

BID NOTICE

STELLENBOSCH MUNICIPALITY HEREBY INVITES YOU TO TENDER FOR B/SM 82/24: WORKS ON TRAFFIC SIGNALS FROM 01 JULY 2024 – 30 JUNE 2027

TENDER NUMBER: **B/SM 82/24**
DESCRIPTION: **WORKS ON TRAFFIC SIGNALS FROM 01 JULY 2024 – 30 JUNE 2027**
CLOSING DATE: 13 May 2024
CLOSING TIME: 12h00: Bids will be opened in the **Council Chambers or Supply Chain Management Boardroom.**

CIDB: The following CIDB class of construction works will be applicable to the Tender, in accordance with the sum tendered or value determined in accordance with regulation 25(7A) of the Construction Industry Development Regulations, 2004 (as amended) – As at 23 May 2019 - **Class of Construction Works: 3EP or higher;**

INFORMATION:

Tender Specifications: Nigell Winter at 021 808 8223: e-mail: Nigell.Winter@stellenbosch.gov.za

SCM Requirements: Renae Bergstedt at 021 808 8588: e-mail: Renae.Bergstedt@stellenbosch.gov.za

Office hours for collection: 08h00-15h30

Tenders may only be submitted on the Tender document issued by Stellenbosch Municipality and must be valid for **180 days** after tender closing. Late, electronic format, telephonic or faxed Tenders will not be considered and Stellenbosch Municipality does not bind itself to accept the lowest bid or any of the tenders that has been submitted.

Sealed Tenders, with “**B/SM 82/24: WORKS ON TRAFFIC SIGNALS FROM 01 JULY 2024 – 30 JUNE 2027**” clearly endorsed on the envelope, must be deposited in the Tender box at the offices of the Stellenbosch Municipality, Town House Complex, Plein Street, Stellenbosch. The Tender box is accessible 24 hours a day and Tenders must be accompanied by the completed Tender documents. Tenders not accompanied by a complete Tender document, will not be considered.

NOTE: This tender will be evaluated in terms of the General Conditions of Contract, Supply Chain Management Policy and relevant specification as depicted in the document and also the Stellenbosch Preferential Procurement Policy effective from 16 January 2023 in accordance with the Preferential Procurement Regulations that was promulgated by the Minister of Finance on 04 November 2022 in Government Gazette No 47452.

The preferential points system applied is as follows: 80/20 in terms of the approved policy.

Price	80
B-BBEE status level of contribution	20
Total points for Price, B-BBEE	100

The following conditions to Tender exist (failure to comply may result in your Tender being disqualified):

1. This Tender is subject to the general conditions of contract (GCC) and special conditions for Tendering.
2. Relevant terms of reference.
3. Tenderers must be registered on the Central supplier database (CSD) if they wish to conduct business with the municipality.
4. No award will be made to tenderers whose tax status is non-compliant.
5. Tenders submitted must be in a sealed envelope clearly marked with the Tender number, placed in the tender box before closing time. Failure will result in the tender being invalid.

*Tender documents, in English, are available free of charge on the website: www.stellenbosch.gov.za. Alternatively, hard copies of the document are obtainable from the offices of the Supply Chain Management Unit, Stellenbosch Municipality, Town House Complex, 1st Floor, Plein Street, Stellenbosch, upon payment of a non-refundable fee of **R1281.00 per document.***

Note: The Municipality will never contact you to pay money in exchange for the award of the tender.

G Mettler (Ms)
MUNICIPAL MANAGER

TENDER KENNISGEWING

STELLENBOSCH MUNISIPALITEIT NOOI U VIR DIE VOLGENDE TENDER: B/SM 82/24 WERK OP VERKEERSSEINE VANAF 01 JULIE 2024 TOT 30 JUNIE 2027

TENDER NOMMER: **B/SM 82/24**
BESKRYWING: **WERK OP VERKEERSSEINE VANAF 01 JULIE 2024 TOT 30 JUNIE 2027**
SLUITINGSdatum: **13 MEI 2024**
TYD VAN SLUITING: **12h00.** Tenders sal oopgemaak word in die **Raadsaal** of in die **Voorsieningskanaalbestuurs Raadsaal**

