraged to actively engage with authorities and landowners adjacent to the site and identify where such 'waste' materials can be usefully deployed to repair existing environmentally damaged areas such as erosion dongas.

(e) Disposal of lamps

The Contractor shall dispose of lamps at an accredited waste disposal site. Contractor shall also provide receipts as proof of disposing of the material.

A control system for the disposal of the lamps shall be established for the collection and removal of the material to the satisfaction of the engineer. No lamps shall be burned or buried at or near the site office/s, nor anywhere else on the site.

C3.3.7.4 Control at the workshop

The contractor's management and maintenance of his plant and machinery will be strictly monitored according to the criteria given below, regardless whether it is serviced on the site (i.e. at the place of construction activity or at a formalised workshop).

(a) Hazardous material storage

Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials e.g. tar or bitumen binders shall be stored in a secured, appointed area that is fenced and has restricted entry. Storage of tar or bituminous products shall only take place using suitable containers to the approval of the ECO and the engineer.

The contractor shall provide proof to the engineer that relevant authorisation to store such substances has been obtained from the relevant authority. In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Before containment or storage facilities can be erected the contractor shall furnish the engineer with details of the preventative measures he proposes to install in order to mitigate against pollution of the surrounding environment from leaks or spillage. The preferred method shall be a concrete floor that is bunded. Any deviation from the method will require proof from the relevant authority that the alternative method proposed is acceptable to that authority. The proposals shall also indicate the emergency procedures in the event of misuse or spillage that will negatively affect an individual or the environment.

(b) Fuel and gas storage

The contractor shall take cognisance of the limits set by legislation for the storage of fuels and acquire the necessary authorisation for storage capacity beyond these. All fuel shall be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers. Leakage of fuel shall be avoided. An adequate bund wall, 110% of volume, shall be provided for fuel and diesel areas to accommodate any spillage or overflow from these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil.

Gas welding cylinders and LPG cylinders shall be stored in a secure, well-ventilated area.

(d) Oil and lubricant waste

Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and sent back to the supplier. Water and

oil should be separated in an oil trap. Oils collected in this manner, shall be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit shall be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company.

All used filter materials shall be stored in a secure bin for disposal off site. Any contaminated soil shall be removed and replaced. Soils contaminated by oils and lubricants shall be collected and disposed of at a facility designated by the local authority to accept contaminated materials.

C3.3.7.5 Clearing the site

In all areas where the contractor intends to, or is required to clear the natural vegetation and soil, either within the road reserve, or at designated or instructed areas outside the road reserve, a plan of action shall first be submitted to the engineer for his approval. Working areas shall be clearly defined and demarcated on site to minimise the construction footprint. 'No-go- areas' and other sensitive areas shall also be clearly demarcated on site, and staff must be made aware of them.

The plan shall contain a photographic record and chainage/land reference of the areas to be disturbed. This shall be submitted to the engineer for his records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during subsequent inspections.

C3.3.7.6 Soil management

(a) Topsoil

Topsoil shall be removed from all areas where physical disturbance of the surface will occur and shall be stored and adequately protected. The contract will provide for the stripping and stockpiling of topsoil from the site for later re-use. Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter. Depth may vary at each site. The areas to be cleared of topsoil shall include the storage areas. All topsoil stockpiles and windrows shall be maintained throughout the contract period in a weed-free condition. Weeds appearing on the stockpiled or windrowed topsoil shall be removed by hand. Soils contaminated by hazardous substances shall be disposed of at an approved waste disposal site. The topsoil stockpiles shall be stored, shaped and sited in such a way that they do not interfere with the flow of water to cause damming or erosion, or itself be eroded by the action of water. Stockpiles of topsoil shall not exceed a height of 2 m, and if they are to be left for longer than 6 months, shall be analysed, and if necessary, upgraded before replacement. Stockpiles shall be protected against infestation by weeds.

The contractor shall ensure that no topsoil is lost due to erosion – either by wind or water. Areas to be topsoiled and grassed shall be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns. The contractor's programme shall clearly show the proposed rate of progress

of the application of topsoil and grassing. The contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the progress plan approved by the engineer. The contractor's responsibility shall also extend to the clearing of drainage or water systems within and beyond the boundaries of the road reserve that may have been affected by such negligence.

(b) Subsoil

The subsoil is the layer of soil immediately beneath the topsoil. It shall be removed, to a depth instructed by the engineer, and stored separately from the topsoil if not used for road building. This soil shall be replaced in the excavation in the original order it was removed for rehabilitation purposes.

C3.3.7.7 Drainage

The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all construction activities. Before a site is developed or expanded, it shall be established how this development or expansion will affect the drainage pattern. Recognised water users / receivers shall not be adversely affected by the expansion or re-development. No water source shall be polluted in any way due to proposed changes.

Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion, direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous or tar products.

The contractor shall submit to the engineer his proposals for prevention, containment and rehabilitation measures against environmental damage of the identified water and drainage systems that occur on the site. Consideration shall be given to the placement of sedimentation ponds or barriers where the soils are of a dispersive nature or where toxic fluids are used in the construction process. The sedimentation ponds must be large enough to contain runoff so that they function properly under heavy rain conditions.

C3.3.7.8 Earthworks and layerworks

This section includes all construction activities that involve the mining of all materials, and their subsequent placement, stockpile, spoil, treatment or batching, for use in the permanent works, or temporary works in the case of deviations. Before any stripping prior to the commencement of construction, the contractor shall have complied with the requirements of Sub-clauses C3.3.7.5 and C3.3.7.7. In addition, the contractor shall take cognisance of the requirements set out below.

(a) Quarries and borrow pits

The contractor's attention is drawn to the requirement of the Department of Mineral Resources, that before entry into any quarry or borrow pit, an EMPr for the establishment, operation and closure of the quarry or borrow pit shall have been approved by the Department. It is the responsibility of the contractor to ensure that he obtains from the engineer, a copy of the approved EMPr prior to entry into the quarry



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or borrow pit. The conditions imposed by the relevant EMP are legally binding on the contractor and may be more extensive and explicit than the requirements of this specification. In the event of any conflict occurring between the requirements of the specific EMP and this specifications the former shall apply. The cost of complying with the requirements shall be deemed to be included in existing rates in the Schedule of Quantities.

(b) Excavation, hauling and placement

The contractor shall provide the ECO and engineer with detailed plans of his intended construction processes prior to starting any cut or fill or layer. The plans shall detail the number of personnel and plant to be used and the measures by which the impacts of pollution (noise, dust, litter, fuel, oil, sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. Particular attention shall also be given to the impact that such activities will have on the adjacent built environment. The contractor shall demonstrate his "good housekeeping", particularly with respect to closure at the end of every day so that the site is left in a safe condition from rainfall overnight or over periods when there is no construction activity.

(c) Spoil sites

The contractor shall be responsible for the safe siting, operation, maintenance and closure of any spoil site he uses during the contract period, including the defects liability period. This shall include existing spoil sites that are being re-entered. Before spoil sites may be used proposals for their locality, intended method of operation, maintenance and rehabilitation shall be given to the ECO for his comments and the engineer for his approval. The location of these spoil sites shall have signed approval from the affected landowner before submission to the ECO and the engineer. No spoil site shall be located within 500m of a wetland and/or within 100m of any watercourse. A photographic record shall be kept of all spoil sites for monitoring purposes. This includes before the site is used and after re-vegetation.

The use of approved spoil sites for the disposal of hazardous or toxic wastes shall be prohibited unless special measures are taken to prevent leaching of the toxins into the surrounding environment. Such special measures shall require the approval of the relevant provincial or national authority. The same shall apply for the disposal of solid waste generated from the various camp establishments. The engineer will assist the contractor in obtaining the necessary approval if requested by the contractor.

Spoil sites will be shaped to fit the natural topography. These sites shall receive a minimum of 75mm topsoil and be grassed with the recommended seed mixture. Slopes shall not exceed a vertical: horizontal ratio of 1:3. Only under exceptional circumstances will approval be given to exceed this ratio. Appropriate grassing measures to minimise soil erosion shall be undertaken by the contractor. This will include both strip and full sodding. The contractor may motivate to the engineer for other acceptable stabilising methods. The engineer may only approve a completed spoil site at the end of the defects liability period upon receipt from the contractor of a landowner's clearance notice and an engineer's certificate certifying slope stability. The contractor's costs incurred in obtaining the necessary certification for opening and closing of spoil sites shall be deemed to be included in the tendered rates for spoiling.

(d) Stockpiles

The contractor shall plan his activities so that materials excavated from borrow pits and cuttings, in so far as possible, can be transported direct to and placed at the point where it is to be used. However, should temporary stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the engineer for his approval, together with the contractor's proposed measures for prevention, containment and rehabilitation against environmental damage.

The areas chosen shall have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care shall be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the contractor shall at all times ensure that they are:

Positioned and sloped to create the least visual impact;
Constructed and maintained so as to avoid erosion of the material and contamination of surrounding environment; and
Kept free from all alien/undesirable vegetation.

After the stockpiled material has been removed, the site shall be re-instated to its original condition. No foreign material generated / deposited during construction shall remain on site. Areas affected by stockpiling shall be landscaped, top soiled, grassed and maintained at the contractor's cost until clearance from the engineer is received.

Material milled from the existing road surface that is temporarily stockpiled in areas approved by the engineer within the road reserve, shall be subject to the same condition as other stockpiled materials. Excess materials from windrows, in situ milling or any detritus material from road construction activities may not be swept off the road and left unless specifically instructed to do so in the contract drawing or under instruction from the engineer.

In all cases, the engineer shall approve the areas for stockpiling and disposal of construction rubble before any operation commences and shall approve their clause only when they have been satisfactorily rehabilitated.

(e) Blasting activities

Wherever blasting activity is required on the site (including quarries and/or borrow pits) the contractor shall rigorously adhere to the relevant statutes and regulations that control the use of explosives. In addition, the contractor shall, prior to any drilling of holes in preparation for blasting, supply the engineer with a locality plan of the blast site on which shall be shown the zones of influence of the ground and air shock-waves and expected limits of fly-rock. The plan shall show each dwelling, structure and service within the zones of influence and record all details of the dwellings/structures/services including existing positions, lengths and widths of cracks, as well as the condition of doors, windows, roofing, wells, boreholes etc. The contractor, alone, shall be responsible for any costs that can be attributed to blasting activities, including the collection of fly-rock from adjacent lands and fields. The submission of such a plan shall not in any way absolve the contractor from his responsibilities in this regard. The contractor shall also indicate to the engineer the manner in which he intends to

advertise to the adjacent communities and/or road users the time and delays to be expected for each individual blast.

C3.3.7.9 Batching sites

Asphalt plants are considered scheduled processes listed in the second schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965). Should the use of an asphalt plant be considered on site, the contractor shall be responsible to obtain the necessary permit from the Department of Environmental Affairs, regardless of where they are sited.

Crushing plants and concrete batching plants, whether sited inside or outside of defined quarry or borrow pit areas, shall be subject to the requirements of the Department of Mineral Resources legislation as well as the applicable industrial legislation that governs gas and dust emissions into the atmosphere. Such sites will be the subject of regular inspections by the relative authorities during the life of the project. In addition, the selection, entry onto, operation, maintenance, closure and rehabilitation of such sites shall be the same as for those under Subclause C3.3.7.8 (c), with the exception that the contractor shall provide additional measures to prevent, contain and rehabilitate against environmental damage from toxic/hazardous substances. In this regard the contractor shall provide plans that take into account such additional measures as concrete floors, bunded storage facilities, linings to drainage channels and settlement dams. Ultimate approval of these measures shall be from the relevant national authority, as shall approval of closure. The engineer will assist the contractor in his submissions to the relevant authority.

Effluent from concrete batch plants and crusher plants shall be treated in a suitable designated sedimentation dam to the legally required standards to prevent surface and groundwater pollution. The designs of such a facility should be submitted to the engineer for approval.

The contractor shall invite the relevant department to inspect the site within 2 months after any plant is commissioned and at regular intervals thereafter, not exceeding 12 months apart

• C3.3.8 AREAS OF SPECIFIC IMPORTANCE

Any area, as determined and identified within the project document as sensitive or of special interest within the site shall be treated according to the express instructions contained in these specifications or the approved EMP. The contractor may offer alternative solutions to the engineer in writing should he consider that construction will be affected in any way by the hindrance of the designated sensitive area or feature. However, the overriding principle is that such defined areas requiring protection shall not be changed. Every effort to identify such areas within the site will have been made prior to the project going out to tender. The discovery of other sites with archaeological or historical interest that have not been identified shall require ad hoc treatment.

(a) Archaeological sites

If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the engineer of such discovery. The National Monuments Council is to be contacted who will appoint an archaeological consultant. Work may only resume once clearance is given in writing by the archaeologist.

(b) Graves and middens

If a grave or midden is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the graves/middens shall be stopped and the engineer informed of the discovery. The National Monuments Council should be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial. The undertaker will, together with the National Monuments Council, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred.

• **C3.3.9 REHABILITATION**

The contractor shall be responsible for the re-establishment of grass within the road reserve boundaries for all areas disturbed during construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for, or from, construction has to be stored temporarily, and designated or instructed areas outside the road reserve. It also includes the area where site offices were erected which may require rehabilitation at the end of the contract. All construction material, including concrete slabs and barbecue (braai) areas shall be removed from the site on completion of the contract unless written approval from the relevant landowner demonstrates it is to be left in place.

Responsibility for re-establishment of vegetation shall extend until expiry of the defects notification period. However, the employer reserves the right to continue holding retention monies (or not releasing guarantees in lieu of retention) depending upon the state of cover at the end of the defects notification period. Such extension may continue until closure of the relevant quarry or borrow pit has been secured,

Rehabilitation of affected areas should be undertaken as early as possible when the relevant activities are done in order to reduce further environmental damage. All re-vegetation should be undertaken using indigenous vegetation. The standard of rehabilitation should be to the satisfaction of the engineer and the relevant authorities. The Department of Mineral Resources will only issue closure certificates for borrow pits and quarries when they are satisfied with the rehabilitation undertaken. It should also be noted that in some cases there is a requirement for a final environmental audit covering the extent of the project.

• **C3.3.10 RECORD KEEPING**

The engineer and the DEO to the contractor will continuously monitor the contractor's adherence to the approved impact prevention procedures and the DEO shall submit regular written reports to the ECO and to the engineer, at least once a month. The engineer shall issue to the contractor a notice of non-compliance whenever transgressions are observed. The DEO should document the nature and magnitude of the non-conformance in a designated register, the action taken to discontinue the non-conformance, the action taken to mitigate its effects and the results of the actions. The non-conformance shall be documented and reported to the engineer in the monthly report.

Copies of any record of decision or EMPr (including those for specific borrow pits or quarries used on the project) shall be kept on site and made available for inspection by visiting officials from the employer or relevant environmental departments.

• **C3.3.11 COMPLIANCE AND PENALTIES**

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The contractor shall act immediately when such notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and a verbal report given at the monthly site meetings.

Any non-compliance with the agreed procedures of the EMPr and this EMP, is a transgression of the various statutes and laws define the manner by which the environment is managed and, therefore, any avoidable non-compliance, dependant on severity, may be considered sufficient grounds for contact to be made with relevant provincial or national authorities to invite their sanction.

The engineer's decision with regard to what is considered a violation, its seriousness and the action to be taken against the contractor shall be final. Failure to redress the cause shall be reported to the relevant authority. The responsible provincial or national authority may ensure compliance and impose penalties relevant to the transgression as allowed within statutory powers.

TABLE C3.3.7/1: SUMMARY OF MITIGATION MEASURES		
ENVIRONMENTAL COMPONENT	ACTIVITY	MITIGATION
Establishment of site offices	Siting of offices	Preferred areas to be flat areas along the route. Avoid steep areas as soil erosion could increase. Avoid water courses
	Site Plan	Contractor to provide Engineer detail of layout of site facilities i.e. chemical toilets, the demarcation of areas for stockpiling of materials, storage of hazardous materials and the provision of containers. The offices shall be fenced. The site plan to be submitted within two weeks of the Commencement Date.
Site rehabilitation	Cleanup	All construction material is to be removed from the site on completion of the contract.
Vegetation	On site	Vegetation planted on the site is to be indigenous. Only trees directly affected by works as confirmed in writing by Engineer, shall be sawn off/removed.
	Weeds	Clearance of weeds must be done by hand before seeding.
	Grass cover	The grass cover surrounding the site is to be left as intact as possible or restored to its original condition.
Water	Available for human consumption	Water for human consumption must be tested and treated in accordance with recommendations.



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Soil management	Topsoil	The topsoil ($\pm$ 300 mm) of any excavation shall be removed and stockpiled separately from underlying material in designated areas.
	Borrow material	EMP's for borrow pits to be submitted to the Department of Mineral and Energy Affairs for approval
Archaeological & Cultural sites	Discover of archaeological sites of artefacts	If an artefact on site is uncovered, work in the immediate vicinity must be stopped immediately and an archaeological consultant must be contacted. Work may only resume once clearance is given in writing by the archaeologist.
Graves	Discovery of graves	If a grave on site is uncovered, work in the immediate vicinity must be stopped and an undertaker should be contacted
Waste management	Solid & Construction waste	Solid waste is to be stored in a designated area for collection and disposal. Disposal of waste will be in a DWS licensed landfill, and no waste may be burnt on site.
	Litter	The site is to be kept free of litter
TABLE C3.3.7/1: SUMMARY OF MITIGATION MEASURES		
ENVIRONMENTAL COMPONENT	ACTIVITY	MITIGATION
Sewage treatment	Toilet facilities	Adequate toilet facilities are to be provided, and the siting of chemical toilets is to be done in consultation with the Engineer. Use of the veld for this purpose shall not be allowed.
Fuel, diesel & hazardous materials	Hazardous Materials	All hazardous materials, i.e. bitumen binders, to be stored in a designated area that is fenced and has restricted entry. No spoiling of bituminous products on site, over embankments, in borrow pits or any burying. No spillage of bituminous products shall be allowed on site.
	Fuels	All fuel tanks will be erected in a designated area. Leakage is to be avoided.
	Cooking fuel	The Contractor shall ensure that sufficient fuel is available for heating and cooking purposes should this be necessary.
	Oil, grease	Oil, grease and cleaning materials from maintenance of vehicles shall be



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General considerations		collected in a sump and returned to the supplier.
	Spillages	Streams, rivers or dams must be protected against spillages of pollutants. In the event of a spillage, prompt action must be taken to clear the affected area.
	Lines of authority	A nominated representative of the Contractor will be the Designated Environmental Officer for the site.
	Reports	The Designated Environmental Officer will submit monthly reports to the Engineer who will verify the information
	Complaints	Complaints received regarding activities on the site pertaining to the environment should be recorded in a designated register, and the response noted with the date and action taken. This record must be submitted with the monthly report

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C3.4: TARGETED PROCUREMENT – PPPFA – Regulations

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C3.4 TARGETED PROCUREMENT

C3.4.1 SCOPE

This section provides the specifications that relate to the contractor's implementation of the policies and initiatives of the Government, through compliance with the Employer's targeted procurement procedure. It is a requirement of the contract for the Contractor to facilitate the contractor development of targeted enterprises as a contract participation goal by means of subcontracting some of the scheduled work under the operational section to targeted enterprises as subcontractors. The Contractor is required to provide sustainable work opportunities for targeted enterprises, and to provide assistance in the form of financial support for the procurement of goods and services. In addition, the Contractor is required to manage the skills development of targeted enterprises by providing training, coaching, guidance and mentoring. The Contractor is also required to facilitate a wellness program for site employees and their relatives.

These specifications should be read in conjunction with the various statutes and legislation that relate to contractor development and Broad-Based Black Economic Empowerment. The Employer may have to amend its targeted procurement procedure in order to meet new or revised targets and requirements of legislation, and the Transport and Construction Charters. The Employer would then negotiate with the Contractor on the implementation of the revised targeted procurement procedure, and the associated costs.

C3.4.2 DEFINITIONS

The following words and expressions shall have the meanings stated.

C3.4.2.1 Black People (BP): is a generic term which means Africans, Coloureds and Indians:

- (a) who are citizens of the Republic of South Africa by birth or descent: or (b) who became citizens of the Republic of South Africa by naturalisation:
 - (i) before 27 April 1994; or
 - (ii) on or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalisation prior to that date.

C3.4.2.2 Contract Participation Goal (CPG): the value of goods, services and works for which the contractor contracts targeted enterprises exclusive of all allowances and any value added tax which the law requires the Employer to pay to the Contractor, expressed as a percentage of the contract amount.

C3.4.2.3 Potentially Emerging Enterprise (PE): an enterprise that is at least 50.1% owned by black persons and where there is substantial management control by Black People.

C3.4.2.4 Project Management Team: three persons comprising the Employer, Engineer and Contractor.

C3.4.2.5 Targeted Enterprise: an enterprise which:

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- (a) is a contractor registered with the Construction Industry Board in a contractor grading designation from 2 to 6 and status as potentially emerging; and
- (b) the Contractor has no equity holding in the targeted enterprise; and
- (c) is registered in terms of the Company's Act, 2008 (Act No 71 of 2008) or Close Corporation Act, 1984 (Act No 69 of 1984); and
- (d) is registered with the South African Revenue Service.

C3.4.2.6 Black Enterprise (BE)

A black enterprise (BE) is defined as a company or economic activity that is at least 51% owned by black persons and where there is substantial management control by Black People. Ownership refers to economic interest, whilst management refers to the membership of any board or similar governing body of the enterprise.

C3.4.2.7 Black People (BP)

Black people (BP) are defined as Africans, Coloureds and Indians who hold South African Citizenship through their birthright.

C3.4.2.8 Small Medium and Micro Enterprise (SMME)

"Small Medium and Micro Enterprise or "SMME" is defined as a separate and distinct business entity, including cooperative enterprises and non-governmental organisations, managed by one owner or more, including its branches or subsidiaries, if any and which can be classified as a small, medium or macro enterprise by satisfying the criteria mentioned in Table A below in terms of the National Small Business Amendment Act 26 of 2003.

TABLE A

Size	Total Gross asset value (fixed property excluded) (less than)	Total annual turnover (less than)	Total full time equivalent of paid employees (less than)
Medium	R 5 m	R 26 m	200
Small	R 1 m	R 6 m	50
Very Small	R 0.5 m	R 3 m	20
Micro	R 0.1 m	R 0.2 m	5

C3.4.3 CONTRACT PARTICIPATION

(a) Contract Participation Targets

Contract participation is a process by which the Employer implements Government's policies on Black Economic Empowerment and small contractor development. The Employer sets targets for construction by specified entities the rand value for which is based on the goods, services and work undertaken by the specified entities and measured as a percentage of the contractor's tender sum (excluding VAT). The contractor is obliged to commit to the targets set by the Employer. For this contract the targets are as follows:

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In this contract the minimum target values shall be as follows:

- (i) Labour maximisation 6%
- (ii) SMME/BE utilisation 15% of which at least 90% is to be contributed by BEs who are also SMMEs

(b) Contract Participation Goals (CPG)

The contractor is encouraged to participate in the Employer's commitment to achieving Government's empowerment objectives by itself committing to perform beyond the set targets. To this end the contractor has to state the goals which it commits to perform on the relevant returnable schedules (see returnable schedules Forms C1 and C2).

(c) Measurement of performance

The contractor's participation performance will be measured monthly in order to monitor the extent to which he is striving to reach the contract participation goal (CPG) specified in his tender. Regular returns are required from the contractor and shall be submitted with each payment certificate.

The contractor's monthly participation performance towards the CPG will be calculated as the sum of labour and SMME/BE achieved.

Failure to reach the CPG shall render the contractor liable for a penalty as prescribed in clause 4.1 of the General Conditions of Contract (as amended by Particular Conditions of Contract and sub-clause D1009(c) herein). Conversely, achievement greater than the specified CPG may entitle the contractor to a bonus, also described in sub-clause D1009(c).

No contract participation goals will be used in the evaluation of tenderers' preference points. Both goals (i.e. that for labour maximisation and SMME/BE utilisation) are used in the calculation of the penalty/bonus applicable to the actual goals performed.

C3.4.4 EVALUATION FORMULAE

Evaluation is based on a points system using the formulae given under each of the judgement criteria explained in F.3.11 of the Tender Data.

C3.4.5 COMMUNITY PARTICIPATION

(a) Purpose

In order to give effect to the need for participation and transparency in the process of delivering services, the community should participate in the decision making process throughout the life of the project. This may be achieved through structured engagement between those responsible for the delivery of the project and the communities adjacent to the project.

(b) Structure and composition

A public liaison committee (PLC) is to be established as a communication structure that interacts with all parties involved with the project. The composition of the PLC comprises representation by the Employer,

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the contractor, the engineer and formal structures within the communities. The contractor is advised to make use of established community communication channels and appoint from among his site personnel a responsible person, (community relations officer, or CRO), to participate in the PLC business. Should the locality and size of the project warrant the need for a project liaison officer, (or PLO), such appointment will be made by the engineer as part of the engineer's staff.

(c) Use of the PLC

The contractor is encouraged to utilise the community participative process in order to facilitate harmonious relationships on the project. Some of the suggested elements of construction activity that should be discussed by the PLC are,

- (i) SMMEs/BEs with whom the contractor is already contractually committed prior to the commencement of the contract,
- (ii) Procurement of labour,
- (iii) Assistance with general community/project liaison.

C3.4.6 UTILISATION OF SMMEs/BEs
(a) Objective

A major objective of the B-BBEE Programme is to extend economic opportunities and entrepreneurial capacity to all localities by the optimum utilisation of the resources existing in the vicinity of projects, the development of these resources in the execution of the project, and by maximising the amount of project funds retained within the project locality.

(b) Requirements

The contractor is required to commit to the direct participation of SMMEs/BEs in its operations that form part of items of work and of the value of goods and services that are to be preferred under this contract. The minimum level of commitment is prescribed in Form C1.2.2; Contract Data – Information provided by the Employer. The commitment forms part of the Contract Participation goals and targets defined in clause D1003.

Contractors who are bonafide empowerment companies do not qualify for relief from the obligations created by these requirements. Similarly, contractors who are joint venture entities cannot claim the value of work or services performed by any of the joint venture elements who are classified SMME or BE as contributing towards the prescribed goals or tendered targets.

Contractors, when tendering, are encouraged to tender more than the goals prescribed in Form C1.2.2; Contract Data – Information provided by the Employer. For this purpose, the contractor shall have entered onto Form C1.2.3; Contract Data – Information provided by the Contractor, the actual target for SMME/BE participation to which he commits. Commitments beyond the prescribed value, and achieved, form part of the incentive programme described in clause D1009(c)

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When calculating achievement of the committed targets, the difference between SMMEs and BEs must be clearly understood. The narrower goal of 90% committed expenditure shall only apply to BE companies who are also SMMEs according to the definition of D1003(a).

The tendered target value shall be used in calculating the performance of the Contract Participation Goal as described in clause D1003(c) and in calculating any penalty per clause D1009(c).

(c) Accredited Registration

Achievement measured against the SMME/BE target value shall only be accepted if the respective SMME/BE for which services or work is being claimed as having been performed, is registered with an accredited agency such as the Construction Industry Development Board. In addition, documentary evidence that such SMMEs/BEs are registered with the South African Revenue Services shall be lodged with the engineer before the work or service may be considered as having been performed by a bona fide SMME/BE. The responsibility for producing evidence of the respective registration documentation shall rest with the contractor.

C3.4.7 TRAINING, MENTORING, GUIDANCE AND ASSISTANCE

(a) General

The contractor shall, from the commencement of the contract, provide a structured training programme designed to improve the entrepreneurial and basic business management skills of identified BEs and hired local labour that show initiative as well as specific task skills (engineering skills) commensurate with the applicable levels of subcontract that will enable BEs to achieve the successful execution and completion of their subcontracts. The progression of training and mentorship may need to start with the identification and general training of potential BEs and hired local labour that show initiative, and should end with their acquisition of sufficient management skills that will equip them to compete confidently for subcontract work beyond the duration of this contract. In addition, generic skills shall be taught where the need for these has been identified as being necessary amongst BE workforces and hired local labour.

The contractor shall be responsible for the provision of everything necessary for the delivery of the various training workshops and modules including:

- (i) A suitable venue with sufficient furniture, lighting and power
- (ii) All necessary stationery consumables and study material
- (iii) Transport for attendants

Before commencing with any structured training the contractor shall submit his intended programme to the engineer for approval of its subject content and proposed trainers, and the contractor shall, if so instructed by the engineer, alter or amend the programme and/or course content.

(b) Identification and general training of potential BEs

Whereas the specified training courses form part of the contractor's structured training programme, all costs relating to the identification and engagement of BEs shall not be paid separately, but are deemed to have been included in the contractor's tendered rates for pay section 1300: Contractor's Establishment on Site and General Obligations.

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(c) Entrepreneurial skills training

SMME/BE subcontractors and hired local labour that show initiative will be entitled to receive a structured training programme that shall comprise both management skills as well as business development skills.

Once BEs have been identified and engaged, the contractor shall closely monitor their performance in the execution of their contracts and shall identify those who, in his opinion, display the potential to benefit from structured training as may be provided for in the contract, and where required by the engineer, shall make recommendations in this regard. Similarly those among the hired local labour that show potential should also be included in this process. The final list of candidates shall be decided between the contractor and the engineer, and those selected shall receive formal training in business skills throughout the duration of the construction period.

The training programme shall offer complete courses that could comprise some or all of the following modules:

- (i) Basic business management
- (ii) Estimating and tender procedures
- (iii) Contractual rights
- (iv) Statutory obligations
- (v) Financial control
- (vi) Programming and measurement

(d) Engineering skills training

BE subcontractors' workforces and hired local labour that show initiative will be entitled to receive structured training that will improve on-task skills necessary for the execution and successful completion of the works. The contractor, in conjunction with the engineer, shall monitor the progress of the hired labour and each BE closely and shall identify those who, in their collective opinion, will benefit from structured engineering skills training as may be provided for in the contract, and where required by the engineer, shall make recommendations in this regard. The final list of candidates shall be decided between the contractor and the engineer, and those selected shall receive formal engineering skills training in a programmed and progressive manner throughout the duration of the contract.

The training programme shall offer complete courses that could comprise some or all of the following modules:

- (i) Use and maintenance of hand tools
- (ii) Operation of small plant
- (iii) Manufacture and installation of minor precast concrete units
- (iv) Erect, dismantle and maintain formwork
- (v) Basic concrete skills
- (vi) Excavation, backfill and compaction
- (vii) Bricklaying
- (viii) Erosion protection using stone pitching, gabions or reos

(e) Generic skills training

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BE subcontractors, their workforces and hired local labour that show initiative will be entitled to receive structured training in generic skills if, after monitoring of their performance, it is considered beneficial to the progress of the works. In this regard the contractor shall make representation to the engineer, who shall approve candidates that should attend such courses as may be provided for in the contract. Those selected shall receive formal generic skills training in a programmed and progressive manner throughout the duration of the contract.

The training programme shall offer complete courses that could comprise some or all of the following modules:

- (i) Basic hygiene and HIV/AIDS awareness
- (ii) Road safety
- (iii) Basic management of the environment
- (iv) Tourism awareness and opportunities

(f) Accredited training and attendance

Only qualified trainers employed by training agencies that are accredited by CETA, or any other institution recognised by the Department of Labour shall deliver all training. Accredited training refers to both the trainers as well as to the training material. Certificates affirming the successful participation in the various courses shall be presented to each attendant.

The contractor shall facilitate in the delivery of training, by instructing and motivating the hired local labour and relevant BE subcontractor regarding attendance and participation.

All training shall take place within normal working hours, or as agreed with the trainees.

(g) Contractor's programme

The contractor shall further make all reasonable efforts to co-ordinate hired local labour and subcontractors' work with that of the delivery of the structured training.

C3.4.8 LABOUR ENHANCED CONSTRUCTION

The contractor's attention is drawn to the fact that it is an objective of the contract to maximise the labour content of certain operations or portions thereof. In this regard, where the specified work allows for a choice between mechanical or labour-enhanced means, the former should generally be kept to the practical minimum.

The contractor shall take cognisance of these objectives and their contribution to the CPG (see subclauses D1003(a) and D1004(b)) when, at tender stage, he commits on Form C2: Preferencing Schedule: Preferences for direct participation of targeted labour.

Before commencing with any labour enhanced operations the contractor shall discuss his intentions with the engineer, and shall submit to the engineer on a monthly basis, daily labour returns indicating the numbers of temporary personnel employed on the works and the activities on which they were engaged.

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The engineer shall assess the monthly labour returns, and proposed measures deemed necessary to rectify any shortfall from the contractor's tendered number of labourers as per Form C2 will be agreed with the contractor.

C3.4.9 MONITORING OF PROGRESS

C3.4.9.1 Keeping of records

The contractor shall assume responsibility for the compilation and maintenance of comprehensive records detailing each BE's progress during the construction duration, starting from the award of a subcontract to a BE until the successful completion of the subcontract work or termination of the subcontract. To this end the contractor shall complete a BE Declaration Affidavit that requires the contractor to obtain a bona fide statement of details for each BE engaged.

The contractor shall keep comprehensive records of the training given to each trainee and, at the successful completion of each course, each trainee shall be issued with a certificate indicating the course contents as proof of attendance and completion. The contractor shall keep a register of certificates issued. Whenever required, the contractor shall provide copies of such records to the Engineer.

C3.4.9.2 Monthly Returns

The Contractor's participation performance will be measured monthly in order to monitor the extent to which he is striving to reach the targets in this contract. The Contractor shall complete and return on a monthly basis the following pro-forma forms of the Employer:

- (i) Report on employment;
- (ii) Report on training; and
- (iii) Report on community liaison meetings.

The complete forms shall accompany the Contractor's monthly claim presented to the Engineer for payment of certified completed work. Failure to adhere to this requirement shall result in the delay of any payment due until the Engineer confirms that the forms have been received.

C3.5 OCCUPATIONAL HEALTH AND SAFETY

Note: Wherever reference is made in this section of the Scope of Work to contractor this is the equivalent of the *principal contractor* in the Occupational Health and Safety Act and Regulations. Similarly, reference to subcontractors is equivalent to *other contractors*.

C3.5.1 SCOPE

This part of the specification has the objective to assist the contractor entering into contract with the Employer, to comply with the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) (OH&S), as well as all applicable Regulations. Compliance with this document does not absolve the contractor from complying with minimum legal requirements and the contractor remains responsible for the health and safety of his employees and those of his Mandataries. The contractor shall, therefore, include this part of the specification to any contract that he may have with subcontractors and/or suppliers.

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This section also covers the development of a health and safety specification that addresses all aspects of occupational health and safety as affected by this contract. It provides the requirements that the contractor shall comply with in order to reduce the risks associated with this contract, which may lead to incidents causing injury and/or ill health. In this matter the spirit and intention of Regulation 5(1)(l) of the Construction Regulations, 2014 regarding negotiations between the parties, related to the contents and approval of the Health and Safety Plan, must be complied with.

C3.5.2 GENERAL OCCUPATIONAL HEALTH AND SAFETY PROVISIONS
C3.5.2.1 Hazard Identification and Risk Assessment (Construction Regulation 9)
C3.5.2.1.1 Risk Assessments

Paragraph C3.5.4 contains a generic list of risk assessment headings that have been identified by the Employer as possibly applicable to this contract. It is, by no means, exhaustive and is offered as assistance to the contractor.

C3.5.2.1.2 Development of Risk Assessments

The contractor shall, before the commencement of any construction work or work associated with the aforesaid construction work and during such work, conduct a risk assessment by a competent person and the risk assessment so produced shall form part of the OH&S plan and be implemented and maintained as contemplated in Construction Regulation 9(1). Competence is a factor of training, knowledge, experience and/or appropriate qualifications. Where proof of competence is required by the Regulation, a concise CV must be attached to the appointment letter.

The risk assessment shall include, as far as is reasonably practicable, at least:

- the identification of the risks and hazards to which persons may be exposed;
- the analysis and evaluation of the risks and hazards identified, inclusive of a residual risk rating methodology. The method to be used is not prescribed;
- a documented plan and applicable safe work procedures to mitigate, reduce or control those residual risks that have been identified as unacceptably high, by means of the rating system;
- a monitoring plan;
- a review plan, inclusive of dates to be adhered to; and
- ergonomic related risks are to be analyzed, evaluated and addressed as part of the process.

Based on the risk assessments, the contractor shall develop a set of site-specific OH&S rules that shall be applied to regulate the OH&S aspects of the construction. The risk assessments, together with the site-specific OH&S rules shall be submitted to the Employer before construction on site commences. Despite the more advanced (or site specific) risk assessments listed in paragraph C3.5.4, the Employer would have conducted a baseline risk assessment before work

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commences and made the same available to the contractor. This does not mean that all risk assessments must be attended before work commences, but that all risk assessments receive the necessary attention as the contract progresses, and this is the responsibility of the contractor.

All variations to the scope of work shall similarly be subjected to a risk assessment process.

C3.5.2.1.3 Review of Risk Assessment

The contractor shall review the hazard identification, risk assessments and standard working procedures at each production planning and progress report meeting as the contract work develops and progresses and each time changes are made to the designs, plans and construction methods and processes. The contractor shall provide the Employer, subcontractors and all other concerned parties with copies of any changes, alterations or amendments as contemplated above.

C3.5.2.2 Legal Requirements

A contractor shall, as a minimum, comply with:

- The Occupational Health and Safety Act and Regulations (Act 85 of 1993), an up-to-date copy of which shall be available on site at all times.
- The Compensation for Occupational Injuries and Diseases Act, 1993 (Act No 130 of 1993), an up-to-date copy of which shall be available on site at all times.
- Where work is being carried out on a “mine”, the contractor shall comply with the Mines Health and Safety Act and Regulations (Act No 29 of 1960) and any other OH&S requirements that the mine may specify. An up-to-date copy of the Mines Health and Safety Act and Regulations shall be available on site at all times.

C3.5.2.3 Structure and Responsibilities

C3.5.2.3.1 Overall Supervision and Responsibility for OH&S

It is a requirement that the contractor, when he appoints subcontractors in terms of Construction Regulations 7(1)(c), 7(1)(d), 7(1)(f), and 7(3) includes in his agreement with such subcontractors the following:

- OH&S Act (85 of 1993), Section 37(2) agreement: “Agreement with Mandatary”
- OH&S Act (85 of 1993), Section 16(2) appointee/s as detailed in his/their respective appointment forms.

C3.5.2.3.2 Further (Specific) Supervision Responsibilities for OH&S

The contractor shall appoint designated competent employees and/or other competent persons as required by the Act and Regulations. Below is a generic list of identified appointments and may be used to select the appropriate appointments for this contract. The contractor shall note that it is a generic list only and is intended for use as a guideline.

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SUPPLY, MAINTENANCE AND COMMISSIONING
PROVINCIAL STREET LIGHTS ON VARIOUS
PROVINCIAL ROADS AND BUILDINGS
FOR A PERIOD OF THREE (3) YEARS: IN THE

Appointment	Regulation
Construction Manager, Assistant Construction Manager, Construction Supervisor and Assistant Construction Supervisor	Construction Regulation 8(1), 8(2), 8(7) and 8(8)
Construction Vehicles and Mobile Plant/Machinery Supervisor	Construction Regulation 23
Demolition Supervisor	Construction Regulation 14
Drivers and Operators of Construction Vehicles or Plant	Construction Regulation 23
Electrical Installation and machinery on construction sites	Construction Regulation 24
Emergency/Security/Fire Coordinator	Construction Regulation 29
Excavation Supervisor	Construction Regulation 13
Explosive actuated fastening device	Construction Regulation 21
Fall Protection Supervisor	Construction Regulation 10
First Aider	General Safety Regulation 3
Fire Equipment Inspector	Construction Regulation 29
Temporary Works Designer and Temporary Works Supervisor	Construction Regulation 12
Hazardous Chemical Substances Supervisor	HCS Regulations
Incident Investigator	General Admin Regulation 29
Ladder Inspector	General Safety Regulation 13A
Cranes	Construction Regulation 22
Materials Hoist Inspector	Construction Regulation 19
OH&S Committee	OH&S Act Section 19
Construction OH&S Officer	Construction Regulation 8(5) & 8(6)
OH&S Representatives	OH&S Act Section 17
Person Responsible for Machinery	General Machinery Regulation 2
Scaffolding Supervisor	Construction Regulation 16
Stacking and Storage Supervisor	Construction Regulation 28
Structures Supervisor	Construction Regulation 11

Appointment	Regulation
Suspended Platform Supervisor	Construction Regulation 17
Tunnelling Supervisor	Construction Regulation 15
Bulk Mixing Plant Supervisor	Construction Regulation 20
Working on/next to Water Supervisor	Construction Regulation 26
Welding Supervisor	General Safety Regulation 9

It is a requirement that a part-time Construction health and safety officer is appointed as per Construction Regulation 8(5) and that the Construction health and safety officer complies with the requirements of Construction Regulation 8(6).

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In addition, the Employer requires that a Traffic Safety Officer be appointed. The above appointments shall be in writing and the responsibilities clearly stated together with the period for which the appointment is made. This information shall be communicated and agreed with the appointees. Notice of appointments shall be submitted to the Employer. All changes shall also be communicated to the Employer.

The contractor shall, furthermore, provide the Employer with an organogram of all subcontractors that he has appointed or intends to appoint and keep this list updated and prominently displayed on site.

C3.5.2.3.3 Designation of OH&S Representatives (Section 17 of the OH&S Act)

Where the contractor employs more than 20 persons (including the employees of subcontractors) he has to appoint one OH&S representative for every 50 employees or part thereof. This is a minimum (legal) requirement. The contractor may at his own discretion appoint more OH&S Representatives according to site specific requirements. General Administrative Regulation 6 requires that the appointment or election and subsequent designation of the OH&S representatives be conducted in consultation with employee representatives or employees (Section 17 of the Act and General Administrative Regulations 6 and 7). OH&S representatives shall be designated in writing and the designation shall include the area of responsibility of the person and term of the designation. OH&S representatives must be experienced, permanently employed by the contractor or his subcontractors, trained and able to move freely within their designated area of responsibility.

C3.5.2.3.4 Duties and Functions of the OH&S Representatives (Section 18 of the OH&S Act)

The contractor shall ensure that the designated OH&S representatives conduct continuous monitoring and regular inspections of their respective areas of responsibility, focusing on unsafe acts and unsafe conditions and report thereon to the contractor. OH&S representatives shall participate in accident or incident investigations. OH&S representatives shall attend all OH&S committee meetings.

C3.5.2.3.5 Appointment of OH&S Committee (Sections 19 and 20 of the OH&S Act)

The contractor shall establish an OH&S committee, which shall meet at least once a month.

C3.5.2.4 Administrative Controls and the Occupational Health & Safety File
C3.5.2.4.1 The OH&S File (Construction Regulation 7(1)(b))

As required by Construction Regulation 7(1), the contractor and subcontractors shall each keep an OH&S file on site. The following list of documentation is neither exhaustive nor prescriptive but recommended as a guide for the contents of the OH&S file:

- Notification of construction work (Construction Regulation 4)
- Latest copy of OH&S Act (General Administrative Regulation 4)
- Proof of registration and good standing with COID Insurer (Construction Regulation 5(1)(j))

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- OH&S plan agreed with the Employer including the underpinning risk assessment/s and method statements (Construction Regulation 7(1))
- Copies of OH&S committee and other relevant minutes
- Designs/drawings (Construction Regulation 7(1)(e))
- A list of subcontractors including copies of the agreements between the parties and the type of work being done by each subcontractor (Construction Regulation 7(1)(f)) • Appointment/designation forms as per paragraphs C3.5.2.1.1 and C3.5.2.1.2.
- Registers as follows:
 - Accident/Incident register (Annexure 1 of the General Administrative Regulations)
 - OH&S representatives' inspection register
 - Asbestos demolition and stripping register
 - Bulk mixing plant inspections
 - Construction vehicles and mobile plant inspections by controller
 - Daily inspection of vehicles, plant and other equipment by the operator/driver/user
 - Demolition inspection register
 - Designer's inspection of structures record
 - Electrical installations, -equipment and -appliances (including portable electrical tools) - Excavations inspection
 - Explosive actuated fastening device inspection, maintenance, issue and returns register (including cartridges and nails)
 - Fall protection inspection register
 - First aid box contents
 - Fire equipment inspection and maintenance
 - Hazardous chemical substances record
 - Ladder inspections
 - Lifting equipment register
 - Materials hoist inspection register
 - Machinery safety inspection register (including machine guards and lock-outs)
 - Scaffolding inspections
 - Stacking and storage inspection
 - Temporary works inspections
 - Inspection of structures
 - Inspection of suspended platforms
 - Inspection of tunnelling operations
 - Inspection of vessels under pressure
 - Welding equipment inspections
 - Inspection of work conducted on or near water
 - Welfare facilities as provided

C3.5.2.5 Notification of Construction Work (Construction Regulation 3)

The contractor shall, where the contract meets the requirements laid down in Construction Regulation 4 prior to commencement notify the Department of Labour of the intention to carry out construction work and use the form (Annexure 2 in the Construction Regulations) for the purpose.

A copy shall be kept on the OH&S file and a copy shall be forwarded to the Employer for record keeping purposes.

C3.5.2.6 Training and Competence

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The training required by the Act and Regulations shall be included in the contractor's OH&S plan. The contractor shall be responsible for ensuring that all relevant training is undertaken. Only accredited training providers shall be used for the regulatory OH&S training. The contractor shall ensure that his and his subcontractors' personnel appointed are competent and that all training required for doing the work safely and without risk to health, has been completed before work commences. The contractor shall ensure that follow-up and refresher training is conducted as the contract work progresses and the work situation changes. This does not absolve any subcontractors from their responsibilities as employers. Records of all training must be kept on the OH&S file for auditing purposes.

C3.5.2.7 Consultations, Communication and Liaison

OH&S liaison between the Employer, the contractor, the subcontractors, the designer and other concerned parties will be through the OH&S committee as contemplated in paragraph C3.5.2.3.5. In addition to the above, communication may be directly to the Employer or his appointed agent, verbally or in writing, as and when the need arises.

Consultation with the workforce on OH&S matters will be through their construction managers and supervisors, OH&S representatives and the OH&S committee. The contractor shall be responsible for the dissemination of all relevant OH&S information to the subcontractors e.g. design changes agreed with the Employer and the designer, instructions by the Employer and/or his agent, exchange of information between subcontractors, and the reporting of hazardous/dangerous conditions/situations. The contractors' most senior manager on site shall be required to attend all OH&S meetings.

C3.5.2.8 Checking, Reporting and Corrective Actions
C3.5.2.8.1 Monthly Audit by Employer (Construction Regulation 5(1)(p))

The Employer will conduct monthly health and safety, and document verification audits in compliance with Construction Regulation 5(1)(o) in order to ensure that the contractor has implemented and is maintaining the agreed and approved OH&S plan.