KIOR: Die volgende KIOR klas vir konstruksiewerk, in ooreenstemming met die totale bedrag getender of waarde bepaal in ooreenstemming met regulasie 25 (7A) van die Konstruksie-industrie Ontwikkelingsraad, Regulasies, 2004 (soos gewysig) op 23 Mei 2019, sal op die bod van toepassing wees. **Tenderaars moet 'n geskatte KIOR kontrakgradering van ten minste 3EP of hoër hê.**

NAVRAE:

Tender spesifikasies: Nigell Winter by 021 808 8223: e-pos: Nigell.Winter@stellenbosch.gov.za
Vkb vereistes: Renae Bergstedt by 021 808 8588: e-pos: Renae.Bergstedt@stellenbosch.gov.za

Kantoor Ure: 08h00-15h30

Tenders mag slegs ingedien word op die tenderdokumentasie verskaf deur Stellenbosch Munisipaliteit en moet geldig wees vir 180 dae na die sluitingsdatum. Laat, elektroniese formaat of gefakse tenders sal nie aanvaar word nie en Stellenbosch Munisipaliteit is nie verplig om die laagste of enige tender wat ingedien word te aanvaar nie.

Verseëde tenders duidelik gemerk: "**BSM 82/24 WERK OP VERKEERSSEINE VANAF 01 JULIE 2024 TOT 30 JUNIE 2027**", op die koevert, moet geplaas word in tenderbus buite die kantore van Stellenbosch Munisipaliteit, Meenthuis Kompleks, Stellenbosch. Die tenderbus is 24 uur per dag beskikbaar en tenders moet vergesel word met die voltooidde stel tenderdokumente. Tenderaanbiedinge wat nie deur die volledige tenderdokument vergesel word nie, sal nie oorweeg word nie.

LET WEL: Hierdie tender sal geëvalueer word ingevolge die Algemene Kontrakvoorwaardes, Voorsieningskanaal Bestuursbeleid and relevante spesifikasies, soos vervat in die tender dokument asook die Stellenbosch Voorkeurverkrygingsbeleid **effektief vanaf 16 Januarie 2023 in samewerking met die Voorkeurverkrygingsregulasies wat op 04 November 2022 deur die Minister van Finansies in Staatskoerant No 47452 afgekondig is.**

Die voorkeerpunte stelsel is soos volg gebaseer: 80/20 in terme van die goedgekeurde beleid:

Prys	80
BBSEB status	20
Totale punte vir prys, B-BSEB	100

Die volgende voorwaardes vir Tender soos volg: (versuim om te voldoen, kan veroorsaak dat u Tender gediskwalifiseer word):

1. Hierdie tender is onderworpe aan die algemene kontrakvoorwaardes (GCC) en spesiale voorwaardes vir die tender;
2. Toepaslike opdrag
3. Tenderaars moet geregistreer wees op Sentrale verskaffersdatabasis (SVD) as hulle met die munisipaliteit sake wil doen
4. Geen toekenning sal gemaak word aan diensverskaffers wie se Belasting status ongeldig is.
5. Die tender wat ingedien moet word, moet in 'n verseëde koevert wees wat duidelik gemerk is met die Tendernommer, wat in die tenderbus voor sluitingstyd geplaas word. Versuim sal tot gevolg hê dat die tender ongeldig is.

Tenderdokumente, in Engels, is verkrygbaar by die kantoor van die Voorsieningskanaalbestuurseenheid, Stellenbosch Munisipaliteit, Meenthuis Kompleks, 1ste Vloer, Pleinstraat, Stellenbosch na betaling van 'n nie-terugbetaalde tenderdeelnamefoo van R 1281.00 per dokument. Alternatiewelik mag die dokument gratis afgelaai word vanaf die webblad www.stellenbosch.gov.za.

Let wel: Die munisipaliteit sal jou nooit kontak om geld te betaal in ruil vir die toekenning van 'n tender nie.