C3.5.2.8.2 Other Audits and Inspections by the Employer

The Employer reserves the right to conduct other ad hoc audits and inspections as deemed necessary. This will include site safety walks.

C3.5.2.8.3 Contractor's Audits and Inspections

The contractor must conduct his own regular internal audits to verify compliance with his own OH&S management system, as well as with this specification. The contractor shall furthermore ensure that each subcontractor's health and safety plan is being implemented by conducting periodic audits at intervals mutually agreed between the contractor and subcontractors, but at least once per month.

C3.5.2.8.4 Inspections by OH&S Representative's and other Appointees

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OH&S representatives shall conduct weekly inspections of their areas of responsibility and report thereon to their foreman or supervisor whilst other appointees shall conduct inspections and report thereon as specified in their appointments e.g. vehicle, plant and machinery drivers, operators and users must conduct daily inspections before start-up.

C3.5.2.8.5 Recording and Review of Inspection Results

All the results of the abovementioned inspections shall be in writing, reviewed at OH&S committee meetings, endorsed by the chairman of the meeting and placed on the OH&S File.

C3.5.2.9 Accidents and Incident Investigation (General Administrative Regulation 9)

The contractor and his subcontractors shall coordinate their investigation of all accidents/incidents where employees and non-employees were injured to the extent that he/she/they had to be referred for medical treatment by a doctor, hospital or clinic. The results of the investigation shall be entered into an accident/incident register listed in paragraph C3.5.2.4.1.

The affected subcontractor shall be responsible for the investigation of all minor and non-injury incidents as described in Section 24(1)(b) & (c) of the Act and keeping a record of the results of such investigations including the steps taken to prevent similar accidents in future.

C3.5.2.10 Reporting

The contractor shall provide the Employer with copies of all statutory reports required in terms of the Act within 7 days of the incident occurring.

C3.5.2.11 Medical certificate of fitness (Construction Regulations 7(1)(g) and 7(8))

The Contractor as well as the subcontractor (where appointed) shall ensure that all their employees have a valid certificate of fitness, specific to the construction work to be performed and issued by an occupational health practitioner, in the form of Annexure 3 to Government Gazette No 37305 of 7 February 2014.

C3.5.3 OPERATIONAL CONTROL

C3.5.3.1 Operational Procedures

Each construction activity shall be assessed by the contractor so as to identify operational procedures that will mitigate against the occurrence of an incident during the execution of each activity. This specification requires the contractor:

- to be conversant with all relevant Regulations;
- to comply with their provisions; and
- to include them in his OH&S plan where relevant.

C3.5.3.2 Emergency Procedures

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Simultaneous with the identification of operational procedures (per paragraph C3.5.3.1 above), the contractor shall similarly identify and formulate emergency procedures in the event an incident does occur. The emergency procedures thus identified shall also be included in the principal contractor's OH&S plan, and communicated as part of induction training. It is the responsibility of the first aid worker, together with the construction supervisor, to make an assessment regarding

the severity of injuries and which actions are appropriate. For example: transfer to a medical facility by ambulance or helicopter.

C3.5.3.3 Personal and Other Protective Equipment (Sections 8/15/23 of the OH&S Act)

The contractor shall identify the hazards in the workplace and deal with them. He must either remove them or, where impracticable, take steps to protect workers and make it possible for them to work safely and without risk to health under hazardous conditions.

Personal protective equipment (PPE) should, however, be the last resort and there should always first be an attempt to apply engineering and other solutions to mitigating hazardous situations before the issuing of PPE is considered.

Where it is not possible to create an absolutely safe and healthy workplace the contractor shall inform employees regarding this and issue, free of charge, suitable equipment to protect them from any hazards being present and that allows them to work safely and without risk to health in a hazardous environment.

It is a further requirement that the contractor maintains the said equipment, instructs and trains the employees in the use of the equipment, and ensures that the prescribed equipment is used by the employee/s.

Employees do not have the right to refuse to use/wear the equipment prescribed by the Employer and, if it is impossible for an employee to use or wear prescribed protective equipment through health or any other reason, the employee cannot be allowed to continue working under the hazardous condition/s for which the equipment was prescribed but an alternative solution has to be found that may include relocating or discharging the employee.

The contractor shall include in his OH&S plan the PPE he intends issuing to his employees for use during construction and the sanctions he intends to apply in cases of non-conformance by his employees. Conformance to the wearing of PPE shall be discussed at the weekly inspection meetings.

C3.5.3.4 Other Regulations

Wherever in the Construction Regulations or this specification there is reference to other regulations (e.g Construction Regulation 24: Electrical Installations and Machinery on Construction Sites) the contractor shall be conversant with and shall comply with these regulations.

C3.5.3.5 Public Health and Safety (Section 9 of the OH&S Act)

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The contractor shall, as far as is reasonably practicable, be responsible for ensuring that nonemployees affected by the construction work are made aware of the dangers likely to arise from said construction work as well as the precautionary measures to be observed to avoid or minimise those dangers. This includes:

- non- employees entering the site for whatever reason; • the surrounding community; and
- passers-by to the site.

C3.5.4 PROJECT/SITE SPECIFIC SPECIFICATIONS

The following is a generic list of a Risk Assessment and Site specific health and safety specifications prepared by the Employer in terms of Construction Regulations 5(1)(a) and 5(1)(f):

- Clearing and grubbing of the area/site
- Site establishment including:
 - Office/s
 - Secure/safe storage for materials, plant and equipment
 - Ablutions
 - Sheltered eating area
 - Maintenance workshop
 - Vehicle access to the site
 - Temporary fuel storage, where applicable
- Dealing with existing structures – possibility of asbestos
- Location of existing services e.g. gas, telecommunications, electrical supply and similar
- Installation and maintenance of temporary construction electrical supply, lighting and equipment
- Adjacent land uses/surrounding property exposures
- Boundary and access control/public liability exposures (NB: the Employer is also responsible for the OH&S of non-employees affected by his work activities.)
- Health risks arising from neighbouring as well as own activities and from the environment e.g. threats by dogs, bees, snakes and lightning
- Exposure to noise
- Exposure to vibration
- Protection against dehydration and heat exhaustion
- Protection from wet and cold conditions
- Dealing with HIV/Aids and other diseases such as silicosis or asbestos, where applicable
- Use of portable electrical equipment including
 - Angle grinder
 - Electrical drilling machine
 - Circular saw
 - Generator
- Excavations including
 - Ground/soil conditions
 - Trenching
 - Shoring
 - Drainage of trenches

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- Welding including
 - Arc welding
 - Gas welding
 - Flame cutting
 - Use of LP gas torches and appliances
- Loading and off-loading of trucks
- Aggregate/sand and other materials delivery
- Manual and mechanical handling
- Lifting and lowering operations
- Driving and operation of construction vehicles and mobile plant including
 - Trenching machine
 - Excavator
 - Bomag roller
 - Plate compactor
 - Front end loader
 - Mobile cranes and the ancillary lifting tackle
 - Grader
 - Parking of vehicles and mobile plant
 - Towing of vehicles and mobile plant
- Use and storage of flammable liquids and other hazardous substances e.g. petrol, diesel, cement, asphalt, bituminous materials and similar
- Layering and bedding
- Installation of pipes in trenches
- Pressure testing of pipelines
- Backfilling of trenches
- Protection against flooding
- Gabion work
- Use of explosives
- Protection from overhead power lines (high and low)
- Work adjacent to or in proximity of railway lines
- Work adjacent to or in proximity of traffic
- Working at heights
- Working in confined spaces – tunnelling
- Formwork and support work (temporary works) including scaffolding
- Demolition work, where applicable
- Bulk mixing plant, where applicable

Environmental impacts such as pollution of water, air or soil

C3.6 STANDARD SPECIFICATION

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C3.6.1 STANDARD SPECIFICATION: GENERAL DESIGN

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C3.6.1.1 SCOPE

This standard specification covers general design criteria and standards applicable to all sections of work. Should the requirements of this standard specification be in conflict with any other standard specification or the detail specification, the other standard specification or detail specification shall govern and the tenderer/contractor shall seek information of such precedence from the engineer.

C3.6.1.2 DESIGN

C3.6.1.2.1 The works shall be designed to facilitate easy accessibility, equipment replacement, maintenance, handling, inspection cleaning and repairs and to ensure satisfactory operation in which safety of plant, personnel and public and continuity of service is the first consideration.

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- C3.6.1.2.2 All plant, equipment and apparatus shall operate satisfactory under the ambient and other conditions prevailing at the site.
- C3.6.1.2.3 All apparatus shall be designed to prevent the risk of accidental short circuits due to animals, birds, ants and vermin.
- C3.6.1.2.4 All moving, rubbing or wearing surfaces shall be machined or ground where they bear upon each other.
- C3.6.1.2.5 The plant and equipment shall be designed and constructed to keep maintenance costs and the number of persons employed for maintenance to a minimum.
- C3.6.1.2.6 All the equipment shall be to the approval of the engineer and shall, unless otherwise specified, be suitably designed for operation on normal electrical supply systems, with voltage fluctuations of plus and minus 10% and under such sudden variations of load and voltage as may be met with under working conditions.
- C3.6.1.2.7 The design of equipment shall include as a major consideration the absolute safety of the general public, operating and maintenance personnel.
- C3.6.1.2.8 All dimensions, units and design parameters shall be in accordance with the international metric (SI) system.

C3.6.1.3 STANDARDS

- C3.6.1.3.1 All electrical equipment shall be of approved manufacture and its construction, design and testing shall be in accordance with the requirements of the most recent South African, British Standards or IEC publications including all amendments issued thereto up to the date of tender. The installation and equipment shall also comply with the relevant clauses of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993), and the regulations promulgated in terms of the Act, and with the Code of Practice for The Wiring of Premises, SANS 10142-1:2001 and SANS 10142-2
- C3.6.1.3.2 Notwithstanding reference in this specification to South African or British Standards and IEC or ISO recommendations the supplier may submit for approval material and designs conforming to other technically equivalent national standards, provided that the supplier supplies the engineer with a translation of the standards into English and satisfactory proof of actual compliance therewith.

C3.6.1.4 QUALITY OF MATERIAL

All material shall be new and of a design and class suitable for working under the conditions specified, and shall withstand the variations of temperature and atmospheric conditions arising under working conditions without distortion, deterioration, or the setting up of undue stresses in any part such as to affect the efficiency and reliability of the plant and also without affecting the strength and suitability of the various parts for the duty which they have to perform.

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C3.6.1.5 INTERCHANGEABILITY

Corresponding parts throughout the works shall be made to such close tolerances that all similar components and spares shall be fully interchangeable without any further alterations or adjustments being necessary.

C3.6.1.6 BOLTS AND NUTS

C3.6.1.6.1 The threads of all bolts, nuts and studs shall be in accordance with SANS 1700-7-3-1996.

C3.6.1.6.2 No brass bolt or stud shall have a diameter of less than 6 mm.

C3.6.1.6.3 All nuts and studs shall be locked in position by lock washers and where necessary, lock nuts.

C3.6.1.6.4 Each bolt shall protrude by at least one but not more than five threads through the nut with all washers in position.

C3.6.1.6.5 All bolts, nuts and washers used outdoors shall be of approved materials and treated to prevent corrosion of the threads.

C3.6.1.6.6 The contractor shall provide special tools if any bolt, nut, screw or other fastener is used in a position which is not accessible using conventional tools. This also applies where the size or shape of the fastener is not conventional.

C3.6.1.7 FIRE PRECAUTIONS

All apparatus, connections and cabling shall be designed and arranged to minimise the risk of fire and any damage which might be caused in the event of fire.

C3.6.1.8 GALVANISING

C3.6.1.8.1 Where galvanising is specified, or is a requirement of the design, such galvanising shall be performed by the hot-dip process to SANS 5763.

C3.6.1.8.2 For all parts, other than wires, the equivalent zinc coating thickness shall not be less than 455 g of zinc per square metre of surface area.

C3.6.1.8.3 The galvanising must be clean, smooth, of uniform thickness, unblemished and free from defects.

C3.6.1.8.4 The preparation for galvanising and the galvanising itself shall not adversely affect the mechanical properties of the coated material.

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- C3.6.1.8.5 All drilling, welding, cutting, sawing, punching, filing and bending shall be complete and the metal shall be cleaned of any machining blemishes, millscale, rust and lubricants, before galvanising.
- C3.6.1.8.6 Galvanised areas must be kept free of lubricants. Surfaces which are in contact with oil shall not be galvanised or cadmium plated.
- C3.6.1.8.7 Electrolytic deposition of zinc is not acceptable.
- C3.6.1.8.8 Where it is not practicable to coat the surface of metal by the hot-dip galvanising process, such equipment may be zinc-sprayed instead. The surface being zinc-sprayed shall be suitably prepared in accordance with the requirements of the process adopted and the rate of deposition of zinc shall not be less than 760 g per square metre of surface area. After zinc spraying the surface shall be painted with a suitable paint to render it completely impervious.

C3.6.1.9 WELDING

- C3.6.1.9.1 All welding shall comply with the appropriate international standards such as BS 1856 (General specification) and BS 709 (methods of testing).
- C3.6.1.9.2 The welding shall be executed in accordance with modern accepted practice for welding and shall be sound, full strength and free from undercut and slag inclusions. Crater effects at the ends of weld runs shall be eliminated.
- C3.6.1.9.3 Intermittent welding and incomplete penetration butt welding will not be accepted.
- C3.6.1.9.4 All fabricated items shall be stress relieved after welding.
- C3.6.1.9.5 The supplier shall well in advance of the commencement of fabrication, submit for approval details of proposed welding procedures.

C3.6.1.10 RADIO AND TV INTERFERENCE

- C3.6.1.10.1 All equipment installed under this contract shall comply with the RSA Government Notice No R2246 and any other applicable rules and regulations in respect of radio and TV interferences.
- C3.6.1.10.2 Any equipment found producing Radio or TV interference subsequent to commissioning, shall be suppressed or replaced to the satisfaction of the engineer without any cost to the employer.

C3.6.1.11 LABELS AND NOTICES

- C3.6.1.11.1 Identification labels must be attached to all equipment, motors, control gear and all panels and the equipment contained therein.

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C3.6.1.11.2 All labels and plates shall be of an approved non-corrosive material and shall be fixed with stainless steel or nickel-plated screws of ISO metric thread form.

C3.6.1.11.3 Labels shall have a matt or satin finish to minimize reflection.

C3.6.1.11.4 Labels shall have black lettering on a white background. Danger plates shall have white lettering on a red background.

C3.6.1.11.5 Cables shall be labelled at both ends, at through joints and at regular intervals.

C3.6.1.11.6 Cables shall be labelled on both sides of the place where the cable passes through a permanent obstruction.

C3.6.1.11.7 For outdoor applications labels shall be of aluminum, with letters filled in black, lightly sanded with fine grit paper and clear lacquered.

C3.6.1.11.8 All lettering shall be in uppercase letters except where standard abbreviations of units are used, eg kWh, KVA, etc.

C3.6.1.11.9 The wording of labels and character height shall be to the approval of the engineer.

C3.6.1.11.10 All labels shall be in English. In addition to the English text, all Warning/Danger labels shall also be in Afrikaans and seTswana.

C3.6.1.12 CLEANING AND PAINTING

C3.6.1.12.1 The cleaning and painting of all exposed surfaces of all plant and accessories, unless otherwise specified or approved, shall be carried out as follows:

(a) Surface preparation

All metal work shall be thoroughly cleaned by blast cleaning or pickling so as to be free of all millscale, dirt, rust, welding slag and spatter, grease and all other contaminants and so as to present a dry, bright metallic finish.

(b) Priming

The metal work shall be primed with an approved primer which, for equipment intended for outdoor use, shall be red lead based and for indoor mounted equipment shall be phosphate based.

(c) Finishing

The primed surfaces shall be finished with an approved Bitumen Aluminium based paint.

C3.6.1.13 WATER AND DEBRIS ACCUMULATION

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All outdoor equipment must be designed so that water and debris will not readily accumulate to cause deterioration of equipment or an electrical discharge hazard. Where this cannot be avoided such places shall be easily accessible for cleaning.

C3.6.1.14 INSPECTION AND TESTS

C3.6.1.14.1 All equipment will be inspected and tested, both in the factory during manufacturing and on site during installation. The tests required are prescribed in the standard and detail specification. The engineer will do all inspections accompanied by the contractor and the contractor shall perform all tests with the engineer as witness.

C3.6.1.14.2 The engineer will require seven (7) days notification to avail himself for any tests or inspection. The contractor shall arrange for the maximum number of tests and inspections to be done on the same day.

C3.6.1.14.3 The contractor shall provide all testing facilities and instruments and all equipment and labour required for a test or inspection. All instruments shall be adequately scaled for the application. All testing facilities and instruments remain the property of the contractor.

C3.6.1.14.4 All instruments used shall have a valid test certificate issued by an accepted testing authority. The engineer reserves the right to call for a calibration test on any instruments used during the test.

C3.6.1.14.5 The contractor shall record all results of the tests done on a test certificate, of which the engineer must receive two (2) copies.

C3.6.1.14.6 The contractor shall ensure that the equipment is ready for testing or inspection and that the equipment conforms to the specifications before the engineer is requested to witness tests or

inspections. Should it be found that the equipment or contract works is not ready for testing/inspection, or does not conform to the specification, the engineer reserves the right to charge the contractor for any retests or subsequent costs.

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C3.6.2 STANDARD SPECIFICATION : POWER CABLES

C3.6.2.1 STANDARD SPECIFICATION : LOW VOLTAGE PVC INSULATED POWER CABLES

CONTENTS

C3.6.2.1.1 <u>SCOPE</u>	95
C3.6.2.1.2 <u>STANDARD</u>	95

C3.6.2.1.1 SCOPE

This specification covers the supply of 600 / 1000 V PVC insulated power and control cables. All cables shall be rated 600 / 1000 V.

C3.6.2.1.2 STANDARD

Cables shall be manufactured strictly in accordance with the requirements of the latest edition of SANS 1507.

C3.6.2.2 STANDARD SPECIFICATION : LOW VOLTAGE Aerial Bundled Conductor (ABC) POWER CABLES

CONTENTS

C3.6.2.2.1 <u>SCOPE</u>	95
C3.6.2.2.2 <u>STANDARD</u>	95

C3.6.2.2.1 SCOPE

This specification covers the supply of 600 / 1000 V Aerial Bundled Conductor (ABC) - XLPE, UV Protection, power cables. All cables shall be rated 600 / 1000 V.

C3.6.2.2.2 STANDARD

Cables shall be manufactured strictly in accordance with the requirements of the latest edition of SANS 1418.

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C3.6.2.3.1 SCOPE

This specification covers the supply of 6.65/11kV XLPE insulated, copper tape screened, PVC bedded, SWA, PVC sheathed, power cables. All cables shall be rated 6.65/11kV.

C3.6.2.3.2 STANDARD

Cables shall be manufactured strictly in accordance with the requirements of the latest edition of SANS 1339.

C3.6.3 STANDARD SPECIFICATION: MEDIUM VOLTAGE AND LOW VOLTAGE CABLE INSTALLATION

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C3.6.3.1 SCOPE

This section covers the supply and installation of medium voltage and low voltage cables.

C3.6.3.2 MATERIALS

C3.6.3.2.1 Medium voltage cable joints and terminations

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The medium voltage cable joints and terminations shall be as specified in section C3.2.8

C3.6.3.2.2 Low voltage cable joints and terminations

Low voltage joints shall be of the epoxy-resin type, no heat shrink joints shall be used.

For indoor use the cable glands shall be of the adjustable type, equal or similar to the Pratley gland and shall be suitable for use with SWA PVC cables complying with the latest edition of SABS 1507-1. All glands shall be installed with non-deteriorating neoprene shrouds.

For outdoor use the cable glands shall be as for indoor use with the addition of a nipple gasket and inner seal kit, rendering the gland suitable for type "e" equipment (increased safety equipment).

In high corrosive areas, such as chlorination, chemical dosing and inlet works areas, the cable gland shall offer a minimum degree of protection according to SABS 1222 of IP 66, shall be suitable for type "e" equipment, shall be corrosion proof and shall have a positive seal internal to the cable gland that seals over the cable outer sheath. For these applications no shrouds are required.

For all gland installations on armoured cable, the outer sheath of the cable shall be cut back in accordance with the gland manufacturers' recommendations, so that a minimum of armouring is exposed between the gland and the outer sheath after gland installation. The shroud shall seal on the outer sheath of the cable.

Bi-metallic aluminium-copper lugs, equal or similar to SIMEL type ACX, shall be used according to the manufacturer's specifications, where solid aluminium conductors are terminated onto copper busbars.

C3.6.3.2.3 Earth continuity conductors

Earth continuity conductors shall comprise of stranded copper conductors of cross-section indicated in the detailed specification.

A single earth conductor may be used where two or more cables run together, providing the earth conductor cross-sectional area is based on the largest size cable in the run.

C3.6.3.2.4 Cable warning tape

The plastic cable warning tape shall consist of a strip of polyethylene of thickness 0,04 mm and of nominal width 230 mm, completely impregnated with a pigment such that the colour of the tape is yellow, colour No B49 of SABS 1091, and having printed at intervals not exceeding 1 metre along its length, a black-triangle and an electric flash symbol and the words "Danger, Gevaar, Ingozi".

The plastic warning tape shall be installed on all cable routes (LV and MV) at 200 mm above the top cable layer. Where a cable route exceeds 600 mm in width multiple warning tapes shall be run in such a way that the space between adjacent warning tapes does not exceed 185 mm.

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C3.6.3.2.5 Concrete protective slabs

Concrete protective slabs shall have the following dimensions:

Length	1 000 mm
Width	350 mm
Thickness	50 mm

The slabs shall be constructed of 20 MPa concrete and each slab shall be reinforced with one longitudinal and three transverse mild steel rod of minimum diameter 8 mm. The slabs shall be manufactured in such a way that the slabs interlock with each other thus avoiding shifting of the slabs after installation.

C3.6.3.2.6 Cable sleeves

Cable sleeves shall be as specified in THE "STANDARD SPECIFICATION : SUPPLY AND INSTALLATION OF CABLE SLEEVES" SECTION of the standard specifications.

C3.6.3.3 EXCAVATIONS

C3.6.3.3.1 General

The contractor shall preserve the site as far as possible. Only the minimum of trees, shrubs, rocks, etc shall be removed and cleared for the cable route.

Where surplus material has to be disposed of the contractor shall dump the material in the area provided by him.

The contractor shall at his own cost load and transport to the above mentioned site all surplus material, unsuitable material for backfilling etc.

C3.6.3.3.2 Trench routes

The cable trench shall be excavated along the routes indicated on the relevant drawings.

The trench shall be absolutely straight and shall comply with all requirements. The engineer shall determine the length of the trench to be excavated, which shall not exceed 400 m, before the cable is installed and the trench backfilled.

If any obstacle or interference should be encountered which may require alterations to the trench or routes, such alterations shall receive prior written approval of the engineer.

C3.6.3.3.3 Cable trench

The trench shall be excavated to a depth indicated on the drawings for the different cables. Where depths are not indicated on the drawings, the following shall apply:

For MV cables 1500 mm and for all LV cables the trench shall be deep enough so that the top layer of LV cables is buried a minimum of 1500 mm below final ground levels.

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The contractor shall excavate by hand where he cannot excavate by means of machines due to limited access and the proximity of other services.

The bottom of the trench shall be level and shall follow the contours of the final ground level. Where the excavation is in excess of the required depth, the excavation shall be backfilled and compacted with suitable material to the required depth.

The contractor shall trim the trenches and clean up the bottom of the trenches after he has completed the required excavation. Bedding and cables shall not be laid until the trench has been approved by the engineer. Where bedding has already been laid the engineer may instruct the contractor to demonstrate that the minimum thickness of bedding has been provided for

before authorizing cable laying to proceed.

The contractor shall remove all sharp projections which could damage the cable where the trench is excavated through rocky formations, and shall remove all loose rocks, material, etc from the bottom of the trench.

C3.6.3.3.4 Excavation of jointing chambers

Jointing pits shall be excavated to a depth of 1,2 m and shall be rectangular in shape and large enough for the cable jointers to work comfortably and in an efficient manner. Where more than one joint is to be made in the same position the joint pit shall be large and long enough to allow staggered joints to be made. The minimum size of a joint pit shall be as follows:

- one joint : 2,5 m long x 1,25 m wide
- two joints : 3,0 m long x 1,5 m wide

C3.6.3.3.5 Excavated material

No excavated material shall be left closer than 300 mm from the side of the excavation. The excavated material which is considered by the engineer to be suitable for bedding material for the cable shall be placed separately on one side of the trench so that it is available when required. The excavated material shall take up as small an area as possible with the safety of the workmen and Works taken into consideration.

C3.6.3.3.6 Inspection and measurement of excavations

Once the excavations for cable trenches and joint pits have been completed, the contractor shall give the engineer 24 hours notice to inspect the trench and to be present when the measurements are made. No inspections shall be undertaken on Saturdays, Sundays and public holidays.

Full detail of the cable trench dimensions and classification of the type of excavation shall be recorded and signed by the contractors representative and the engineers representative as the final quantities for such excavations.

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Inspections and recordings shall be completed before the installation of any bedding or backfilling. The contractor shall be responsible to keep all records as proof of progress and as basis for claims for payment.

C3.6.3.3.7 Maintenance of excavations

The contractor shall maintain the excavation in a good condition, free of water, mud, loose ground, rocks, stones, gravel and other strange material until the cables are installed and the excavation is backfilled and compacted.

C3.6.3.4 INSTALLATION OF CABLES

C3.6.3.4.1 Sand bed for cables

A sand bed layer of soft soil shall be installed and levelled at the bottom of each trench after the trench has been approved by the engineer, and prior to cable laying.

The minimum thickness of the sand bed layer is 150 mm.

If the material that has been excavated is not suitable for the sand bed layer then suitable soil shall be imported for this purpose. The cost thereof shall be included in the unit price for the excavation unless otherwise specified.

An adequate quantity of concrete with a strength of 20 MPa shall be available when an inspection of the cables is called for. The concrete bed cover for MV and LV cables shall be a minimum of 150 mm thick and shall be placed directly after the cable(s) has been inspected.

C3.6.3.4.2 Cables shall be laid without delay

The cable shall, after the completion of the trench, be laid with the minimum of delay so that the trench can be backfilled. The contractor shall, however, not backfill the trench until each length of cable has been inspected and approved by the engineer.

Only one cable shall be laid at a time and the contractor shall take precautions that the cables which are already installed are not damaged.

C3.6.3.4.3 Laying of cables

The method to be used for laying cables shall be approved by the engineer prior to the commencement of the laying of the cables.

Cable rollers shall be used when cables are drawn into trenches. The cable rollers shall be placed so that the cable does not touch the bottom or the sides of the trench. The rollers shall be of an approved construction without any sharp metal parts which could damage the cables.

If the contractor intends using a winch to draw the cable into the trench, a cable stocking shall be used or the draw wires shall be soldered to the cable so that the tension is exerted on all the cores, lead sheath and/or steel wire armouring at the same time.

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The maximum tension on a cable during laying operations shall not exceed the value specified by the manufacturer.

Should the engineer not be satisfied with the manner or method employed to lay the cable he shall have the authority to instruct the contractor to lay the cable by hand or in accordance with approved standards.

The medium-voltage cables shall be laid in such a manner that the beginning of a drum shall be laid from the end of the previous drum to ensure that the lay of the cores remain the same.

Medium-voltage cables shall overlap by at least 1 m, but not more than 1,5 m at joints.

Sufficient lengths of cable shall be left at the beginning and end of the cable routes to allow for the termination of the cables. Where necessary the engineer shall decide on what length of cable is to be left. The contractor shall take the necessary precautions to protect the cable ends until they are terminated. The cable ends shall be sealed by means of lead or heat shrink sealing caps to ensure that the cable is waterproof.

Where cables are drawn through sleeves, care shall be taken that they are not kinked or excessively bent. No bend in a cable shall have a radius less than the minimum bending radius specified by the cable manufacturer.

The contractor shall keep accurate records of each length of cable laid. The following information shall be recorded:

- Cable drum number
- Size of cable
- Laid from where to where - Length of cable - Date laid.

The contractor shall be liable for the repair of the cable due to the faulty manufacture of the cable, should this information not be recorded directly after the cable has been laid.

Every cable shall be marked by means of an aluminium label on which the size of cable and its source or destination and cable number is punched. The label shall be installed around the inner PVC sheath immediately above the cable gland.

C3.6.3.4.4 Verification of cables

The contractor shall be solely responsible for inspecting all cables before backfilling to ensure that the correct type and number of cables have been installed.

The engineers representative shall inspect all cable trenches before backfilling to ensure that the laying of cables complies with the specification.

During this inspection the contractor's and engineer's representative shall record the lengths for all cables and all such records shall be signed by both representatives as the final quantities. The

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contractor shall be responsible to keep the records as proof of progress and as basis for claims for payment.

C3.6.3.4.5 Road crossings

The cable sleeves shall be installed 1,5 m below ground level to avoid damage when the roads are constructed.

Unless otherwise specified, two additional sleeves shall be installed for future use at each road crossing.

Sleeves used for crossings shall be straight and undamaged. Bends shall not be allowed in road crossings.

After the installation of the sleeves, the sleeves shall be meticulously backfilled so that no air pockets are left. The trench shall thereafter be backfilled in layers of 150 mm and compacted

with mechanical vibrators to 95% modified AASHTO density.

The contractor shall lay and join the cable sleeves and compact the trench to the satisfaction of the engineer. After installation, the sleeves shall be cleaned and a galvanized steel draw wire installed in the sleeve prior to the sleeve ends being sealed by means of plastic plugs.

C3.6.3.4.6 Crossing of other services

Where a cable crosses over other services, the cable shall not be installed at a depth less than 800 mm below ground level and if this is not possible the cable shall be installed underneath the other service and shall be protected in the prescribed manner by means of concrete slabs. The depth of the cable shall be maintained for one metre on either side of the crossing.

If it is not possible to cross over or underneath a service in the prescribed manner, the matter shall be referred to the engineer for a decision.

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The following minimum clearances shall be maintained between electrical cables and other services:

	Vertical	Horizontal
GPO Cables	0,3 m	0,3 m
Water pipes	0,3 m	0,3 m
Sewer pipes	0,3 m	0,8 m
Storm water pipes	0,3 m	0,6 m
Other electrical cables in same route)	0,15 m	0,15 m (Other than LV cables
LV cables on same route cable diameter of larger cable	0,100 m	One

C3.6.3.4.7 Backfilling of trenches

When the cable has been laid, inspected and approved and the sand bed cover as specified in the clause on "Sandbed for cables" has been installed, the trench shall be backfilled with soil containing not more than 40% rock or shale which shall be able to pass through a 100 mm sieve and which is approved by the engineer.

Where more than 40%, but less than 70% rock occurs, the contractor shall replace the rock with imported soil. However, should more than 70% rock occur then all the backfilling material shall be imported.

- The contractor may import further stone-free material to the site or sieve the excavated material for sand bedding and cover but payment shall only be compensated for the actual quantity of imported material required as determined by the engineer. The quantity of imported material required shall be calculated from the nominal trench width.
- The excavated material shall be backfilled in layers of 150 mm and shall be well compacted and consolidated to 93% MOD AASHTO. Where necessary the engineer may require that a mechanical vibrator be used for compacting the trench.
- The contractor shall maintain the completed sections of the cable trench in a proper safe condition for the duration of the contract. The contractor shall refill and compact the trench where subsidence occurs.
- After completion of the work the route of the cable shall be neatly finished off and cleared. All stones bigger than 25 mm as well as all loose organic material and rubble shall be removed.

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C3.6.3.4.8 Installation of concrete slabs and cable markers

Where cables cross other services such as water pipes, sewage pipes and other cables or where the chance exists that the cable may be damaged as a result of excavation by others, the cable shall be protected by means of reinforced concrete slabs. The slabs shall protect the cable for

a distance of 500 mm on either side of the crossing.

Cable route markers shall be installed to indicate the cable route and positions of cable joints and cable sleeves. The markers shall be buried in the ground directly over the cable, joint, sleeve, or where the cable crosses a known service, with the top protruding 50 mm above the finished ground level. Route markers shall be placed at every change in direction and at 100 m intervals on straight runs.

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C3.6.3.5 JOINTING AND TERMINATION OF MEDIUM-VOLTAGE CABLES

The contractor shall provide the engineer with documentary proof that he has qualified, experienced and competent cable jointers in his employ to execute the work to the satisfaction of the engineer.

The contractor's jointer(s) shall thereafter demonstrate to the engineer or his representative that he/they are completely conversant with the standard jointing methods by doing a test joint for each type of cable to be installed on the contract.

The test joint may at the discretion of the engineer be a joint which is to be made in the execution of the contract. The jointer(s) shall be permitted to proceed with the jointing should the engineer be satisfied with the test joint and the test joint withstands a medium-voltage test. Notwithstanding the aforementioned, the engineer may at his discretion require that any one of the joints completed be opened and inspected to determine whether the joints comply with the requirements before the contractor shall be allowed to proceed with the jointing.

The requirements in these clauses shall also apply to all new cable jointers employed during the duration of the contract to do cable jointing on the contract.

No jointer shall be permitted to do more than two joints per day.

The engineer shall be informed in advance of when jointing is to take place to enable him to inspect the joint.

The jointer shall, before he commences with the jointing, ensure that:

- he has sufficient and suitable material to properly and efficiently complete the joint
- the joint chamber is dry
- all stones, loose ground, sticks, leaves etc., is removed from the joint chamber
- the walls and sides of the joint chamber is firm and free of loose ground, stones, gravel etc., which could fall into the chamber
- the necessary barriers are made to keep water out of the joint chamber
- the necessary cover is provided over the joint chamber to keep unexpected rain out of the chamber and that enough light and ventilation is provided under the cover
- he has the necessary material to seal off the joint or termination when he has to discontinue jointing or terminating the cable due to unexpected storms or flooding of the chamber which makes it impossible to continue jointing or terminating the cable, irrespective of how far the work has commenced
- he has the necessary ground sheets to line the floor of the joint chamber

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- the cable and other materials are dry, undamaged and in all respects suitable for jointing or terminating
- his equipment and tools are at all times dry, clean and absolutely free of ground

No jointing or terminating shall commence in rainy weather without the prior approval of the engineer. When the jointer commences with a joint he shall complete the joint before he leaves the site

The contractor is responsible to ensure that the requirements are carried out by his jointer.

No cable jointer shall be allowed to terminate more than two ends per day.

The standard phase arrangement shall be observed when connecting up cables in the end boxes. The contractor shall ensure that the prescribed phase arrangement is at all times maintained on the external terminals of the end boxes.

C3.6.3.6 JOINTING AND TERMINATION OF LOW-VOLTAGE CABLES

No joints shall be allowed in the low-voltage cables without the prior approval of the engineer.

C3.6.3.7 TESTS BEFORE ACCEPTANCE

After the completion of the electrical installation, the contractor shall test the installation in accordance with the requirements of the specification.

The engineer shall have the right to call for or to carry out any additional tests which may be necessary to prove that the requirements of the specification have been met. The contractor shall assist with the conducting of these tests without delay.

All tests shall be conducted in the presence of the engineer and the costs thereof shall be included in the installation rates of the cables, joints and terminations.

C3.6.3.7.1 General

The tests hereinafter described comprises only the site tests and tests before acceptance or handing over of the installation. Where cables and other material are supplied by the contractor the factory and manufacturing tests shall be as specified in the specification.

After the installing and completing of the installation, before the service is taken over, the following tests shall be undertaken. These tests shall form an integral part of the erection, construction or installation of the various items and the costs thereof shall be included in the unit rates for the erection, construction or installation of the various items.

C3.6.3.7.2 Tests on medium-voltage cables

The contractor shall undertake the following tests in the presence of the engineer before the engineer shall agree to accept any part of the installation. The contractor shall, furthermore undertake

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any other tests the engineer may prescribe to satisfy himself that the work is of an acceptable standard.

(a) Voltage tests

Each section of the cable installation between miniature substations shall be subjected to a preliminary voltage or insulation resistance test to prove the insulation resistance.

(b) Continuity test

The resistance between each core and the lead sheath of the cable shall be measured for each section while the core and sheath is short circuited at the far end to ascertain if all connections have been correctly made.

All test instruments shall be of a high quality and shall, if required, be calibrated by the SABS or such body approved by the engineer at the cost of the contractor.

(c) DC medium-voltage tests

Each cable circuit, including joints and terminations, shall be tested by means of a direct current voltage of 18 kV between the different cores and between the cores and the lead sheath or copper tape screen for a period of 15 minutes. The voltage shall be gradually raised to 18 kV and kept there for 15 minutes.

The contractor shall undertake all repairs and replacements at his own costs in the event of the installation failing the above-mentioned tests.

C3.6.3.7.3 Tests on low-voltage cables

(a) Phase and continuity tests

The resistance of each circuit shall be determined by imposing a DC voltage not greater than 100 V between each phase and earth while the phase is short circuited at the end of the cable route.

(b) Voltage tests

The insulation resistance shall be determined by imposing a 2000 volt DC supply between each individual phase and earth at the miniature substations. The insulation resistance shall not be less than 50 megohm.

C3.6.3.8 INFORMATION REGARDING THE COMPLETED NETWORK

The contractor shall submit the "as built" drawings on which complete information of the installation, as installed, is indicated after the completion of the installation and before the installation is handed over to the employer.

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C3.6.3.9 CLEARING OF SITE

The contractor shall remove everything that he brought onto the site or handled on the site in the execution of the contract as well as all excess excavated material and rubble so as to leave the site in a neat and clean condition to the satisfaction of the engineer after the completion of the contract and after the engineer's approval has been obtained.

C3.6.4 STANDARD SPECIFICATION: INSTALLATION OF STREET AND AREA LIGHTING

CONTENTS

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C3.6.4.1 SCOPE

This specification covers the requirements for the supply of small material required to complete the streetlighting installation and the installing, testing and commissioning of street and area lighting installations.

C3.6.4.2 STANDARDS

SANS 1501

C3.6.4.3 MATERIAL

- C3.6.4.3.1** Miniature circuit breakers.
- C3.6.4.3.2** PVC insulated conductors.
- C3.6.4.3.3** Underground cable junction boxes.

C3.6.4.4 SETTING OUT OF THE WORKS

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The contractor shall set out the positions of the poles and the cable route as indicated on the drawings.
The distance between the poles shall be maintained as specified.

C3.6.4.5 EXCAVATIONS

The holes for poles shall be excavated to the following depths:

- Streetlight poles with a mounting height exceeding 10,5 metres: 2,0 metres.
- Streetlight poles with a mounting between 7,5 metres and 10,5 metres: 1,8 metres.
- area light poles with a mounting height exceeding 3,5 metres: 1,0 metre.

The holes for poles shall have minimum dimensions of 1,0 metre by 0,5 metres.

Once the poles have been erected and aligned the excavations shall be backfilled and compacted in layers of 150 mm to 95% MOD AASHTO using material free of stones, vegetation, etc.

Where the soil is sandy, loose or marshy, the poles shall be planted in a 12:1 sand/cement mixture.

C3.6.4.6 PLANTING OF POLES

The poles shall be fitted with a base plate that shall be securely bolted with hook bolts before the pole is planted.

Poles that are designed for mounting on a reinforced concrete foundation by means of a base plate secured to bolts casted into the foundation. The base plate needs to match PCD dimensions of the bolts that are already casted in the foundation.

The contractor shall ensure that the poles are not strained or damaged in any way during the erecting thereof.

The structures shall be vertical to a tolerance of 0,5% at the top of the pole after erection.

The streetlight poles shall be planted with the luminaire outreach extended in the direction of the roadway and so that the outreach arm is perpendicular to the centre line of the road, except if otherwise specified by the engineer.

Under no circumstances shall poles be shortened to create the impression that they have been planted to the correct depth.

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C3.6.4.7 INSTALLATION

- (a) Every pole shall be fitted with a equipment mounting plate fixed inside the pole. The cables shall be terminated on the gland plate fitted to the mounting plate by means of cable glands.
- (b) A 20A circuit breaker with a 5 kA breaking capacity shall be installed near the bottom of each pole. Contractor shall make allowance in his/her pricing for the removal of any fuses including fuse holders and to allow for the wiring of the luminaire/s directly to the 20A circuit breaker.
- (c) Terminal blocks as specified and suitable for the particular cable size shall be fitted on the rail allowed therefore on the mounting plate and the conductors of the cables shall be

terminated therein.
- (d) The cable armouring and the earth continuity conductors shall be terminated on the earth stud provided in the pole by means of crimped lugs.
- (e) The connection between the terminal block on the mounting plate in the pole and the terminal block of the luminaire shall be made using two PVC insulated 1,5 mm² copper conductors, red and black for the phase and neutral conductor respectively, and a 1,5 mm² bare copper earth wire for the earth connection.
- (f) After the pole has been planted and the conductors have been drawn in, the streetlight luminaire shall be mounted on the spigot and securely fastened with the bolts and/or nuts provided.
- (g) All the bolts, nuts, screws and clips of the fitting shall be properly screwed.

C3.6.4.8 TESTING

After the completion of the installation the streetlights and central equipment shall be tested to the satisfaction of the engineer prior to the system being taken over and energised by the supply authority.

C3.6.5 STANDARD SPECIFICATION : LIGHTING SPECIFICATION

CONTENTS

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C3.6.5.1 SCOPE

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This specification covers the requirements for the manufacturing, supply, delivery and off-loading of streetlight luminaires.

C3.6.5.2 STANDARDS

- (a) SABS/SANS 1277
- (b) SABS/SANS 1088
- (c) SABS/SANS 1250
- (d) SABS/SANS 1266
- (e) SANS 60598

C3.6.5.3 HIGHWAY AND STREETLIGHT LUMINAIRES

Quality and performance specification of highway and streetlight luminaires

The luminaire shall bear the SANS IEC 60598-2-3: 2002 Safety Mark, as well as the SABS 1277 (SANS 475).

Luminaire spigot entries shall comply with SANS 1088.

The luminaire shall be of totally enclosed, corrosion- and weather-proof type and shall comply with SANS 60598 where applicable and shall bear an IP rating of 66 for both the lamp and gear compartments.

The tenderer has to confirm that the parameters, as stated in the Technical Design Schedule (Table 1) are met and documentary evidence has to be provided.

Only IP rating as reported in SANS IEC 60598-2-3: 2002 Test Report are acceptable.

The housing shall be robustly constructed from die cast LM6 aluminium alloy or other corrosive proof material which shall all ensure reliable heat dissipation and effective sealing against ingress of moisture and dust, etc.

The high-impact diffuser shall be constructed from heat resistant armour glass, high impact resistant acrylic. The use of polycarbonate material shall not be allowed under any circumstances. The diffuser shall be UV stabilized. The diffuser shall have no external prisms. It shall remain attached to the housing when opened via a hinge mechanism.

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Reflectors shall be manufactured from 99.98% super pure deep anodised aluminium and shall not be subject to accidental misalignment during lamp replacement or cleaning. All fasteners, retaining clips, etc., shall be manufactured from stainless or ferritic steel. The luminaire shall have an efficiency (Light Output Ratio) of not less than 78%.

Access to the lamp and gear compartment shall be gained from underneath. It shall not be possible to open the gear cover without the use of a tool.

The control gear shall not be mounted on the gear compartment cover but on a removable gear tray fixed to the inside wall of the gear compartment. The control gear shall be suitable for operation with the specified rating of the lamp on a 230 V +3%/-10% 50 Hz single-phase system. The internal wiring shall be by means of high temperature grade silicone rubber insulated high quality flexible stranded conductors not subject to deterioration. The low voltage wiring shall not be less than 660 volt grade and in the case of high voltage wiring the continuous voltage grade must be suitable for the open circuit voltage of the ballast.

Ignitors, where applicable, shall be of the superposed pulse type.

The control gear compartment shall be accessible to ease maintenance and shall be complete with earthing terminal and 660 volt insulated line connector block.

The lamp holder and end cap shall be porcelain, having silver plated metal parts and able to withstand the high starting voltage.

C3.6.5.4 INFORMATION TO BE PROVIDED

Tenders shall submit the following luminaire details with their tender documents:

- (a) Manufacturer
- (b) Catalogue number
- (c) Iso-candela diagrams (candelas)
- (d) Iso-illumination diagram (lux)
- (e) Efficiency curves for the luminaires
- (f) Mass of the luminaires with and without the control gear
- (g) Reflector material and its thickness
- (h) Full particulars of the control gear
- (i) Maximum permissible ambient and storage temperatures
- (j) Adjustability of lamp holder

Tenders to attach the above requested information under "FORM C3.4: LUMINARE SPECIFICATION DETAILS".

C3.6.6 STANDARD SPECIFICATION : MASTS

CONTENTS

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C3.6.6.1 SCOPE	C3.114
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C3.6.6.4 DRAWINGS	C3.116

C3.6.6.1 SCOPE

This specification covers the supply and installation of the 15 to 30 metre high masts suitable for the mounting of lighting luminaires.

C3.6.6.2 MASTS

The masts shall be of the octagonal cross-section tapered type and shall be designed in accordance with SABS 0160 to withstand a wind velocity appropriate to the site at a height of 10 metres above ground with a mean return period of 50 years, terrain category 2 class B and drag factor of 1,4. The deflection at the top of the mast shall not exceed 2,5% of the mast height when subjected to two thirds of the maximum wind velocity. The masts shall withstand the maximum design conditions when fully equipped with the specified luminaires and their associated equipment.

The masts shall be designed for mounting on a reinforced concrete foundation by means of a base plate secured to bolts casted into the foundation. The base plate needs to match PCD dimensions of the bolts that are already casted in the foundation. Additional gussets shall be provided between the base plate and the mast. No steel used in the construction of the mast shall be less than 5 mm in thickness and all steel shall comply with the requirements of BS 4360 grade 43A.

The masts shall be of the scissor type with the lower half divided into two fully enclosed half section which shall form an octagonal section in the operating position with no unsightly steps or protrusions. The pivot shall be located approximately at the mid-point of the mast and shall consist of two full length stainless steel sleeves. The material used in the pivot construction shall be of AISI grade 316L stainless steel. The pivoting half of the mast base section shall be securely bolted to the base plate by means of an adequately designed vandal proof securing system. A suitable framework or crossarms, for mounting of luminaires, shall be fitted to the top of the mast. The pivoting half of the base section shall be balanced in such a manner that the lowering can be done by one person using a nylon or stainless steel rope without additional equipment being required. A safety chain shall connect the pivoting half to prevent accidental lowering or damage to the trailing cable. The trailing cable shall be strapped to a galvanised or stainless steel wire rope affixed on the inside to the top and bottom of the mast.