G Mettler (Me)
MUNISIPALE BESTUURDER



TENDER NO.: B/SM 82/24
WORKS ON TRAFFIC SIGNALS FROM 01 JULY 2024 – 30 JUNE 2027
PROCUREMENT DOCUMENT

NAME OF TENDERER:	
Total Bid Price (Inclusive of VAT) (refer to page 363):	
BBBEE LEVEL	

DATE: APRIL 2024

PREPARED AND ISSUED BY:

Directorate: Finance:
Supply Chain Management Unit
Stellenbosch Municipality,
PO Box 17, Stellenbosch, 7599

**CONTACT FOR ENQUIRIES
REGARDING SPECIFICATIONS:**

Nigell Winter
**Manager: Traffic
Engineering
Infrastructure Services**
Tel. Number: **021 808 8223**



TENDER NOTICE & INVITATION TO TENDER

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G Mettler (Me)
MUNISIPALE BESTUURDER



STELLENBOSCH

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MUNISIPALITEIT • UMASIPALA • MUNICIPALITY

PART A INVITATION TO BID

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE (NAME OF MUNICIPALITY/ MUNICIPAL ENTITY)					
BID NUMBER:	82/24	CLOSING DATE:	13 MAY 2024	CLOSING TIME:	12h00
DESCRIPTION	WORKS ON TRAFFIC SIGNALS FROM 01 JULY 2024 – 30 JUNE 2027				
THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT FORM (MBD7).					

BID RESPONSE DOCUMENTS MUST BE DEPOSITED IN THE BID BOX SITUATED AT **STELLENBOSCH MUNICIPALITY, TOWN HOUSE COMPLEX, PLEIN STREET, STELLENBOSCH**

SUPPLIER INFORMATION					
NAME OF BIDDER					
POSTAL ADDRESS					
STREET ADDRESS					
TELEPHONE NUMBER	CODE		NUMBER		
CELLPHONE NUMBER					
FACSIMILE NUMBER	CODE		NUMBER		
E-MAIL ADDRESS					
VAT REGISTRATION NUMBER					
TAX COMPLIANCE STATUS	TCS PIN:		OR	CSD No:	
B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE [TICK APPLICABLE BOX]	<input type="checkbox"/> Yes <input type="checkbox"/> No		B-BBEE STATUS LEVEL SWORN AFFIDAVIT	<input type="checkbox"/> Yes <input type="checkbox"/> No	

[A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE/ SWORN AFFIDAVIT (FOR EMES & QSEs) MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE]

1. ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	<input type="checkbox"/> Yes <input type="checkbox"/> No [IF YES ENCLOSE PROOF]	2. ARE YOU A FOREIGN BASED SUPPLIER FOR THE GOODS /SERVICES /WORKS OFFERED?	<input type="checkbox"/> Yes <input type="checkbox"/> No [IF YES, ANSWER PART B:3]
3. TOTAL NUMBER OF ITEMS OFFERED		4. TOTAL BID PRICE	R
5. SIGNATURE OF BIDDER	6. DATE	
7. CAPACITY UNDER WHICH THIS BID IS SIGNED			

BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO:		TECHNICAL INFORMATION MAY BE DIRECTED TO:	
DEPARTMENT	SCM	CONTACT PERSON	Nigell Winter
CONTACT PERSON	Renae Bergstedt	TELEPHONE NUMBER	021 808 8223
TELEPHONE NUMBER	021 808 8588	FACSIMILE NUMBER	N/A
FACSIMILE NUMBER	N/A	E-MAIL ADDRESS	Nigell.Winter@stellenbosch.gov.za
E-MAIL ADDRESS	Renae.Bergstedt@stellenbosch.gov.za		



**PART B
TERMS AND CONDITIONS FOR BIDDING**

1. BID SUBMISSION:	
(a)	BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION.
(b)	ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED–(NOT TO BE RE-TYPED) OR ONLINE
(c)	THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2022, THE STELLENBOSCH SUPPLY CHAIN MANAGEMENT POLICY, THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.
2. TAX COMPLIANCE REQUIREMENTS	
2.1	BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.
2.2	BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VIEW THE TAXPAYER'S PROFILE AND TAX STATUS.
2.3	APPLICATION FOR THE TAX COMPLIANCE STATUS (TCS) CERTIFICATE OR PIN MAY ALSO BE MADE VIA E-FILING. IN ORDER TO USE THIS PROVISION, TAXPAYERS WILL NEED TO REGISTER WITH SARS AS E-FILERS THROUGH THE WEBSITE WWW.SARS.GOV.ZA.
2.4	FOREIGN SUPPLIERS MUST COMPLETE THE PRE-AWARD QUESTIONNAIRE IN PART B:3.
2.5	BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.
2.6	IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.
2.7	WHERE NO TCS IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.
3. QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS	
3.1.	IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)? <input type="checkbox"/> YES <input type="checkbox"/> NO
3.2.	DOES THE ENTITY HAVE A BRANCH IN THE RSA? <input type="checkbox"/> YES <input type="checkbox"/> NO
3.3.	DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA? <input type="checkbox"/> YES <input type="checkbox"/> NO
3.4.	DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA? <input type="checkbox"/> YES <input type="checkbox"/> NO
3.5.	IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION? <input type="checkbox"/> YES <input type="checkbox"/> NO
IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 ABOVE.	