An aperture shall be provided on the side of the mast base compartment to afford ample and easy access to the equipment installed therein. The opening shall be fitted with a lockable, close fitting cover fully sealed against the weather. The perimeters of the opening shall be reinforced with fully welded sheet sections to restore the section modulus and to prevent buckling. Welding shall be in accordance with BS 135 and shall be carried out by qualified welders.

Each mast shall be provided with a bracket to mount the luminaires as specified.

All ferrous parts of the mast shall be hot dipped galvanized after fabrication in accordance with SABS 763.

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Each mast shall be provided with the following:

- a gland plate suitable for three 4-core cables
- one 30 ampere 5 kA triple pole isolator
- four 10 ampere single pole 5 kA moulded case circuit breakers
- terminal block to terminate cables
- one earth stud.

C3.6.6.2.1 Luminaire mounting carriage

The luminaire mounting carriage shall be constructed from galvanized mild steel and shall be provided with all the necessary brackets for the mounting of the luminaires, control gear and terminal boxes.

The carriage shall be designed to carry the weight of the luminaires and associated equipment.

C3.6.6.2.2 Lighting pole arrestor

A pole lighting arrestor shall be installed on the top of the high mast to protect the luminaires from direct lightning strikes. A "Copperweld" copper steel bi-metallic rod with a spindle on top shall be used for the lighting arrestor. The minimum length of the lighting arrestor shall be equal to the radius of the luminaire cluster with the luminaires installed.

The lighting arrestor shall be attached to the top column of the mast by means of two non-ferrous mechanical clamps and bolts. A 70 mm² copper earth conductor shall be installed inside the mast. Cable lugs shall be crimped on either side of the earth conductor and the earth conductor shall be bolted to the earth bar and pole arrestor.

C3.6.6.2.3 Electrical connection to the luminaires

The connection to the luminaires shall be by means of a suitable rated multicore trailing cable. The cable shall have numbered cores with one green/yellow earth core. Each core shall be rubber insulated and the multicore cables shall be overall sheathed to give a circular form. The final sheath shall be of chloroprene. The cable shall be terminated in an adequately sized terminal box mounted on the luminaire mounting carriage from which the connections to the individual luminaires and ancillary equipment shall be taken. The cable shall be provided with an approved tension sock at the point of suspension.

C3.6.6.3 INSTALLATION

The base of the mast shall be installed + 75 mm above the top of the foundation and lock nuts shall be provided to secure the bolting-down bolts. The opening between the mast base and foundation shall be filled with a weak cement mixture and 4 small weep holes shall be provided.

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C3.6.6.4 DRAWINGS

The following drawings shall be submitted by the Contractor if required by the Engineer -

- (a) the mast detail.
- (b) the baseplate detail.
- (c) the luminaire mounting carriage showing clearly the mounting arrangement for the luminaires and associated equipment detail.
- (d) the layout and mounting arrangements of all the equipment located in the base compartment.
- (e) the construction and locking arrangement of the access panel.

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C3.6.7 STANDARD SPECIFICATION : STREET LIGHT POLES

CONTENTS

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C3.6.7.1 SCOPE

This specification covers the requirements for the manufacturing, supply and delivery of street light poles.

C3.6.7.2 STANDARDS

The latest edition, including all amendments up to date of tender of the following particular and international specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

- (a) SANS 62-2 - Steel pipes and pipe fittings with a nominal internal diameter up to 150 mm which is suitable for ISO R7 pipe screw thread.
- (b) SANS 657-1 - Steel tubes for general engineering purposes
- (c) SANS 121 - Hot dip (galvanized) zinc coatings
- (d) SANS 10160-1 - General procedures and loadings to be adopted for the design of buildings
- (e) BS 4360 - Specification for weldable structural steels

C3.6.8 STANDARD SPECIFICATION: LV METERING KIOSK, MINIATURE SUBSTATIONS, DISTRIBUTION KIOSKS AND PILLARS

CONTENTS

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C3.6.8.6 STANDARD SPECIFICATION: MINI-SUBSTATIONS	C3.129

C3.6.8.1 SCOPE

This specification covers the supply, installation, testing and commissioning of all material and equipment required for the service connections.

C3.6.8.2 MATERIALS

C3.6.8.2.1 Cables

Service connection cables shall be in accordance with SANS 1507-3 and shall comprise of PVC insulated stranded copper conductors, PVC bedded, steel wire armoured and PVC sheathed.

C3.6.8.2.2 Cable terminations

Service connection cables shall be terminated either by means of mechanical glands with shrouds equal or similar to the Pratley gland on the cable gland plate provided or by means of K-clamps on the unistrut rail provided. The glands and K-clamps shall be suitable for the cable size specified.

C3.6.8.2.3 Consumer distribution kiosks

(a) General

The kiosks shall be of adequate size to accommodate the number of outgoing consumer circuits specified.

The kiosks shall have two sections, namely:

- (i) one section containing all incoming and outgoing switchgear and cables, and (ii) one section containing the consumer meters and circuit breakers.

(b) Fabrication

The kiosks shall be fabricated from 3CR12 stainless steel of minimum thickness 2,5 mm and shall be mounted on a channel iron steel base.

A metal frame work, manufactured from solid angle iron, channel iron, or 2,5 mm 3CR12 folded sheet steel shall be mounted on the base of the kiosk. The kiosk shell shall be completely independent from the frame and equipment so that the kiosk shell can be removed and replaced without disconnecting any equipment. The kiosk shall be bolted down onto the base by means of four M16 high tensile bolts which shall be accessible from the inside of the kiosk only.

The kiosks shall be weatherproof, vermin and insect-proof and proved against tampering. To prevent the ingress of water onto live equipment, the door entry surrounds shall have a channel shape, at least 12 mm deep, to accommodate the door

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edge. A rubber or neoprene closer strip shall be so fitted to the edges of each door as to provide a seal to keep rain water and dust out of the kiosk.

The kiosk shall have a pitched roof that slopes downwards at the front and at the back with an overhang of at least 75 mm all round.

The kiosks shall be fitted with a door in the front and at the back of the kiosk. The maximum width per door shall be 600 mm. The doors shall provide free access to the equipment and shall provide a full view of all meters. The doors shall have well returning edges to fit into the channel of the door entry surrounds. Each door shall have three robust solid brass hinges each of length at least 100 mm. The hinges shall be completely concealed. Doors shall be fitted with lever locks equal or similar to the "Barker & Nelson" type. The locking mechanism shall facilitate three point latching at the top, side and bottom of the doors. In the case of double doors the first door shall be locked with two slides on the inside onto the kiosk shell. The second door shall close over a lip on the first one. Nylon door restraints shall be provided. The fixing points of the restraints at the door and the canopy shall be reinforced. The doors shall be earthed bonded to the frame by means of a copper braided strap, tooth washers, bolts and nuts.

Ventilation louvres with approximate size 225 x 150 mm shall be provided on both sides of the kiosk. Each ventilation louver shall be covered on the inside with perforated plates with 2,5 mm holes so that

- it is not possible to push a steel wire through it into the interior of the kiosk, and -
- it prevents vermin from entering into the kiosk.

A mounting panel shall be positioned in the centre of each kiosk, fixed to the frame work, for the mounting of the specified equipment.

(c) Mounting panel

The mounting panel shall consist of a minimum 3 mm thick mild steel plate.

The one section of the panel shall be equipped with copper busbars mounted on porcelain or similar insulators and of sufficient length to accommodate three 12 mm brass bolts for the connection of distribution cables and six consumer meter connections per phase. The busbars shall be tinned after the drilling of holes. The busbars shall be able to carry 250 Ampere at a current density of not more than 1,5 A/mm. Each busbar shall be marked red, yellow and blue with black for the neutral bar. The busbars shall be able to withstand the thermal and dynamic forces resulting from short circuits without deformation taking place or parts breaking.

The specified consumer equipment shall be installed in the second section. The mounting panel and equipment shall be enclosed by a machine punched removable front panel through which the operating handles of the equipment and the face plates of the meters protrude.

(d) Equipment installed in kiosks

The equipment to be installed in the kiosks shall be as specified in the detail specification.

(e) Wiring of kiosks

The internal wiring in the kiosks shall be done with PVC insulated copper conductors. The wiring shall be done in neat horizontal and vertical columns. Each consumer circuit

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shall be wired from the phase busbars to the circuit breaker and from the circuit breaker to the meter.

Connections to busbars and terminals shall be done by means of cable lugs crimped in an approved manner to the conductor ends. Connections to the busbars shall be made by means of cadmium plated high tensile steel bolts and nuts with locking washers.

(f) Earthing

A 25 mm x 6 mm long tinned copper earth bar shall be installed at the bottom of the kiosk.

10 mm diameter holes shall be drilled through the earth bar to provide for the distribution cable and service cable earth conductors. All bolts used for the fixing of the earth conductors shall be cadmium plated and only one earth conductor shall be connected per bolt.

The metal work of the kiosk shall be earthed to the earth bar by means of a 70 mm² stranded copper conductor. An earth stud shall be provided on the kiosk housing for this purpose.

(g) Cable gland plate

The cables shall be terminated on a removable galvanised gland plate of suitable dimension and strength. The gland plate shall cover the full length of the kiosk.

The gland plate shall be at least 300 mm below the nearest terminal of switchgear allowing sufficient space for bending the cable ends. Sufficient space shall be provided underneath the gland plate to allow for the installation of the cables without removing the gland plate. The gland plate shall be earthed to the earthbar by means of a 70 mm² stranded copper earth conductor.

(h) Terminal blocks

A terminal block of the "Klippon SAK" or equivalent type suitable for the termination of 16 mm² stranded copper conductors shall be provided. Terminals shall be of the screw type and a terminal shall be provided for each service connection cable.

(i) Labels

The kiosks shall be supplied with the following labels:

- (i) An aluminium label with 40 mm high letters and numeral indicating the kiosk number.
- (ii) Engraved trafolite labels with 6 mm high numerals under each circuit breaker, meter, and terminal on the terminal block indicating the consumer stand number.

The labels shall have a white background and black letters. The 40 mm labels shall be fixed by means of rivets and the 6 mm high labels shall be inserted in 25 mm wide aluminium label holder mounted at the bottom of the relevant equipment.

(j) Danger signs



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The requirements of Regulation C-52 of the Machinery and Occupational Safety Act No 6 of 1983 shall be complied with. All doors shall be fitted with a 150 x 100 mm Danger/Gevaar/Ingozi signs.

(k) Painting and finishing

(i) Post-weld cleaning and passivation of 3CR12:

Post-weld cleaning shall be undertaken on all welded areas. One of the following cleaning methods may be used to remove all surface discolouration and scale from welded areas.

Wire brushing: Where it is possible to remove the discolouration and detritus from weld areas by brushing, stainless steel wire brushes, that have not been used on other material other than 3CR12, may be used.

Grinding: Dedicated grinding wheels and discs based on alumina shall be used for the dressing of welds. The use of silicon carbide wheels and discs shall not be used.

Abrasive blast cleaning: The abrasive used shall be washed silica sand or alumina totally free of metallic iron, iron oxides or chlorides.

(ii) Chemical cleaning (pickling)

The pickling of 3CR12 shall be carried out using formulations based on nitric (HNO₃) and hydrofluoric (HF) acid. Formulations based on hydrochloric acids shall not be used. Acids used shall conform to commercial purity standards. Where proprietary pickling formulations are used, the manufacturer's directions concerning the application procedures shall be strictly adhered to.

(iii) Passivation

The passivation of the 3CR12 shall be carried out as soon as possible after the post-weld cleaning has taken place. A solution made up of nitric acid shall be used for the passivation of the 3CR12. The solution shall be generously applied to the steel by brush, cloth, spray or dipping. Care shall be taken that the solution does not dry on the steel surface. The steel shall be thoroughly washed with clean cold water to remove all traces of the acid use.

(iv) General

The entire process of cleaning, pickling, passivation and neutralization shall be completed in one working day.

Tenderers shall submit full details of the post weld process their suppliers intend to use.

(v) Painting

All interior metal work shall be thoroughly de-rusted and degreased and shall be prepared for painting in accordance with SABS 064.

Immediately after cleaning with zinc chromate red oxide primer with a dry film thickness of 25 micrometre shall be applied in accordance with SABS 679. An intermediate enamel coat shall be applied to the primed surface and thereafter the

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finishing coat of white enamel paint shall be applied to the interior and "light stone", colour C37 SANS 1091 to the exterior.

The bases and under sides must be treated in an approved manner and finished with two coats epoxy-tar paint.

(l) Drawings and information

Tenderers shall submit full details of the cubicles offered with the following drawings with the tender

- a drawing indicating all dimensions of the kiosks
- a drawing indicating the dimensions of the plinth with fixing arrangements - a drawing indicating the general internal equipment layout of the kiosks.

The successful tenderer shall, before the manufacturing of the kiosks commences, submit the final drawings to the Engineer for approval.

A schematic wiring diagram of the kiosk, as wired and colour coded, shall be submitted at the completion of the contract.

(m) Inspection

The successful tenderer shall allow the representative of the Engineer access to the manufacturer's works at all reasonable times to inspect the progress of the work and to witness all tests.

C3.6.8.2.4 Consumer distribution pillars

(a) General

The pillars shall be of adequate size to accommodate the distribution cables and outgoing circuits specified.

(b) Fabrication

The pillars shall be manufactured from 3CR12 stainless steel of minimum thickness 2 mm.

The pillars shall be 300 mm wide, 300 mm deep and 1 300 mm high and shall be suitable for planting directly in the ground. The top lid of the pillar shall slide upwards for easy access to the equipment. Guides shall be welded to the shell of the pillar and the lid to prevent any contact with live terminals when the top lid is moved. Hinged panels shall be provided below the lid at the front and the rear of the pillar for easy access to connect the incoming and outgoing cables. The lid shall overlap the hinged panels when in position.

Ventilation of the pillar shall be provided by means of holes in the roof return of the pillar lids.

A mounting panel shall be positioned in the centre of the pillar for the mounting of the specified equipment.

(c) Equipment installed in pillars

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The following equipment shall be installed in the pillars:

- (i) 60 ampere 10 kA curve 1 type single pole circuit breakers.
- (ii) P1000 unistrut rail with K clamps to connect the incoming and outgoing cables.
- (iii) Three tinned copper busbars for the phase connections. The busbars shall be of sufficient length to accommodate three 12 mm brass bolts for the connection of distribution cables and four 8 mm bolts for consumer connections per phase.
- (iv) A 25 mm x 6 mm tinned copper neutral bar.
- (v) A 25 mm x 6 mm tinned copper earth bar.
- (vi) Provision shall be made for suitable shrouds to cover all live terminals in the pillar so that no live parts are exposed when the lid of the pillar is moved into the open position.

(d) Wiring of the pillars

The internal wiring in the pillar shall be done with 16 mm² PVC insulated copper conductors. Each circuit breaker shall be individually wired.

Connections to busbars and terminals shall be done by means of cable lugs crimped in an approved manner to the conductor ends. Connections to the busbars shall be made by means of cadmium plated high tensile steel bolts and nuts with locking washers. The busbars shall be predrilled with holes for the connection of the distribution cables and service connection cable conductors. Only one conductor shall be connected to a bolt. The steel wire armouring of each of the cables shall be bonded to the earth bar.

(e) Labels

The pillars shall be supplied with the following labels:

- (i) An aluminium label with 40 mm high letters and numeral indicating the pillar number.
- (ii) Engraved trafalite labels with 6 mm high numerals under each circuit breaker, meter, and terminal on the terminal block indicating the consumer stand number.

The labels shall have a white background and black letters. The 40 mm labels shall be fixed by means of rivets and the 6 mm high labels shall be inserted in 25 mm wide aluminium label holder mounted at the bottom of the relevant equipment.

(f) Danger signs

The requirements of Regulation C-52 of the Machinery and Occupational Safety Act No 6 of 1983 shall be complied with. All doors shall be fitted with a 150 x 100 mm Danger/Gevaar/Ingozi signs.

(g) Finishing

- (i) Post-weld cleaning and passivation of 3CR12

Post-weld cleaning shall be undertaken on all welded areas. One of the following cleaning methods may be used to remove all surface discolouration and scale from welded areas.

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Wire brushing:	Where it is possible to remove the discolouration and detritus from weld areas by brushing, stainless steel wire brushes, that have not been used on other material other than 3CR12, may be used.
Grinding:	Dedicated grinding wheels and discs based on alumina shall be used for the dressing of welds. The use of silicon carbide wheels and discs shall not be used.
Abrasive blast cleaning:	The abrasive used shall be washed silica sand or alumina totally free of metallic iron, iron oxides or chlorides.

(h) Chemical cleaning (pickling)

The pickling of 3CR12 shall be carried out using formulations based on nitric (HNO₃) and hydrofluoric (HF) acid. Formulations based on hydrochloric acids shall not be used. Acids used shall conform to commercial purity standards. Where proprietary pickling formulations are used, the manufacturer's directions concerning the application procedures shall be strictly adhered to.

(i) Passivation

The passivation of the 3CR12 shall be carried out as soon as possible after the post-weld cleaning has taken place. A solution made up of nitric acid shall be used for the passivation of the 3CR12. The solution shall be generously applied to the steel by brush, cloth, spray or dipping. Care shall be taken that the solution does not dry on the steel surface. The steel shall be thoroughly washed with clean cold water to remove all traces of the acid use.

(j) General

The entire process of cleaning, pickling, passivation and neutralization shall be completed in one working day.

Tenderers shall submit full details of the post weld process their suppliers intend to use.

C3.6.8.2.6 Watt-hour meters

All meters shall be equal or similar to the Sangamo or GEC type watt-hour meters.

The meters shall be rated for a maximum current of 80A and shall be capable of continuously carrying 20 amperes at the supply voltage of 231 volts.

The meters shall be supplied with a bakelite case and a clear polycarbonate or makrolon cover.

The current and voltage windings of the meter shall be fully encapsulated.

The meters shall be fully temperature compensated and shall be provided with a magnetic suspension bearing system.

Every meter shall bear the following information on the nameplate

- manufacturers name and trade mark
- designation of type
- number of phases and wires for which the meter is suitable

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- serial number and year of manufacture
- reference voltage
- basic current and rated maximum current
- reference frequency
- constant of the meter in rev/kWh
- class index
- BS standard.

All meters shall be subjected to accuracy tests in accordance with BS 5685 : 1979 and test certificates indicating the test results of each meter shall be submitted to the Engineer on delivery of the meters.

C3.6.8.2.7 Cable sleeves

The pipes for the sleeving of the service connection cables for the road crossings shall be of 100 mm Dia UPVC or pitch fibre pipes.

C3.6.8.2.8 Consumer distribution kiosk plinths

The plinths and underbases where specified shall be of the precast concrete type equal or similar to the products supplied by Salberg Concrete Products (Pty) Ltd.

All surfaces and edges of the plinths shall be free from imperfections, cracks and chips. The plinths shall be of dimensions specified in the detailed specification and on the drawings and shall have four galvanised bolts with transverse reinforcing to hold the bolts in the concrete cast in the plinth.

The wall thickness of the plinths shall not be less than 75 mm.

C3.6.8.3 INSTALLATION

C3.6.8.3.1 Excavation for trenches and backfilling

The excavation of the trenches for the service connection cables shall be undertaken by the Electrical Contractor.

The Electrical Contractor shall undertake all hand excavation required where excavation by means of machines cannot be undertaken due to limited access and the proximity of other services, miniature substations and kiosks.

The Electrical Contractor shall trim the trenches and clean up the bottom of the trenches after completion of the required excavation. Cables shall not be laid until the trenches have been approved by the Engineer.

C3.6.8.3.2 Consumer distribution kiosks and pillars

The concrete plinths for the kiosks shall protrude at least 300 mm above finished ground level. It shall be the Contractor's responsibility to determine the finished ground level where the roads,

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kerbing and pavement areas have not been completed. Where possible the contractor shall install the plinths and kiosks when the service connection cables are installed.

The distribution pillar shall be buried directly in the ground 100 mm off the stand boundary.

Doors and access flaps shall open along the boundary line.

C3.6.8.4 TESTS BEFORE ACCEPTANCE

After the completion of the installation the relevant tests as specified in sub clause 3.14 of Section 3 shall be carried out.

C3.6.8.5 MEASUREMENT AND PAYMENT

The unit of measurement shall be the length in metres of service connection cables supplied.

The tendered rate shall include full compensation for the supply and delivery of the cable to site.

<u>Item</u>	<u>Unit</u>
C3.6.8.5.3 Install service connection cable	m

The unit of measurement shall be the length in metres of service connection cable laid.

The tendered rate shall include full compensation for the handling, inspection, laying, cutting and testing the cable. Cables will be measured linearly over all lengths laid.

<u>Item</u>	<u>Unit</u>
C3.6.8.5.4 Terminate service connection cable	No.

The unit of measurement shall be the number of service connection cable terminated.

The tendered rate shall include full compensation for providing the cable glands and shrouds and for the cost of handling, fitting and cutting the cable and for connecting the conductors to the terminal block, neutral bar and earth bar.

<u>Item</u>	<u>Unit</u>
C3.6.8.5.5 Capping service connection cable	No.

The unit of measurement shall be the number of service connection cable capped.

The tendered rate shall include full compensation for supplying the heat-shrink capping

<u>Item</u>	<u>Unit</u>
-------------	-------------

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C3.6.8.5.7 Supply and install distribution board

No.

The unit of measurement shall be the number of distribution boards supplied and installed.

The rate shall include full compensation for the supply and installation of the distribution board complete as specified. The tendered rate shall allow for supplying, handling, transporting, installing, painting, testing and commissioning of each Mast distribution board including all costs to ensure a functional working solution.

Item
Unit
C3.6.8.5.8 Supply and install distribution kiosk

No.

The unit of measurement shall be the number of distribution pillars supplied and installed.

The rate shall include full compensation for the supply and installation of the distribution kiosk complete as specified. The tendered rate shall allow for supply, handling, transporting, installing, painting, testing and commissioning of each kiosk including all costs to ensure a functional working solution. The rate shall also allow for supply and installation of precast concrete plinths for the kiosk including excavation for the installing of the kiosk and the backfilling, compacting and disposal of the surplus material once the kiosk has been installed.

Item
Unit
C3.6.8.5.9 Welding and Strapping of Access Points

No.

- a) Supply and install: Welding of access points on poles (5m to 20m)
- b) Supply and install: Welding of access points on masts (20m to 40m)
- c) Supply and install: Strapping of access points on poles (5m to 20m)

The unit of measurement shall be the welding of access points on the number of poles/masts.

The tendered rate shall include full compensation for supplying of material for the welding of access points, cutting/grinding off access points, strapping of access points including any other costs to ensure a functional working solution.

Item
Unit
C3.6.8.5.10 Labelling

No.

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a) Supply and install: Labelling of Poles and Masts

The unit of measurement shall be the labelling of the number of poles and masts.

The tendered rate shall include full compensation for supplying and installation of labelling on the poles and masts including any other costs to ensure a functional working solution.

<u>Item</u>	<u>Unit</u>
C3.6.8.5.11 Pole Covers	No.

- a) Supply and Install: 6mm pole covers (for 20m to 40m masts)
- b) Supply and Install: 4mm pole covers (for 5m to 20m poles)

The unit of measurement shall be the installation of pole covers points on the number of poles/masts.

The tendered rate shall include full compensation for supplying and installation of pole covers on to the poles including any other costs to ensure a functional working solution.

C3.6.8.6 STANDARD SPECIFICATION: MINI-SUBSTATIONS

C3.6.8.6.1 GENERAL

- (a) Minisubs shall in general comply with the Standard Specification. Unless otherwise

approved by the Engineer, all parts and components shall comply with SANS 1029 specifications.

- (b) Minisubs shall be suitable for outdoor use and shall be divided into three compartments, namely:

- 1) HV switch compartment
- 2) Transformer compartment
- 3) LV compartment

- (c) The high voltage and low voltage cubicles of all minisubs to be used at coastal or high corrosive areas shall be manufactured of fibre-glass. In such cases all metal work of the transformer tank shall be specially treated and protected against corrosion.

- (d) All live connections shall be completely tamper-proof. The HV and LV cables shall enter their respective compartments from below.

- (e) The low voltage compartment shall be divided into a front and a rear sections:

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The front section for housing the circuit breakers, meters and street-lighting control units and the rear section for housing busbars, bushings, cable end boxes, glands, terminal blocks and all connections. The rear section shall, however, be easily accessible on site, either by means of a removable cubicle or a rear door or a hinged panel. A separate street-lighting control compartment where required, is preferred.

- (f) Access to the high voltage and low voltage compartments shall be gained only by means of locked doors. Suitable tamper-proof locks shall be provided. The doors shall be provided with top and bottom locking pins. The successful Contractor shall obtain the Engineer's approval for the type of locks and locking system before manufacturing the minisub cubicles. Doors of the high voltage compartments shall be opened with one master key and doors of the low voltage compartments shall be opened with another master key. Five sets of master keys shall be supplied for all locks and handed over to the Engineer. The lock mechanism shall have lock guards similar to existing Mini-substations on GDRT roads.
- (g) The separate compartments of the miniature substation shall be mounted on a galvanized and bitumen painted channel iron base in such a way that any compartment can be removed without disturbing other compartments. Each compartment shall form a completely separate steel enclosed unit.
- (h) The channel iron base shall be provided with the open end of the channel facing the outside. The channel iron base shall be sufficiently rigid to prevent any movement or distortion of the base or of any metal panels when the substation is lifted and handled as a complete unit.
- (i) Suitable lifting lugs shall be provided to facilitate the lifting of the minisub as a complete unit (with roof removed) or to lift any separate compartment or component, e.g. the ring main unit or the transformer.
- (j) The complete Minisub shall be covered with a single sheet steel roof.
- (k) All bolts, nuts, washers, contacts, terminals and other electrical parts and connections shall be properly treated against corrosion. Where equipment is used in highly corrosive areas, e.g. coastal areas and others, special care shall be given to the treatment of equipment.
- (l) The HV and LV cubicles shall be provided with adequate cross ventilation holes to prevent condensation, in such a manner that foreign objects cannot penetrate the interior.

C3.6.8.6.2 High Voltage Compartment

- (a) An SF6 ring main unit consisting of two isolators and one switch fuse unit shall be provided and housed in the high voltage compartment and shall comply with SANS 1874.

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- (b) The ring main unit shall be bolted onto the minisub frame.
- (d) The fuses to be supplied shall be suitable for the protection of the minisub transformer.
- (e) All minisubs shall be supplied with one set of spare fuses. The spare fuses shall be housed in the HV compartment by means of suitable brackets or clamps.
- (f) The switch fuse unit shall be earthed to the steel frame of the minisub and to the transformer tank by means of 70mm² bare stranded copper conductor. An earth bar is to be mounted in the HV compartment. This bar is to be connected to the earth bar in the LV compartment by means of a 70mm² bare stranded copper conductor. The HV earth bar shall also be connected to the trench earth.
- (g) A suitable oil level sight glass or indicator shall be provided and fitted and shall be so positioned that it is clearly visible with the doors of the high voltage compartment opened.
- (h) Suitable cable end boxes shall be provided on both isolator units, where paper insulated lead covered cables are to be terminated by means of compound filled cable boxes. Tender prices shall also include for the necessary oil or compound for the filling of the cable boxes.

2.10 Tender prices for miniature substations shall include for the provision of galvanized unistruts across the channel iron frame, as well as suitable cable support clamps to clamp and support the incoming high voltage cables. The point of support shall be above the top level of the minisub foundation.

C3.6.8.6.3 Transformer in Transformer Compartment

- (a) Number of phases : Three
- (b) Type of load : 315 or 200kVA (pending on requirement)
- (c) No-load voltage ratio on nominal tap : 11/6.6kV/400V
- (d) Vector diagram : Dyn 11
- (e) Frequency : 50 Hz
- (f) Type of windings : Double wound
- (g) Ambient temperature : The transformers shall be suitable for the site conditions specified.

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- (h) Tappings : An externally operated off-load tap changing switch shall be provided, enabling the primary voltage to be varied from 95% to 105% in five steps. Tapping switches shall be insulated for full line voltage between tappings. Means shall be provided to prevent inadvertent operation of the tap changing switch. Padlocks are not favoured. The tap changing switch shall be housed in the low voltage compartment and shall be easily accessible.
- (i) Primary terminal arrangement : Three shedded bushings suitable for minisub use.
- (j) Secondary terminal arrangement : Four shedded bushings suitable for minisub use.
- (k) Type of cooling : ONAN
- (l) Tank fittings required : The following transformer accessories shall be provided:
 - 1) Oil filling plug
 - 2) Oil drain valve
- (m) Tank : Unless otherwise specified, sealed transformers shall be provided for miniature substations.
- (n) Transformer losses : Low loss transformers to be provided. Loss figures shall be submitted with tenders and shall be guaranteed.
- (o) Impedance voltage : Approximately 4% on the nominal tapping.

C3.6.8.6.4. Low Voltage Compartment

(a) Equipment Mounting Frame

A suitable steel mounting frame or panel shall be provided to mount the ammeters, voltmeter, fuses, switches, circuit breakers, contactors and other equipment specified. Unless specifically approved by the Engineer, the use of hardboard, pressed wood or similar products to mount equipment on, will not be acceptable. All live parts shall be screened by means of perspex or metal sheet for protection against inadvertent contact.

(b) Busbars

- 1) The busbar rating shall be suitable for the size transformer specified. The feeders between the transformer and the busbars shall have a current rating equal or higher than the busbars.

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- 2) The cross-section area of the neutral busbar shall be the same as the cross-section area of the phase busbars.

- 3) All busbars shall be fully screened to prevent accidental contact.

(c) Fault Rating of Equipment

The fault rating of the busbars, circuit breakers and other equipment in the low voltage compartment shall be determined by the rating and impedance of the transformer used.

(d) Metering Equipment

Each miniature substation shall be provided with the following:

- 1) Three combined indicating and 15 minute maximum demand flush-mounted 96 mm square ammeters.

The ammeters shall be suitable for operation from current transformers with 5A secondary windings. Scale plates shall be provided as follows :

- a) 200 kVA minisubs : 0- 300A plus 20% extended scale
- b) 315 kVA minisubs : 0- 500A plus 20% extended scale
- c) 400 kVA minisubs : 0- 600A plus 20% extended scale
- d) 500 kVA minisubs : 0- 800A plus 20% extended scale
- e) 630 kVA minisubs : 0-1000A plus 20% extended scale

Each ammeter shall be clearly and permanently marked with the appropriate phase colour.

- 2) One flush-mounted 96 mm square voltmeter with scale 0 to 550 V complete with selector switch.
- 3) kWh Meters for consumer service connections if applicable.
- 4) Combined kVA/kWh meters similar to Sangamo CYLP meters for consumer service connections if applicable.

(e) Current Transformers

- 1) Current transformers shall be used for the ammeters and combined kVA/kWh meters.
- 2) Rating and diagram plates for current transformers shall be provided.
- 3) Current transformers shall be properly installed and mounted.
- 4) Class 1,0 current transformers in accordance with BS 3938.

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The following ratios shall be provided:

- a) 200 kVA minisubs : 300/5 A
- b) 315 kVA minisubs : 500/5 A
- c) 400 kVA minisubs : 600/5 A
- d) 500 kVA minisubs : 800/5 A
- e) 630 kVA minisubs : 1000/5 A

- 5) The VA rating of current transformers shall be sufficient to drive all metering equipment connected.

(f) Surge Arresters

Unless otherwise specified, three suitable low voltage surge arresters shall be provided and installed, one on each of the low voltage phase busbars. The surge arresters shall comply with the following minimum requirements :

- a) Rated voltage : 440V rms minimum
- b) 50 Hz sparkover voltage : 1500V rms maximum
- c) 1,2/50 microsecond pulse : 2000V peak maximum

Surge arresters shall comply with SABS 171.

The surge arresters shall be solidly connected to the earth bar by means of stranded copper conductor or copper bar with a minimum cross-sectional area of 35mm².

(g) Moulded Case Circuit Breakers (MCCB's)

- 1) All MCCB's shall carry the SABS mark in terms of SABS 156.
- 2) Mechanically coupled single-pole circuit breakers used as double or triple pole circuit breakers are not acceptable.
- 3) The fault rating of any MCCB shall not be less than the fault rating of the associated busbars to which it is connected.
- 4) Solid aluminium core cables may be used. Where the MCCB terminals are insufficient to house the specified cable size and lug physically, suitable tinned copper extension bars shall be provided.

(h) Outgoing Circuits

- 1) The miniature substations shall be complete with the outgoing circuit breakers, meters and metering equipment, contactors, cable glands and gland plates, wiring and connections, terminal strips, etc.

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- 2) The outgoing circuits shall be connected to the phases as shown on the drawings, or as specified.
 - 3) If consumer service connections through meters and/or single phase circuit breakers are required, then terminal strips shall be provided for these circuits. All these circuits shall be completely wired up to the terminal strips to ensure that all cables to be installed on site, can be easily connected.
 - 4) If aluminium core cables are used, then the three-pole circuit breakers shall be fitted with suitable tinned copper terminal extensions onto which the aluminium core cable lugs can be bolted.
- (i) Terminal Strip
- 1) Terminal strips are required for consumer connections, where applicable.
 - 2) The terminals of the terminal strip shall be large enough to house the cores of the outgoing cables. Solid aluminium core cables can be used.
 - 3) Terminals shall be approved by the Engineer. Full details shall be submitted at the time of tendering.
 - 4) All terminal connections shall be placed in easily accessible positions.
 - 5) All phase, neutral and earth connections shall be wired to terminals by the manufacturer.
 - 6) The terminal strip shall be mounted not less than 200mm above the gland plate and the terminals to be connected to a cable shall be above the specific cable gland as shown on the drawing.
 - 7) Each terminal shall have a colour identification tag to show whether it is connected to "Neutral" or "Red", "Yellow" or "Blue" phases.
 - 8) Each terminal shall also be provided with an engraved ivory tab with the stand number.
- (j) Switches and Selector Switches
- 1) The fault level of the switches and selector switches shall be equivalent to or higher than the fault level at the associated busbar, unless protection fuses are used in the circuits.
 - 2) The voltmeter or ammeter selector switch shall be mounted directly below the associated volt or ammeter.
- (k) Combination Fuse Switch Units

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- 1) All components shall be capable of continuously carrying rated normal current without excessive temperature rise.
- (l) High Rupturing Capacity Fuses and Fuse Holders
- (m) Contactors and Relays
- (n) Earthing
 - 1) A pre-drilled tinned copper earth bar of suitable dimension shall be mounted above the gland plate or in a suitable position in the LV compartment.
 - 2) The neutral bar shall be solidly connected to the earth bar by means of a 70mm² bare stranded copper conductor. This earth bar shall also be connected to the trench earth system.
 - 3) The armouring of all cables shall be properly bolted to the earth bar by means of suitable lugs.
- (o) Cable Glands and Clamps
 - 1) Minisubs can be provided with gland plates complete with glands or Unistrut P4000, complete with one-piece cable clamps with rear pressure shoes.
 - 2) All gland plates shall be galvanised steel or tinned copper complete with the correct size of glands for the cables.
 - 3) All unistruts and clamps shall be galvanised.
 - 4) Suitable glands similar to the Pratley compression type glands shall be used to ensure that the armouring of the cables can be taken through the glands and connected to the earth bar.
 - 5) Gland plates shall be pre-drilled before galvanizing to terminate the specified quantities, types and sizes of cables.
- (p) Labels
 - 1) Where consumers are supplied from minisubs, then the stand numbers shall be labelled on the terminals, meters and circuit breakers.
 - 2) Each cable shall be clearly marked by means of an aluminium tag or other suitable permanent means with the stand number or cubicle number supplied by the cable. This tag shall be fixed to the cable in a visible position close to the cable gland or clamp.

C3.6.8.6.5. Street-Light Compartment (where required)

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The street-light compartment shall house the equipment specified in the detail specification and/or drawings, but shall in general consist of the following:

- a) A three-pole contactor with minimum rating of 60A and with coils suitable for operation at a nominal voltage of 231V, 50Hz, and in compliance with IEC 158/1 and/or BS 775.
- b) A three-phase circuit breaker unit with 60A fuses to protect the contactor.
- c) All wiring required for the switching of the contactor by means of an externally mounted photocell; or
- d) Sufficient space and all wiring to be provided for the mounting of a ripple control relay;
- e) A photocell bypass switch.
- f) Three-pole or single pole MCCBs to protect the street-light supply circuits.
- g) A suitable terminal block for the connection of street-light circuits and photocell circuit.
- h) All wiring required to complete the installation up to the terminal blocks.

C3.6.8.6.6. Installation and Erection

- (a) Contractors shall tender for the complete erection of the miniature substations, including the making-off and termination of all high voltage and low voltage cable ends, the positioning and mounting of the high voltage ring main switch fuse unit and including the supply of all materials for and the casting of the concrete plinth.
- (b) **CONCRETE PLINTH**

The mini-substation shall be mounted on a concrete plinth. The plinth shall be cast on site.

The contractor shall issue to the engineer a detailed plinth drawing suitable for each type of mini-substation supplied.

The top of the plinth shall protrude at least 200mm above the final surrounding, ground level. The concrete plinth shall protrude approximately 100mm beyond the edges of the mini-substation to form an apron.

The concrete apron and plinth shall be wood float finished and shall slope from the base to permit rain water runoff. A 3mm thick gasket of approved material shall be inserted between the mini-substation and the concrete surface. The gasket shall be as wide as the base of the minisub.

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Cable ducts shall be provided in the plinth to accommodate all the incoming and outgoing cables. The cable ducts shall be sealed to prevent entry of rodents. The sealing shall be easily removable in the event of future cable work and may consist of a layer of 10:1 sand and cement mix, approximately 10mm thick, and finished flush with the top of the concrete plinth.

On sloping ground where the above requirements cannot be met, approved methods shall be employed to the satisfaction of the Engineer. In such cases the Contractor shall ensure that the plinth is buried at least 250mm all round.

- (c) The Contractor shall inform the Engineer or his duly authorised representative to inspect and approve these concrete plinths after they have been put in position and before the minisubs are placed in position.

All plinths shall be completed and approved before any minisub is placed in position.

A malthoid or other suitable moisture barrier layer shall be provided and installed between the minisub frame and the foundation. The minisubs shall be bolted to the plinths.

- (d) The concrete plinths shall be neatly finished after erection of the minisubs.
- (e) The minisubs shall be erected on pavements in the positions as indicated on the drawings. The minisubs shall be erected parallel with the stand boundaries and shall be at least 0,2 metres away from the boundary or to suit the type of minisub.
- (f) The armouring of low voltage cables shall be terminated into crimped lugs and bolted onto the earth bar. In the case of cables with copper earth continuity conductors all such conductors shall be taken through to the earth bar. Where cables with only steel armouring conductors, or only aluminium strip armouring are provided all steel or aluminium shall be taken through to the earth bar.

When CNE cables are used the armouring (neutral) shall be terminated onto the neutral bar.

- (g) When aluminium core low voltage cables are used, suitable tinned copper or aluminium lugs with "Densal" paste shall be used for the terminations. Aluminium core cables shall be terminated in the lugs by means of deep indent crimping. Methods whereby the core itself (with solid core cables) is formed into a lug will be accepted if approved by the Engineer.
- (h) The costs for the supply and delivery of all lugs and paste shall form part of the price for the erection of the minisubs.
- (i) All paper insulated cables shall be wiped unless other suitable termination arrangements are approved by the Engineer. A stranded copper earth conductor shall be provided in the cable wipe or termination and shall be connected to an earth point.

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- (j) Cross-linked polyethylene cables shall be made off with suitable terminating kits recommended by the cable manufacturer. These cables shall be properly clamped with wooden blocks fixed to the switchgear.
- (k) The minisub earth bar, HV ring main unit and transformer tank shall be connected to the substation or system earth.
- (l) In coastal or high corrosion areas the cable glands shall be properly taped with a suitable tape where the low voltage cables enter into the glands. The supply and delivery of the tape shall be included in the prices for erection of minisubs.
- (m) The floors of the low voltage and high voltage compartments shall, after complete erection of minisubs and after all the cables have been made off, be levelled and finished off with a weak cement mixture.
- (n) Each minisub shall be provided with a name or number designation label with lettering at least 40mm high. Detail of the wording shall be obtained from the Engineer.
- (o) Suitable vermin-proofing shall be provided.

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C3.7: MODIFICATIONS TO THE STANDARD COLTO CONDITIONS

COLTO SERIES 1000: GENERAL

SECTION B1100: DEFINITIONS AND TERMS

B1115 GENERAL CONDITIONS OF CONTRACT

Replace Clause 1115 with the following:

The General Conditions applicable to this Contract are the FIDIC Conditions of Contract for Construction for Building and Engineering Works designed by the Employer, 1st Edition 1999.

Accordingly, all reference in the Standard Specifications to any other General Conditions of Contract (GCC) has to be amended. The Standard Specifications have been scrutinized and clauses which refer to another GCC identified. These are tabulated below together with the relevant equivalent clause in the FIDIC Conditions of Contract. The context of the reference to the GCC is also noted.

Whereas every effort has been made to include all of the affected clauses in the table, there may be some omissions. In every case, however, the FIDIC Conditions of Contract for Construction, as amended by the Particular Conditions of Contract in Part C1.2 of this Volume, shall apply and the contractor shall be responsible for interpretation of the equivalent clause

CHANGES TO REFERENCES BY THE COLTO STANDARD SPECIFICATIONS TO THE COLTO GENERAL CONDITIONS OF CONTRACT AND FIDIC GENERAL CONDITIONS

COLTO Standard Specification		COLTO General Conditions of Contract 1998 (GCC)		FIDIC Conditions of Contract for Construction 1st edition 1999	
Clause No	Page No	Clause No	Description or Reference	Clause No	Description or Reference
1115	1100-2		Definition of GCC		Definition of FIDIC
1204	1200-2	15	Construction programme	8.3	Construction programme
1204	1200-2		General reference to GCC		Applicable to FIDIC
1206	1200-3	14	Setting out of works	4.7	Setting out of works
1209(a)	1200-4		General references to GCC		Applicable to FIDIC
1209(e)	1200-5	52(2)	Valuation of material brought onto site	14.5	Plant and material intended for use in the works.
1210	1200-5	54(1)	Certificate of practical completion	10.1	Taking-over certificate
1212(1)	1200-7	49(2)	CPA on alternative designs	13.8	CPA on alternative designs
1215	1200-9	45(2)	Extension of time for completion due to abnormal rainfall.	8.4	Extension of time for completion due to abnormal rainfall.
1217	1200-10	35	Care of the works	17.2	Care of the works
1303(ii)	1300-1		General reference to GCC		Applicable to FIDIC
1303(iii)	1300-1	49	Price adjustment Item 13.01(a)	13.7&13.8	Price adjustment Item 13.01(a)
1303(iii)	1300-2	49	Price adjustment Item 13.01(b)	13.7&13.8	Price adjustment Item 13.01(b)
1303(iii)	1300-1	53	Variations exceeding 20%		Not applicable to this contract
1303(iii)	1300-2	53	Variations exceeding 20%		Not applicable to this contract

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1303	1300-2	12	Payment Item 13.01(c)	8.1	Payment Item 13.01(c)
1303	1300-2	45	Payment Item 13.01(c)	8.4	Payment Item 13.01(c)
1403(c)(ii)	1400-4	40(1)	Variation for rented accommodation	13.3	Variation for rented accommodation

COLTO Standard Specification		COLTO General Conditions of Contract 1998 (GCC)		FIDIC Conditions of Contract for Construction 1st edition 1999	
Clause No	Page No	Clause No	Description or Reference	Clause No	Description or Reference
1505	1500-3	40(1)	Variation for temporary drainage	13.3	Variation for temporary drainage
Item 15.08	1500-8	48	Payment of Provisional Sum	13.5	Payment of Provisional Sum
Item 15.09	1500/8	48	Payment of Provisional Sum	13.5	Payment of Provisional Sum
Item 15.11	1500-8	48	Payment of Provisional Sum	13.5	Payment of Provisional Sum
Note (2)	3100-4	40	Payment for prospecting for materials	13.5	Payment for prospecting for materials
3204(b)(iii)	3200-2	40	Payment for oversize material	13.3	Payment for oversize material
3303(b)	3300-2	2	Engineer's decisions, with reference to materials classification	3	Engineer's decisions, with reference to materials classification
Item 44.06	4400-3		General reference to GCC, PC Sums	13.5	Provisional Sums in FIDIC
Item 45.06	4500-3		General reference to GCC, PC Sums	13.5	Provisional Sums in FIDIC
5803(c)	5800-3	40	Variation, for landscaping	13.3	Variation, for landscaping
5805(d)	5800-4	40	Variation, for grassing	13.3	Variation, for grassing
Item 58.10	5800-10	48	Payment for Extra Work	13.5	Payment for Extra Work
8103(c)	8100-1	40	Variation, for testing material	13.3	Variation, for testing material
Item 81.02	8100-26		General reference to GCC, Provisional Sums		Applicable to FIDIC, Provisional Sums
Item 81.03	8100-26	22	Clearance of site on completion, with reference to core drilling	11.11	Clearance of site on completion, with reference to core drilling

B1155 WORK IN RESTRICTED AREAS

Add the following:

"Any omission of pay items from the pricing schedule with regard to additional or extra over payment for work in restricted areas should be regarded as deliberate and any additional cost incurred shall be included in the bulk rates tendered. (Refer also to clause B1209(g))"

Add the following clauses:

"B1156 OTHER DEFINITIONS

The COLTO Standard Specifications for Roads and Bridge Works for State Road Authorities (1998 edition) has been written for all contractors, employers and engineers. Similarly, the works and the site are not defined and the general nature of the entities and elements that collectively constitute construction under a contract are characterized by the use of lower case letters throughout.

These project specifications continue to use lowercase spellings in order to avoid the appearance of the capitalised and non-capitalised words to describe or prescribe the same elements of work required on this project. However, for the purposes of this contract the following definitions shall apply:

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Contractor

The Contractor and the contractor is the same persona defined under clause 1.1.2.3 of the FIDIC Conditions of Contract, but who will only be formally identified by the completed Form of Acceptance C1.1.2 in this document and which will be bound into the final contract document.

Employer

The Employer and employer is the same persona and is defined in C1.2.2 Contract Data, and clause 1.1.2.2 of the FIDIC Conditions of Contract.

Engineer

The Engineer and engineer is the same persona and is defined in the C1.2.2 Contract Data, and clause 1.1.2.4 of the FIDIC Conditions of Contract.