**NB: FAILURE TO PROVIDE ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID.
NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE.**

SIGNATURE OF BIDDER:

.....

CAPACITY UNDER WHICH THIS BID IS SIGNED:

.....

DATE:

.....



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PART A – ADMINISTRATIVE REQUIREMENTS IN TERMS OF THE SUPPLY CHAIN MANAGEMENT POLICY



CHECKLIST

PLEASE ENSURE THAT THE FOLLOWING FORMS HAVE BEEN DULY COMPLETED AND SIGNED AND THAT ALL DOCUMENTS AS REQUESTED, ARE ATTACHED TO THE TENDER DOCUMENT:

Certificate of Clarification/Virtual Meeting Attendance - Is the form duly completed and signed by both tenderer and agent of the Stellenbosch Municipality?	Yes	No	
Authority to Sign a Bid - Is the form duly completed and is a certified copy of the resolution attached?	Yes	No	
MBD 4 (Declaration of Interest) - Is the form duly completed and signed?	Yes	No	
MBD 5 - Is the form duly completed and signed?	Yes	No	
MBD 6.1 (Preference Points claim form for purchases/services) - Is the form duly completed and signed? Is a copy of the B-BBEE Certificate issued by a Verification Agency accredited by SANAS or the original Sworn Affidavit attached? (NB! BBBEE CERTIFICATES CAN BE VERIFIED WITH THE VERIFICATION AGENCY BUT A SWORN AFFIDAVIT MUST BE AN ORIGINAL AND NOT A COPY TO BE ELIGIBLE FOR BBBEE POINTS)	Yes	No	
MBD 8 (Declaration of Past Supply Chain Practices) - Is the form duly completed and signed?	Yes	No	
MBD 9 (Certificate of Independent Bid Determination) - Is the form duly completed and signed?	Yes	No	
MBD 10 (Certificate of Payment of Municipal Accounts) - Is the form duly completed and signed? Are the Identity numbers, residential addresses and municipal account numbers of ALL members, partners, directors, etc. provided on the form as requested? (NB! MUNICIPAL ACCOUNTS WILL BE VERIFIED AND USED AS BASIS FOR PREFERENCE POINTS SCORING IN TERMS OF THE STELLENBOSCH PREFERENTIAL PROCUREMENT POLICY. THE BUSINESS ADDRESS, LEASE AGREEMENT OR SWORN AFFADAVIT WILL BE THE BASIS FOR AWARDDING POINTS FOR LOCALITY) (n/a)	Yes	No	
OHSA (Occupational Health and Safety) - Is the form duly completed and signed? Is a valid Letter of Good Standing from the Compensation Commissioner attached?	Yes	No	
Form of Indemnity - Is the form duly completed and signed?	Yes	No	
Pricing Schedule - Is the form duly completed and signed?	Yes	No	
Form of Offer - Is the form duly completed and signed?	Yes	No	
Declaration by Tenderer - Is the form duly completed and signed?	Yes	No	



AUTHORITY TO SIGN A BID

1. SOLE PROPRIETOR (SINGLE OWNER BUSINESS) AND NATURAL PERSON

1.1. I, _____, the undersigned, hereby confirm that I am the sole owner of the business trading as _____.

OR

1.2. I, _____, the undersigned, hereby confirm that I am submitting this tender in my capacity as natural person.

SIGNATURE:		DATE:	
PRINT NAME:			
WITNESS 1:		WITNESS 2:	

2. COMPANIES AND CLOSE CORPORATIONS

2.1. **If a Bidder is a COMPANY, a certified copy of the resolution by the board of directors**, duly signed, authorising the person who signs this bid to do so, as well as to sign any contract resulting from this bid and any other documents and correspondence in connection with this bid and/or contract on behalf of the company **must be submitted with this bid**, that is, before the closing time and date of the bid

2.2. In the case of a **CLOSE CORPORATION (CC)** submitting a bid, **a resolution by its members**, authorizing a member or other official of the corporation to sign the documents on their behalf, **shall be included with the bid**.