Site

The site is defined in clause 1.1.6.7 of the FIDIC Conditions of Contract. It is bound by the limits of construction as shown in the drawings or the title of the project and extends to also include the following:

- Areas outside the construction zone areas where accommodation of traffic is placed.
- All borrowpits defined in the applications approved by the relevant Department of Minerals and Energy.
- All haul roads constructed by the contractor for purposes of access.
- Any non-adjacent sites specified in the contract documentation.
- The contractors and his subcontractors camp sites

Prime cost

An amount allowed for an item or services for which actual details of the scope of work are not defined at tender stage. Payment is made on the production of invoices showing the actual cost after implementation or installation. Services rendered in this manner carry a mark-up for which a rate is offered at tender stage to cover all the tenderer's costs and profit in providing the item or services.

Provisional Sum

An amount allowed for an item and its extent of which is alluded to in the Pricing Schedule, the Scope of Work or elsewhere, but of which the quantity of work is not known.

B1158 SABS SPECIFICATIONS

Where reference is made in this specification or the standard specifications to SABS specifications, the latest published national standard shall be applicable. Use:

[https://www.sabs.co.za/content/uploads/files/SABS%20Catalogue%20February%202012%20\(abridged\).pdf](https://www.sabs.co.za/content/uploads/files/SABS%20Catalogue%20February%202012%20(abridged).pdf)

for the most up-to-date versions of the various standards.

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SECTION B1200: GENERAL REQUIREMENTS AND PROVISIONS

B1202 SERVICES

Add the following first paragraph:

"All reference to services in this clause shall also mean utility services as well as traffic monitoring devices such as Comprehensive Traffic Observation (CTO), Speed Measuring Device (SMD) and Weigh-in-Motion (WIM) stations."

In the final paragraph, replace "clause 15" in the second line with "clause 8.3".

B1205 WORKMANSHIP AND QUALITY CONTROL

Add the following after the title:

"The contractor shall implement a quality assurance system that replicates an ISO 9002 and appoint a quality manager who shall ensure that members of the contractor's staff comply with the requirements of the quality system. The quality system and the methods used to implement it shall be described in a quality plan produced by the contractor.

The quality manager shall be resident on site full time. No construction activities shall take place on site before the engineer approves the quality plan".

Delete the second, third, fourth and fifth paragraphs and replace with the following:

"The contractor shall submit the quality assurance system he proposes using to the engineer, for his approval, within two weeks of the site handover. Once accepted by the engineer the contractor shall not deviate from it unless written notification of proposed changes have similarly been submitted and approved. The system shall record the lines and levels of responsibility and indicate the method by which testing procedures will be conducted."

B1206 THE SETTING OUT OF WORK AND PROTECTION OF BEACONS

Replace "clause 14" in the first paragraph with "clause 4.7".

Delete "and of clause 14 of the general conditions of contract" in the sixth paragraph.

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Add the following paragraph:

“The contractor shall take care that property beacons, trigonometrical survey beacons or setting-out beacons are not displaced or destroyed without the consent of the engineer. Property beacons and trigonometrical survey beacons that have been displaced or destroyed shall be replaced by a registered land surveyor, who shall certify such replacement.

The cost of replacing all beacons displaced or destroyed during the course of the contract without the consent of the engineer shall be the contractor’s responsibility and included in the tender rates”.

B1207 NOTICES, SIGNS AND ADVERTISEMENTS

Delete the third paragraph and replace with the following:

“All signboards erected in accordance with the drawings shall be removed at the same time as the disestablishment of the contractor’s camp. Payment under subitem 13.01 for the final instalment of 15% of the tendered lump sum shall not be made unless all the advertisements, notices and temporary signs have been removed. A typical signboard layout is shown opposite”.

B1209 PAYMENT

(b) Rates to be inclusive

Add the following to the first paragraph:

“VAT shall be excluded from the rates.”

Insert the following after “constructional plant” in lines 6 and 7 of the first paragraph:

“(distinguishing between operational costs and hire costs)”.

(c) The meanings of certain phrases in payment clauses

Procuring and furnishing ... (material)

Add the following:

“Payment for procuring and furnishing material from commercial sources shall include all transport costs, irrespective of distance hauled”.

(e) Materials on the site

Replace “clause 52” in the first line with “sub-clause 14.5”

Add the following sub-clauses:

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“(g) Work in confined areas

Except where provided for in the specification and the Pricing Schedule no extra payment shall be made nor shall any claim for additional payment be considered for construction in confined areas. The omission of standard pay items from the schedule of quantities shall be taken to be deliberate and any additional costs incurred shall be included in the bulk rate.”

B1213 VARIATION FROM SPECIFIED NOMINAL RATES OF APPLICATION OR NOMINAL MIX PROPORTIONS

Amend the last line of the second paragraph to read as follows:

“materials, condition of the site and cement type (in order to comply with the durability requirements described in sub-clause B6404(h)).”

B1214 CONTRACTOR’S ACTIVITIES IN RESPECT OF PROPERTY OUTSIDE THE ROAD RESERVE AND OF SERVICES MOVED, DAMAGED OR ALTERED

Add the following to the last paragraph of subclause (d):

"These written statements shall be handed to the engineer before the final certificate will be issued. Failing to obtain these written statements from all landowners and authorities concerned, the Defects Notification Period will be extended including all conditions related to such an extension, until such time that all these statements are obtained.

The obtaining of any such written statements will not relieve the contractor of the execution of any of his obligations to the satisfaction of the landowner or authority concerned, and to the approval of the engineer."

Under sub-clause (e) replace the opening paragraph with:

“Should the contractor use land not provided by the Employer for the purpose of his own establishment, engineer’s offices and laboratory, or storing of equipment or materials required for construction or disposal, it shall be subject to the following:”

and add the following sub-sub-clauses:

- “(vi) That lease agreements are concluded with the owner or owners of such land for the full period that such areas are required. The leases shall provide for possible extensions to match the duration of the contract. The lease agreements shall also provide for the contract being terminated by contractor’s default or liquidation and the resulting possibility for them to be taken over by a succeeding contractor.
- (vii) That copies of lease agreements shall be submitted to the engineer prior to signature by the signing parties, and copies lodged with the engineer after signing. Notwithstanding the engineer’s approval of the conditions of a lease the contractor shall be solely responsible for adherence to the terms of the agreements.

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(viii) Adherence to the principles of the environmental management plan and legal obligations”

Add the following sub-clause:

“(f) Cleaning of public roads

Where material is spilled on public roads during the haul of material, the road shall be cleaned immediately.”

“B1230 MATERIALS

The contractor, when using materials that are required to comply with any standard specification, shall, if so ordered, furnish the engineer with certificates showing that the materials do comply with this specification.

Where so specified, materials shall bear the official mark of the appropriate authority. Samples ordered or specified shall be delivered to the engineer's office on the site free of charge.

Where materials are specified under trade names tenders must be based on these materials. Alternative materials may be submitted as alternative tenders and the engineer may, after receipt of tenders, approve the use of equivalent materials. The tender must be clearly marked as an alternative tender, failing which the tender may be rejected.

Unless otherwise specified, all proprietary materials shall be used and placed in strict accordance with the relevant manufacturer's current published instructions. Agrément certified products shall be used and placed in accordance with its Agrément certification criteria.

Unless anything to the contrary is specified, all manufactured articles or materials supplied by the contractor for the permanent works shall be unused.

Any materials excavated or present on the site or within the road reserve, or in borrow areas shall not become the property of the contractor, but will be at his disposal only in so far as they are approved for use on the contract, unless otherwise indicated in the project specification.

Existing structures on the site shall remain the property of the Employer and except as and to the extent required elsewhere in the contract, shall not be interfered with by the contractor in any way.

Materials to be included in the works shall not be damaged in any way and, should they be damaged on delivery or by the contractor during handling, transportation, storage, installation or testing they shall be replaced by the contractor at his own expense.

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All places where materials are being manufactured or obtained for use in the works, and all the processes in their entirety connected therewith shall be open to inspection by the engineer (or other persons authorised by the engineer) at all reasonable times, and the engineer shall be at liberty to suspend any portion of work which is not being executed in conformity with these specifications.

The contractor shall satisfy himself that any quarry selected for use provides the necessary mined material in accordance with the specification."

B1232 OWNERSHIP OF REDUNDANT ROAD SIDE FURNITURE AND OTHER MATERIALS

Ownership of all redundant roadside furniture and other materials will become the property of GDRT unless otherwise instructed by the Engineer.

SECTION B1300: CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS

B1302 GENERAL REQUIREMENTS

(c) Legal and Contractual Requirements and responsibilities to the public

Add the following:

"Legislation imposes mutual obligations on the Employer and contractor in the performance of their duties to society and to the built and natural environment. To assist the contractor in understanding and assessing his obligations, and thus to make allowances for the cost of compliance with this legislation, the following additional specifications are included in the project specifications.

Section C3.3 of the Scope of Works contains the Environmental Management Plan for this project. Its provisions regulate the contractor's construction methods to ensure responsible conduct and treatment of the environment relevant to the project. No separate payment mechanism has been made available for the contractor to allow for his compliance with relevant environmental legislation. The contractor shall include such costs in the existing payment items under section B1303: Payment. However, non-compliance with the provisions of this section may lead to the imposition of penalties by the relevant authority.

Section 3.4 of the Scope of Works contains provisions that regulate the contractor's construction methods for compliance with Government's initiatives towards black economic empowerment. It also contains information on criteria used in the procurement process. No separate payment mechanism has been made available for the contractor to allow for his compliance with relevant black economic empowerment legislation. The contractor shall include such costs in the existing payment items under section B1303: Payment. However, non-compliance with the provisions of this section may lead to the imposition of penalties.

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Section 3.5 of the Scope of Works contains the specifications that regulate the contractor's construction methods so far as to ensure health and safety of his employees and of the public. New pay item has been made available under this section to allow the contractor to make separate provision for the cost of health and safety measures during the construction process."

B1303

B13.01 The contractor's general obligations

Add the following paragraphs:

"Should the combined total tendered for sub items (a), (b), and (c) exceed 20% of the tender sum (excluding CPA, contingencies and VAT), the tenderer shall state his reasons in writing for tendering in this manner. The tenderer's attention is drawn to Form B1: Contractor's Establishment on Site, (bound in this Volume), to be completed by the tenderer. If the tenderer should require additional compensation for his obligations under section 1300 (over and above the total tendered for item B13.01) by including such additional compensation in the tendered rates and/or lump sum of items in the Pricing Schedule, these items and the value of such additional compensation shall also be indicated in writing in a letter attached to Form B1.

Payment of the rate per month for sub item C3.2.1.3.5 shall include full compensation for all the contractor's obligations relevant to health and safety legislation.

The tendered rate shall apply in the same manner as pay sub item B13.01(c) but shall not form part of the calculation of the restrictions imposed by Condition of Tender F.3.8(c) and Form to tender B1: Contractor's Establishment on Site. A contractor who tenders zero for this pay item shall not be relieved of his statutory obligations. A nil rate offered shall be deemed not as an omission but as deliberate notice that costs have been included in the tendered rates for individual items of work or in the other preliminary and general pay items."

The following paragraph relates to the treatment of all pay items for which the unit of measurement is the month and shall become applicable only for use in calculations of approved extensions of time in terms of the General Conditions of Contract:

Insert the following paragraphs:

"The tendered percentage under item (e) shall be the day, or part thereof, for which the vehicle was hired and used for its intended purpose. The rate tendered shall include full compensation for the hire of the vehicle including cost of insurances, fuel, wear and tear and any other incidentals."

SECTION B1400: HOUSING, OFFICES AND LABORATORIES FOR THE ENGINEER'S SITE PERSONNEL

B1402 OFFICES AND LABORATORIES

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(a) General

Add the following:

“It is a requirement of the contract that the offices for the engineer’s supervisory staff shall be supplied with approved burglar proofing, the cost of which shall be taken as included in the relevant tendered rates for the provision of the specified building.

B1404 SERVICES

(b) Water, electricity and gas

Add the following to the end of the third paragraph:

“The power supply shall be regulated by a suitable voltage regulator in order to maintain a constant current and voltage level at all times to prevent damage to the office equipment and related machinery during power surges. In the event of damage to the office equipment and related machinery because of a faulty voltage regulator, the contractor shall be liable for payment of all repair or replacement costs of such damaged items.”

Add the following paragraph:

“The supply of electricity and water to the offices of the engineer’s supervisory staff shall be maintained 24 hours per day.”

SECTION B1500: ACCOMMODATION OF TRAFFIC

B1501 SCOPE

Add the following:

“It is a condition of this contract that traffic is accommodated taking into account the provisions of the latest edition of the South African Road Traffic Signs Manual (SARTSM). The latest version for use in the accommodation of traffic is volume 2, chapter 13 of the June 1999 edition. Copies of this publication are available from Government Printers –Tel: (012) 334 4507/8/9 or (012) 334 4510 Fax: (012) 323 9574.

This section also covers the provision of additional information signs for motorists and the release of any notices to the media and public.”

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B1502 GENERAL REQUIREMENTS

Insert the following:

"The whole of the site will be handed over to the Contractor at the beginning of the contract. The sequence in which various parts of the site may be occupied by the Contractor for the execution of the different items of work shall be subject to the requirements of the contract documents regarding, inter alia, working hours and the number, spacing and length of the work areas which may be occupied at any particular time.

The contractor shall programme his work taking due cognizance of restrictive conditions. The contractor's tendered rates shall include full compensation for all possible additional costs which may arise from the above and no claims for extra payment as a result of this *modus operandi* will be considered. The contractor shall in particular note that no additional compensation shall be made for work that could be considered as half-width construction."

(a) Safety

Replace the full stop at the end of the first paragraph and continue with the following:

"... flow of traffic, including the prohibition of his, and his subcontractor's, construction plant from disregarding the stop/go accommodation of traffic control facilities. Failure to comply with this requirement shall be taken as a penalty event in terms of B1502(I)."

Add the following paragraphs:

"The contractor shall be responsible for maintaining the existing road surface both within the works area and the advance warning and termination areas in a safe and trafficable condition for the duration of the contract.

The contractor shall be fully responsible for all the traffic accommodation on site, including for work undertaken by sub-contractors, e.g. at bridges etc.

Traffic shall be accommodated as indicated on the drawings unless an alternative tender incorporating an amended method of traffic accommodation has been accepted.

The contractor may amend the agreed traffic accommodation scheme but only with the approval of the engineer in consultation with the provincial and municipal traffic authorities.

During the non-working hours, or when construction is not taking place on a certain section of road all obstructions to the traffic shall be removed and all signs no longer applicable to the situation shall be removed to an approved safe location or effectively covered.

No equipment or vehicles shall be stored or parked in the median or on the road side during non-working hours except if protected or demarcated and only if approved by the engineer.

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When requested by the engineer, the contractor shall provide lane closures for the purpose of road inspection. This must be done in advance of the actual programmed time for the work."

(f) Approval of temporary deviations

Add the following:

"If, after any temporary deviation has been constructed, any changes are considered necessary or desirable, the proposal shall be submitted to the engineer for his approval."

(i) Traffic Safety Officer

Add the following to the end of the second paragraph:

"The contractor shall submit a CV of the candidate to the engineer for approval before the candidate is appointed as the traffic safety officer. "

Insert the following as the opening phrase to sub-sub-clause (i):

"make himself available to discuss road safety and traffic accommodation matters whenever required by the engineer and shall be responsible..."

Delete sub-sub-clauses (ii) and (iii) and replace with the following:

"(ii) Record on neat and dimensioned sketches and submit to the engineer the position and sign reference number, where applicable, of each sign, barricade, delineator, cone, amber flicker light, guardrail and permanent or temporary painted road marking feature. The position of each shall be adequately referenced from the marker boards or other surveyed points on the site of the works.

These records shall also show the date and time at which the recorded traffic accommodation features are certified correct by the traffic safety officer, and shall be signed by the traffic safety officer before being submitted to the engineer.

The records shall similarly account for whatever changes are made in the field. Such changes shall record the position of flagmen and stop/go control men and their associated traffic accommodation equipment wherever they are used.

(iii) Personally inspect the position and condition of each traffic accommodation feature on the whole site of works twice per workshift, whether daytime or nightwork, and at least twice a day/night during non-working hours, to record all irregularities discovered and the remedial action taken, and to sign off as correct and submit to the engineer such record sheets by middle of the next working shift. The above inspections must at least take place before the commencement of peak traffic periods. The traffic safety officer shall keep a duplicate book for this specific purpose.

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The traffic safety officer shall also submit with this report the daily labour returns of flagmen, stop/go, traffic signal control personnel employed and the traffic data recorded at each traffic control point."

Add the following sub-sub-clauses:

"(ix) The traffic safety officer shall be equipped with a cellular telephone and shall have a traffic safety vehicle and sufficient labour at his disposal 24 hours a day, including all prescribed non working days, and shall not be utilised for other duties. He shall be directly answerable to the contractor's site agent. The traffic safety officer shall have his own vehicle to carry out inspections and at least one assistant to accompany him full time. Furthermore the traffic safety vehicle shall be a truck with a capacity of at least 3 tons and shall be equipped with a high visibility rear panel in accordance with the requirements of the SARTSM as well as a truck mounted impact attenuator complying with TL-2 criteria when tested in accordance with NCHRP 350 or N1 criteria when tested in accordance with EN 1317. (Certification of compliance must be on site at all times). The attenuator shall be used when the vehicle is utilized to close traffic lanes or when attending to stationary or broken down vehicles or accident scenes. The words TRAFFIC CONTROL shall be written on a warning sign in highly legible letters, not less than 150 mm high, and the sign shall be mounted on both the traffic safety officer's vehicle and the traffic safety vehicle at least 1,5 m above ground level. The proposed sign and letter dimensions shall be submitted to the engineer for his approval.

The vehicles shall also be equipped with an amber-coloured flashing light of the rotating parabolic reflector type with a minimum intensity of 100W. The warning light shall be switched on at all times and the sign shall be displayed when the vehicle is used on site.

The traffic safety officer shall have a direct line of communication at all times with the police and traffic officers responsible for the area within limits of the contract.

- (x) Ensure that all obstructions related to the contractor's activities be removed at the end of each work shift where applicable as instructed by the engineer and that the roads are safe for the traveling public.
- (xi) The traffic safety officer shall, in addition to the duties listed in paragraph 1502 (i), also be responsible to arrange for the removal of stationary or broken down vehicles off the roadway in conjunction with the routine maintenance contractor and/or traffic authorities and implementing actions requested by the traffic authorities with regard to the work to be carried out and be responsible for the erection and maintenance of all traffic signs necessary for the accommodation of traffic.
- (xii) In the event of an accident the traffic officer shall record in a written report the details of the accident, record the position of all temporary road signs, barricades, delineators, flagmen and any other devices used for traffic accommodation. In addition the report shall include a neat dimensional sketch, photographs, identifiable permanent features, and any other relevant information.
- (xiii) At least two separate traffic safety officers and teams shall be employed when

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construction is carried out during the day and night.”

Add the following sub-clauses:

“(j) Crossing the median or carriageway centreline

No vehicle or item of equipment shall be allowed to cross the median of a dual carriageway road or the centreline of a single carriageway unless the traffic accommodation and signage specifically allows for this and is approved by the engineer as safe.

(k) Site personnel

The contractor shall ensure that all his personnel, excluding those who are permanently office bound, are equipped with reflective safety jackets and that these are worn at all times when working on or near to the travelled way. Any person found not wearing a reflective jacket under these circumstances shall be removed from the site until such time as he is in possession of and wearing a reflective jacket. Reflective safety jackets shall be kept in good condition and any jackets that are, in the opinion of the engineer, ineffective shall be immediately replaced by the contractor.

(l) Penalty events

Whenever the following events occur, the contractor shall be subjected to penalty conditions expressed in the Appendix to Tender.

(i) Non compliance with accommodation of traffic specifications

Failure or refusal on the part of the contractor to take the necessary steps to ensure the safety and convenience of the travelling public, accommodation of traffic, plant and personnel in accordance with these specifications or as required by statutory authorities or ordered by the engineer, shall be sufficient cause for the engineer to apply penalties as follows:

A fixed penalty of R10 000,00 per occurrence shall be deducted for each and every occurrence of non-compliance with any of the requirements of section

1500 of the standard specifications and section B1500 of the project specifications.

In addition a time-related penalty of R1000,00 per hour over and above the fixed penalty shall be deducted for non-compliance to rectify any defects in the accommodation of traffic within the allowable time after the engineer has given an instruction to this effect. The engineer's instruction shall state the allowable time, which shall be the time in hours for reinstatement of the defects. Should the contractor fail to adhere to this instruction, the time-related penalty shall be applied from the time the instruction was given.

(ii) Late occupation of lanes, ramps and/or crossroads

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The contractor shall be charged a lane occupation levy if he continues to occupy interchange ramps, crossroads and/or carriageway lanes beyond programmed completion dates. The levy shall be deducted from payments due on the relevant interim payment certificates at the rates provided in the Appendix to Tender and the pricing schedule."

(m) Liaison with relevant Authorities

Where applicable, the contractor shall liaise on a daily basis with the Employer's relevant i-traffic Management Centre (TMC), informing their operations manager about the expected works and lane closures for the next day, inclusive of all work shifts, in order for the operational manager to take into account the accommodation of traffic impacts in the TMC's operations.

For exceptional traffic accommodation impacts, such as lane closures in peak hours, short term contra flow conditions, lane closures over weekend peak periods, etc., the TMC operational manager shall be informed seven days prior to the event.

The contractor shall inform the TMC about all traffic related incidents, as soon as he becomes aware of the incident.

Where required the contractor shall be responsible for acquiring the services of a municipal traffic officer and traffic vehicle (equipped with a blue light) to assist in the accommodation of traffic. The traffic officer and vehicle will be required when lanes are to be closed and/or where directed by the Engineer.

If the road under construction forms part of an abnormal load route the contractor shall liaise with the relevant provincial abnormal load office that issues permits to ensure that permits are not issued when construction restrictions do not allow passage of the abnormal load.

(n) Other requirements

The following other requirements must be adhered to for the entire contract period:

- i) The travelling public shall have the right of way on public roads and the contractor shall make use of approved methods to control the movement of his equipment and vehicles so as not to constitute a hazard on the road.
- ii) The contractor's tendered rates for the relevant items in the schedule of quantities shall include full compensation for all possible additional costs which may arise from the above and no claims for extra payment due to inconvenience as a result of the modus operandi will be considered.

B1503 TEMPORARY TRAFFIC-CONTROL FACILITIES

Replace the first sentence of the first paragraph with the following:

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"The contractor shall provide, erect and maintain the necessary traffic-control devices, road signs, channelisation devices, barricades, warning devices and road markings (hereinafter referred to as traffic-control devices) in accordance with these special provisions and as shown on the drawings and in the SARTSM and remove them when no longer required. It shall be incumbent upon the contractor to see to it that the abovementioned traffic-control devices are present where required at all times and are functioning properly."

Replace the last sentence of the second paragraph with the following:

"Traffic-control facilities no longer required at the site of a deviation or a lane closure shall be moved for re-use. Traffic-control facilities lost or damaged by the contractor shall be replaced at his own cost. Where it can be proved that loss of or damage to such facilities is beyond the contractor's control and not the result of his actions or omissions, the engineer may order the facilities to be replaced and paid for at scheduled rates."

Replace the third paragraph with the following:

"The type of construction, spacing and placement of traffic-control devices shall be in accordance with the SARTSM. The recommended arrangements of the traffic control devices illustrated and/or drawings issued by the engineer shall not be departed from without prior approval of the engineer. The arrangements expected to be most commonly used in the contract are given on the tender drawings.

The details shown for spacing and placement of traffic-control facilities may however, be revised at the discretion of the engineer where deemed necessary to accommodate local site geometry and traffic conditions."

(a) Traffic control devices

Add the following at the end of the last paragraph:

"At each signalised traffic control point, an all weather shelter of at least three (3) square metres capable of accommodating two operators, with a clear window, a stable door, two chairs and a portable chemical toilet that shall be regularly maintained, shall be provided. Each control point shall have a 2 (two) phased signal system mounted on 3m high steel poles complete with all electrical wiring, a floodlight system of at least 2x400w metal halide floodlights mounted onto a 9m high pole to light up the traffic control point and lighting along the road where the traffic will queue. The provision shall include for a sufficient continuous power supply to operate each traffic control point. Included in the establishment and operation of the traffic control devices shall be a communication system that allows the operators to communicate with each other.

Records of opening and closing of closures and traffic counts shall be kept and submitted daily to the traffic safety officer."

(b) Road signs and barricades

Add the following:

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“The contractor shall be responsible for the protection and maintenance of all signs, and shall at his own cost replace any that have been damaged, lost, or stolen.

All temporary road signs required to remain in position for some time shall be pole mounted as shown on the drawings. All temporary road signs required to be moved more often shall be mounted on portable supports for the easy moving of signs to temporary positions. The only permitted method of ballasting the sign supports shall consist of durable sandbags filled with sand of adequate mass to prevent signs from being blown over by wind. The cost of the sandbags shall be included in the tendered rates for the various types of temporary road signs.

The covering of permanent road signs, if applicable, shall be by utilizing a suitable and durable covering that shall be pulled over the sign in the form of a hood and fastened to the signposts. Plastic bags or other materials and fastened by means of adhesive tape shall not be permitted. The cost of covering of permanent road signs shall be included in the tendered rates of items B15.01 and B15.10.”

(c) Channelisation devices and barricades

Add the following:

“The use of drums as channelisation devices shall not be permitted. Drums may however be used to set up barriers as provided for in sub-clause 1503(d).

Delineators shall:

- (i) comply with the manufacturing and reflective requirements of the SARTSM and the blades shall be reversible with dimensions as indicated on the drawings;
- (ii) have smooth and round edges and be mounted on a post and base. All components shall be of durable plastic material;
- (iii) have the lower edge of the reflective part of the delineator mounted not lower than 250mm above the road surface;
- (iv) be capable of withstanding the movement of passing vehicles and gusting winds up to 60 km/h in typical working conditions without falling over. To achieve this, the base shall be at least 0,18m² and ballasted by its own weight or with sandbags filled with sand;
- (v) together with its mounting be designed such that it will collapse in a safe manner under traffic impact.

Traffic cones manufactured in a fluorescent red-orange or red plastic material may be used only at short term lane deviations during daylight. Cones shall not be used on

their own, but shall be interspersed with delineators at a ratio not exceeding 3:1. Cones used on all deviations shall be 750mm high. Lane closures which continue into the night time shall be demarcated by delineators only.

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On section of road where the centreline has been obliterated, delineators shall be provided on both road edges at minimum 200m spacing on straight sections and at least 3 (three) visible on all curves."

(d) Barriers

Add the following:

"Barriers for preventing vehicles from leaving the permitted lanes shall be movable barriers with an approved safety shape design (e.g. New Jersey, F-shape or single slope). Temporary movable barriers shall be obtained from suppliers and placed between the existing road and the construction areas. They shall comply with the requirements of either of the following specifications:

- (i) The European Specification EN 1317 with containment level H1, or
- (ii) The American Federal Highways Administration Specification NCHRP Report 350 with containment level TL4.

When applying these specifications the contractor must take cognisance of his liabilities relating to the installation of temporary works to provide protection to the permanent Works and safety to his personnel and select a barrier system appropriate to his chosen work methodology. Particularly pertinent is the working width rating of a barrier system; the displacement width of the system shall not exceed the available safe width to the nearest edge of the construction. All moveable barriers shall be installed in accordance with the manufacturer's instructions or generally accepted best practice and shall be submitted to the engineer for review and comment.

Even though the Employer has made available its own barrier system for the contractor to price no transfer of responsibility for use of that system shall pass to the Employer it being deemed that any price offered by the contractor constitutes his confirmation that this barrier system provides appropriate protection. When using the Employer's concrete barriers the connecting system using metal plates and bolts (as shown in the drawings) provides a system compliant with the specifications of i) above. The working width classifications of this system are W3 and W6 when impacted by a TB11 or TB42 vehicle respectively. This means that the unsafe working width behind this barrier system is 1000mm or 2100mm measured from the back of the barrier depending on the impact characteristics of each vehicle. If the contractor installs a different connecting system to that shown on the drawings it is entirely in the knowledge that the risk of protection lies entirely with the contractor.

Where instructed by the engineer, the terminal sections of moveable barriers may be a proprietary type or may be contractor designed to attenuate head-on impacts of at least NCHRP Test Level 1 (50 km/h, 2 000 kg) or EN1317 Containment Level H1 (80 km/h, 1 500 kg).

(e) Warning devices

Add the following:

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"All construction vehicles and plant used on the works shall be equipped with rotating amber flashing lights and warning boards as specified. All vehicles and plant before being allowed onto the site shall obtain a clearance permit from the engineer.

(i) Vehicle mounted flashing lights

Rotating lights shall have an amber lens of minimum height of 200mm and shall be mounted in such a way as to be highly visible from all directions. The lights on construction vehicles shall not be switched on while vehicles are being operated on unrestricted sections of a public road, but shall be switched on while construction vehicles are operating within the accommodation of traffic area, as the vehicles decelerate to enter a construction area, and as the vehicles accelerate to the general speed when entering the road from a construction area. Lights on plant shall operate

continuously while the plant is working alongside sections of road open to public traffic within the work areas.

All LDV's and cars operating on site shall also be equipped with rotating amber flashing lights which shall be placed so as to be highly visible from all directions and operated continuously while the vehicles are manoeuvring in or out of traffic or are travelling or parked alongside roads open to public traffic within the work areas.

Rotating lights and the "construction vehicle" signs on the contractor's vehicles and plant shall not be paid for separately but shall be included in the rates covering the use of the vehicles.

The contractor shall apply and maintain lights together with temporary mounting brackets, to the approval of the engineer. Vehicles and plant that do not comply with these requirements shall be removed from the site.

(ii) Sign mounted flashing lights

Two amber flashing lights shall be vertically mounted on top of the traffic signs at each end of each traffic accommodation section as shown on the drawings. The lights shall be operated during the hours of darkness.

(iii) Flashing Illuminated Arrow Board

The arrow board shall be made up of light sources mounted on a backing board. A single shaft arrow will be required that can be used for both left and right directions. The light sources must be of LED type to improve visibility if used also during day time. The arrow board shall be used at lane drops as described B1502.

(iv) Mobile Variable Message Sign (VMS)

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The VMS shall be mobile and located in a safe position to convey to the travelling public of traffic conditions ahead and/or inform a motorist of his actual travelling speed.

The mobile VMS system must be equipped with solar panels to provide an output of 400 Watt. It shall be stable for shocks up to 3G and wind speeds up to 120 km/h.

The sign face shall not be less than 3m wide by 1.5m high to provide a full matrix LED with at least 50 and 27 pixels for the width and height respectively. Each pixel shall have 4 LED's and the pixel spacing shall not be less than 60mm. An LED mask for contrast and shading shall be provided. The sign shall be able to display 3 lines by 10 characters. The cone of vision is to be 30°.

The information displayed on each individual sign shall be controlled by a computer with internet connection operated by the contractor."

(f) Road Markings (move to 5700)

Add the following new paragraphs:

"The contractor will be required to survey all existing road marking prior to commencement of construction or repair work.

Temporary road marking shall be reinstated before the road is opened to full width traffic. Temporary road marking shall consist of heavy pre-marking, and/or retroreflective road marking paint, and/or temporary road studs, as directed by the engineer.

Temporary road studs shall be installed at double the spacing and shall be fixed to the road surface with the bitumen rubber crack sealant to allow for easy removal by application of gentle heat.

Temporary road marking lines for demarcation of temporary traffic lanes, on the final road surface shall not be allowed, except if approved by the engineer. Should temporary road marking lines be approved, it shall consist of one of the following as directed by the Engineer:

- (i) Construction grade tape for temporary road marking which can be removed by applying gentle heat. The tape shall be foil backed, adhesive, reflective tape. The tape shall be capable of being easily removed from the road surface by the application of gentle heat.
- (ii) Removable road marking paint."

Add the following sub-clauses:

"(g) Other traffic control measures ordered by the engineer

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The engineer may instruct the contractor to provide any other road sign, reflective tape, etc not measured in standard pay-items. Such road signs shall conform to the requirements of the SARTSM, or specification provided by the engineer. Similarly, in order to ensure that the travelling public is kept fully informed and warned on matters relating to the accommodation of traffic, construction sign posting and the effect of the construction on the free flow of traffic through the site, the engineer may arrange for advertising in the press and/or for other forms of publicity.

(h) Flagmen

Flagmen shall be provided where shown on the drawings or required by the specification. During the daytime, at least two flagmen shall be provided at each traffic control point in addition to the STOP/GO sign operator, one flagman at the first speed reduction sign and a second roving flagman at least a 100m behind the last vehicle in the queue to indicate to the traffic to stop. At night time all flagmen shall be equipped with a suitably visible strobe, and a torch at each traffic control point as well as the traffic light operator. Where the shoulder of the road is closed to traffic, flagmen shall be provided at the leading ends of closures during daytime. These flagmen shall be provided at the first speed reduction sign to warn the traffic about the closure. No flagmen shall be on duty for a period of more than 10 hours per day.

Flagmen shall be adequately trained in the standard flagging techniques as described in the SARTSM (refer to figure 13.23 of detail 13.23.1) and be provided with conspicuous clothing such as safety jackets utilizing retro-reflective and/or fluorescent panels in red, yellow and/or white.

Flagmen shall have in their possession, at all times, certification that they have attended and passed an accredited course in flagging techniques before being allowed onto the construction site.

Flags shall be made from bright red or red-orange material and shall be square with a minimum side length of 600mm. The flag shall be attached to a staff at least 1,0m in length.

In terms of lateral clearance and safety, flagmen shall stand on the shoulder of the lane of traffic that is being controlled and under no circumstances shall flagmen be permitted to stand within the traffic lane. In order to obtain maximum visual impact for the travelling public, flagmen shall stand alone."

B1510 EXISTING ROADS USED AS DIVERSIONS

Add the following:

"The contractor shall indemnify the employer against all proceedings, claims, actions, damages and costs which may arise from or be related to damage to vehicles or property or injury to persons as a result of loose stones or aggregates on the road surface or as a result of bituminous applications during the construction of the works.

The contractor shall arrange his activities so that construction traffic and equipment do not unnecessarily obstruct public traffic or force it to a complete standstill. The flow of public traffic shall always

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take precedence and the contractor shall not stop or delay public traffic to make way for construction traffic."

OF



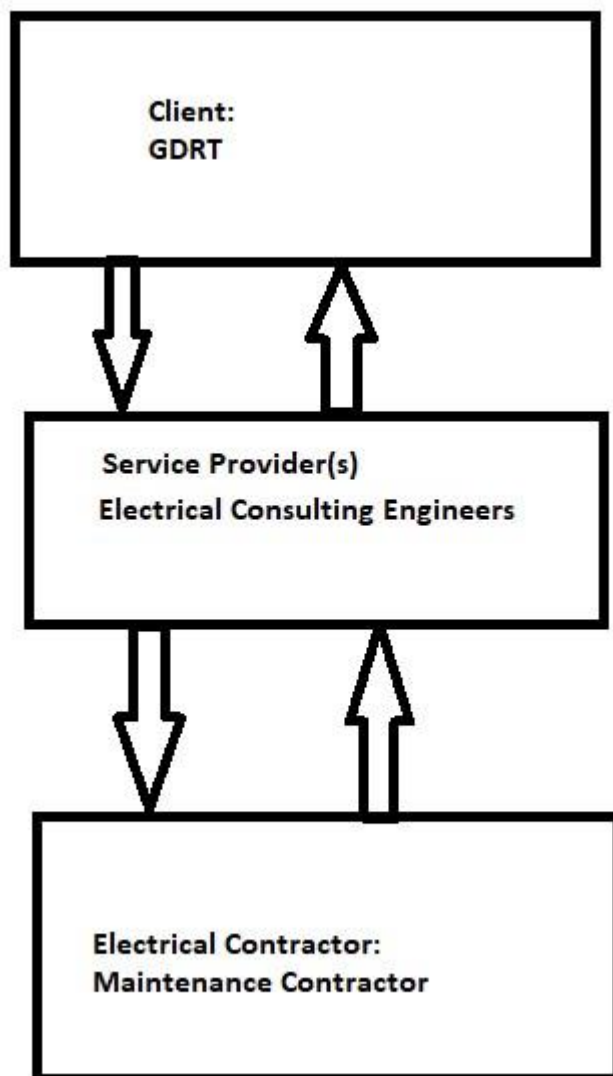
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C3.8: PROCEDURES FOR THE REPORTING OF ELECTRICAL OCCURRENCES

ANNEXURE A

CHANNELS OF COMMUNICATION



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PART C4: SITE INFORMATION



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Part C4: site information

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C4.2

C4.1 LOCALITY PLAN

The Map will be freely issued by the department during site handover.



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C4.2 LOCATION OF THE PROJECT

The proposed project comprises of various sections of street lighting owned by the Gauteng Department of Roads and Transport. The site comprises of the following sections of roads with a total length of approximately 16.02km:

Item No.	Street Name	Region	Distance (km)
1	P66 (R55 - Laudium Road)	Pretoria	16.02
2	Pretoria Regional Office	Pretoria	
TOTAL			16.02

C4.3 ADDITIONAL INFORMATION AS REQUIRED FOR THE PROJECT

C4.3.1 Limiting Factors

Priorities

- Road Safety of travelling public, engineering staff and construction personnel.
- Minimum user delays and damage.
- High standard of work.
- Accurate budgeting
- Achievement of BBBEE goals
- Successful completion of contract.

Constraints

- Three lanes per direction open to traffic where geometry allows.
- Road safety not to be compromised under any circumstances, especially at night.
- High traffic volumes.
- No overspending of budget

Customers

Road Users – the level of service to remain high and user delays and damage to property to be kept to a minimum. **Key Stakeholders** i. Roads users ii. Contractor
iii. Works Contract Engineer

C4.3.2 Risks Analysis Risk Register

No	Key Risk	Identified Risk	Mitigating Factors
1	Road Safety	Loss of life and property	Road safety audits & Coordination with road and law enforcement authorities

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2	Funding	Legal actions, claims for damages sustained by users due to bulky work.	Prioritization of work Insurance
3	Environmental Management	Non-compliance with legislation. level of public scrutiny GDRT is exposed	Environmental management policies in achievement of GDRT's primary objectives are pursued Consulting engineers to oversee compliance to standards by contractors
4	Expanded training	Reputation Risk	Adequate funding in contract Pro-active awareness for training need
5	Proficient consulting services (Project Management)	Inadequate knowledge transfer within companies.	Knowledge transfer and capacity building Project managers closely monitor contractors and consulting resident engineers.
6	All payments are accurate and valid.	Actual project progress does not correlate payment certificate. Collusion between the resident engineer and the contractor used as the basis of payment. Work performed without prior approval VO's. Prov Sums used without quotes and VO approval	Site audits should be performed. All variation orders to be approved in advance for all work not covered by rates in the contract. Minimum of three quotations required for Prov Sum items.
7	Accurate and timeous cash flow projections	Cash flow projections prepared by project managers are inaccurate	Project engineers to exercise greater financial diligence in preparation of monthly/annual cash flow projections. Reasons for variance greater than 10% on monthly forecasts to be provided with each payment certificate.
8	OHS legislation	Compliance Risk	Safety audits
9	Equity targets.	Employment Equity targets have not been met	Awareness of economic Empowerment and job creation results should be improved

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SECTION A

Item No.	Item Description	Unit	Qty	Unit Amount	Total
C3.2.1.1	Contractor's Establishment on Site and General Obligations				
C3.2.1.1.3.1	Site bush clearing	Lot	1		
C3.2.1.1.3.1	Site Office and storage	Monthly	12		
C3.2.1.1.3.1	Site Fencing	Lot	1		
C3.2.1.1.3.5	Development of the Health and Safety File	Lot	1		
C3.2.1.1.3.5	Health and Safety Agent	Monthly	12		
C3.2.1.1.3.5	Personal PPE for all staff	Lot	1		
C3.2.1.6.4.2	Cherry Picker (Lifting Equipment)	P/Sum	1	R560,000.00	R560,000.00
C3.2.1.1.3.1 - b	Site Security	Monthly	12		
C3.2.1.1.3.6	Compliance with the Environmental Management Plan (EMP)	Monthly	36		
SUB - TOTAL (Excl. VAT)					



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SECTION B					
Item No.	Item Description	Unit	Qty	Unit Amount	Total
C3.2.1.2	Accommodation of Traffic				
C3.2.1.2.8.1	Temporary Control Facilities				
	Traffic control measures ordered by the engineer	P/Sum	1	R600,000.00	R600,000.00
	Provisions of other traffic control measures	P/Sum	1	R500,000.00	R500,000.00
	Handling cost and profit	%			
C3.2.1.2.8.2	Traffic Safety Officer	Each	36		
C3.2.1.2.8.4	Security Systems (Cameras, cable guards, Armed Response)	P/Sum	1	R40,000,000.00	R40,000,000.00
SUB - TOTAL (Excl. VAT)					



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SECTION C - MAINTENANCE					
Item	Description	Qty	Unit	Unit Price	Total Price
C3.2.1.6.4.2	Emergency Call-Out				
	1) Transport cost per km	2500	km		
	2) Normal Working Hours	576	Call out fee		
	3) After Hours, Holidays and Weekend	288	Call out fee		
C3.2.1.6.4.2	Labour Cost During Office Hours				
	1) Technician	350	ZAR/ Hour		
	2) Electrician	800	ZAR/ Hour		
	3) Assistant	800	ZAR/ Hour		
C3.2.1.6.4.2	Labour Cost After Office Hours, Weekends and Public Holidays				
	1) Technician	175	ZAR/ Hour		
	2) Electrician	400	ZAR/ Hour		
	3) Assistant	400	ZAR/ Hour		
C3.2.1.3.6.6	Supply and Installation of Materials and Equipment for Maintenance Work				
	Luminaires complete with luminaire setting up and also the suitable lifting equipment for heights of up 20m				
	1) Luminaire (LED, IP66, 122W, 19000lm)	50	Each		
	2) Bulkhead, wall mounted, IP66, LED	10	Each		
	3) Weatherproof, Fluorescent, T8, LED, 18W, 1350 lm	10	Each		
	4) Luminaire (LED, IP66, 110W, 16250lm)	60	Each		
	Luminaire Switchgear complete with mounting brackets				
	5) Day night switch per circuit	5	Each		
	6) 5A, 230 V, Double Pole Circuit Breaker	20	Each		



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	7) 5A, 230 V, Single Pole Circuit Breaker	20	Each		
	8) 25A, 400 V, Three Pole Circuit Breaker	10	Each		
	Cables				
	9) 35 mm ² , 4 core PVC insulated PVC bedded SWA PVC sheathed 600/1000V cable with copper conductors and manufactured to SANS 1507-3	600	m		
	10) 25 mm ² , 4 core PVC insulated PVC bedded SWA PVC sheathed 600/1000V cable with copper conductors and manufactured to SANS 1507-3	600	m		
C2.1..7.1	Poles (complete with mounting structural works)				
C3.1.1.10.5.2	10m M/H 11.5M T/L galvanised pole - buried C/W double 3m goose neck bracket on the median	10	Each		
	20 m Scissor mast complete with foundation, light brackets, internal fibre glass DB with photo cell, splitter boxnd 5c x 2.5 mm trailing cable	2	Each		
	Spigots				
	Single Outreach Arms complete with mounting ancillary	10	Each		
	Double Outreach Arms complete with mounting ancillary	10	Each		
C3.2.1.10.10.1	Routine Maintenance Monthly visual inspection and report (i.e. status of the luminaire, status of the poles, cable connection, circuit breaker status) complete with torquing of the bolts, if found loose.	36	Months		



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	Tracking application and network monthly premiums	3	Years		
SUB - TOTAL (Excl. VAT)					



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SECTION D - SUPPLY AND INSTALL						
Item No.	Item Description	Unit	Qty	Unit Labour	Unit Material	Total
C3.2.1.10.4.1	Replacement of luminaires complete with a tracker, day night switch and surge protection. a) LED Light Fittings 1) Luminaire (LED, IP66, 122W, 19000lm) 2) Luminaire (LED, IP66, 110W, 16250lm) 3) Day night switch per circuit	Each	1450			
		Each	415			
		Each	15			
C3.2.1.10.5.2	c) Replacement of Masts / Pole complete without Luminaires 1) 10m M/H 11.5m T/L Galv pole - buried c/w double 3m goose neck bracket on the median 2) 20 m Scissor mast complete with foundation, light brackets, internal fibre glass DB with photo cell, splitter box and 5c x 2.5 mm trailing cable and maintenance set Civils	Each	120			
		Each	10			
C2.1.27.1	Test the integrity of each median 20m scissor mast that has been vandalised and provide the results	Each	10			
C2.1.27.1	Remove the failed foundation and dispose the recovered material	Each	10			
C11.1.6	Excavate and cast new foundation for a median 20m scissor mast complete with rainforce, mounting bolts and earth conductor	Each	10			



**TENDER NUMBER: DRT 21/01/2025 THE SUPPLY,
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GAUTENG PROVINCE

C3.2.1.6.4.1	Supply, deliver, install, test and commission					
	1) 35 mm ² , 4 core PVC insulated PVC bedded SWA PVC sheathed 600/1000V cable with copper conductors and manufactured to SANS 1507-3	m	7500			
	2) 25 mm ² , bare copper earth wire as per SANS 1411	m	10200			
C2.1.11.2	Cable Trenching	m ³	300			
C3.2.1.10.18.1	Test and Issue CoC for each circuit	Lot	35			
C3.2.1.3.6.6.	10A, 230 V, Double Pole Circuit Breaker	Each	60			
C3.2.1.10.2	Operation and Maintenance Manuals on System Changes	L/Sum	1			
SUB - TOTAL (Excl. VAT)						



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SECTION E - PRETORIA CAMP						
Item No.	Item Description	Unit	Qty	Unit Labour	Unit Material	Total
C3.2.1.10.4.1	Wall Mounted - Bulkhead					
	1) Bulkhead, wall mounted, IP66, LED	Each	135			
	2) 4mm2, Suffix cable, flat twin and earth	m	1000			
	3) Mini-rail 10A, 4 kA, 220V, single pole	Each	20			
	4) Day-night switch (25A)	Each	10			
C3.2.1.10.4.1	Flourescent Lights					
	5) Weatherproof, Flourescent, T8, LED, 18W, 1350 lm	Each	120			
	6) 4mm2, Suffix cable, flat twin and earth	m	1000			
	7) Mini-rail 10A, 4 kA, 220V, single pole	Each	1			
	8) Day-night switch (25A)	Each	1			
C3.2.1.10.18.1	CoC	Per Site	4			
SUB - TOTAL (Excl. VAT)						



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BoQ - Summary - Pretoria Region		
Item No.	Description	Amount
1	SECTION A	
2	SECTION B	
3	SECTION C	
4	SECTION D	
5	SECTION E	
SUB - TOTAL		
CONTINGENCY (10%)		
CPA (Provisional Sum)		R11,654,065.59
VAT		
TOTAL		