PARTICULARS OF RESOLUTION BY BOARD OF DIRECTORS OF THE COMPANY/MEMBERS OF THE CC

Date Resolution was taken	
Resolution signed by (name and surname)	
Capacity	
Name and surname of delegated Authorised Signatory	
Capacity	
Specimen Signature	

Full name and surname of ALL Director(s) / Member (s)			
1.		2.	
3.		4.	
5.		6.	
7.		8.	
9.		10.	

Is a CERTIFIED COPY of the resolution attached?	YES		NO	
--------------------------------------------------------	------------	--	-----------	--

SIGNED ON BEHALF OF COMPANY / CC:		DATE:	
PRINT NAME:			
WITNESS 1:		WITNESS 2:	

3. PARTNERSHIP



We, the undersigned partners in the business trading as _____ hereby authorize Mr/Ms _____ to sign this bid as well as any contract resulting from the bid and any other documents and correspondence in connection with this bid and /or contract for and on behalf of the abovementioned partnership.

The following particulars in respect of every partner must be furnished and signed by every partner:

Full name of partner		Signature	
SIGNED ON BEHALF OF PARTNERSHIP:		DATE:	
PRINT NAME:			
WITNESS 1:		WITNESS 2:	

4. CONSORTIUM

We, the undersigned consortium partners, hereby authorize _____ (Name of entity) to act as lead consortium partner and further authorize Mr./Ms. _____ To sign this offer as well as any contract resulting from this tender and any other documents and correspondence in connection with this tender and / or contract for and on behalf of the consortium.

The following particulars in respect of each consortium member must be provided and signed by each member:

Full Name of Consortium Member	Role of Consortium Member	% Participation	Signature
SIGNED ON BEHALF OF PARTNERSHIP:		DATE:	
PRINT NAME:			
WITNESS 1:		WITNESS 2:	



CERTIFICATE OF AUTHORITY FOR JOINT VENTURES

This returnable schedule is to be completed by JOINT VENTURES

We, the undersigned, are submitting this tender offer in joint venture and hereby authorize Mr./Ms. _____
authorized signatory of the Company/Close Corporation/Partnership (name) _____,
acting in the capacity of lead partner, to sign all documents in connection with the tender offer and any contract resulting from it on our behalf.

(i) Name of firm (Lead partner)			
Address			
		Tel. No.	
Signature		Designation	

(ii) Name of firm			
Address			
		Tel. No.	
Signature		Designation	

(iii) Name of firm			
Address:			
		Tel. No.	
Signature		Designation	

(iv) Name of firm			
Address			
		Tel. No.	
Signature		Designation	

NOTE: A copy of the Joint Venture Agreement showing clearly the percentage contribution of each partner to the Joint Venture, shall be appended to this Schedule.



STANDARD CONDITIONS OF TENDER (CIDB)

F.1 General

F.1.1 Actions

F.1.1.1 The employer and each tenderer submitting a tender offer shall comply with these conditions of tender. In their dealings with each other, they shall discharge their duties and obligations as set out in F.2 and F.3, timeously and with integrity, and behave equitably, honestly and transparently, comply with all legal obligations and not engage in anticompetitive practices.

F.1.1.2 The employer and the tenderer and all their 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.

Note

- 1) *A conflict of interest may arise due to a conflict of roles, which might provide an incentive for improper acts in some circumstances. A conflict of interest can create an appearance of impropriety that can undermine confidence in the ability of that person to act properly in his or her position even if no improper acts result.*
- 2) *Conflicts of interest in respect of 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 would in any way, affect any decisions taken.*

F.1.1.3 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.

F.1.2 Tender Documents

The documents issued by the employer for the purpose of a tender offer are listed in the tender data.

F.1.3 Interpretation

F.1.3.1 The tender data and additional requirements contained in the tender schedules that are included in the returnable documents are deemed to be part of these conditions of tender.

F.1.3.2 These conditions of tender, the tender data and tender schedules, which are only required for tender evaluation purposes, shall not form part of any contract arising from the invitation to tender.

F.1.3.3 For the purposes of these conditions of tender, the following definitions apply:

- a) **conflict of interest** means any situation in which:
 - i) someone in a position of trust has competing professional or personal interests which make it difficult to fulfil his or her duties impartially;
 - ii) an individual or organisation is in a position to exploit a professional or official capacity in some way for their personal or corporate benefit; or
 - iii) incompatibility or contradictory interests exist between an employee and the organisation which employs that employee.
- b) **comparative offer** means the price after the factors of a non-firm price and all unconditional discounts it can be utilised to have been taken into consideration;



- c) **corrupt practice** means the 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;
- d) **fraudulent practice** means the 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;
- e) **organization** means a company, firm, enterprise, association or other legal entity, whether incorporated or not, or a public body;
- f) **functionality** means the measurement according to the predetermined norms of a service or commodity designed to be practical and useful, working or operating, taking into account quality, reliability, viability and durability of a service and technical capacity and ability of a tenderer.

F.1.4 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 readily read, copied and recorded. Communications shall be in the English language. 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.

F.1.5 Cancellation and Re-Invitation of Tenders

F1.5.1 An organ of state may, prior to the award of the tender, cancel a tender if-

- (a) due to changed circumstances, there is no longer a need for the services, works or goods requested; or
- (b) funds are no longer available to cover the total envisaged expenditure; or
- (c) no acceptable tenders are received.

F1.5.2 The decision to cancel a tender must be published in the cidb website and in the government Tender Bulletin for the media in which the original tender invitation was advertised.

F.1.6 Procurement procedures

F.1.6.1 General

Unless otherwise stated in the tender data, a contract will, subject to F.3.13, be concluded with the tenderer who in terms of F.3.11 is the highest ranked or the tenderer scoring the highest number of tender evaluation points, as relevant, based on the tender submissions that are received at the closing time for tenders.

F.1.6.2 Competitive negotiation procedure

F.1.6.2.1 Where the tender data require that the competitive negotiation procedure is to be followed, tenderers shall submit tender offers in response to the proposed contract in the first round of submissions. Notwithstanding the requirements of F.3.4, the employer shall announce only the names of the tenderers who make a submission. The requirements of F.3.8 relating to the material deviations or qualifications which affect the competitive position of tenderers shall not apply.

F.1.6.2.2 All responsive tenderers, or not less than three responsive tenderers that are highest ranked in terms of the evaluation method and evaluation criteria stated in the tender data, shall be invited in each round to enter into competitive negotiations, based on the principle of equal treatment and keeping confidential the proposed solutions and associated information. Notwithstanding the provisions of F.2.17, the employer may request that tenders be clarified, specified and fine-tuned in order to improve a tenderer's



competitive position provided that such clarification, specification, fine-tuning or additional information does not alter any fundamental aspects of the offers or impose substantial new requirements which restrict or distort competition or have a discriminatory effect.

F.1.6.2.3 At the conclusion of each round of negotiations, tenderers shall be invited by the employer to make a fresh tender offer, based on the same evaluation criteria, with or without adjusted weightings. Tenderers shall be advised when they are to submit their best and final offer.

F.1.6.2.4 The contract shall be awarded in accordance with the provisions of F.3.11 and F.3.13 after tenderers have been requested to submit their best and final offer.

F.1.6.3 Proposal procedure using the two stage-system

F.1.6.3.1 Option 1

Tenderers shall in the first stage submit technical proposals and, if required, cost parameters around which a contract may be negotiated. The employer shall evaluate each responsive submission in terms of the method of evaluation stated in the tender data, and in the second stage negotiate a contract with the tenderer scoring the highest number of evaluation points and award the contract in terms of these conditions of tender.

F.1.6.3.2 Option 2

F.1.6.3.2.1 Tenderers shall submit in the first stage only technical proposals. The employer shall invite all responsive tenderers to submit tender offers in the second stage, following the issuing of procurement documents.

F.1.6.3.2.2 The employer shall evaluate tenders received during the second stage in terms of the method of evaluation stated in the tender data, and award the contract in terms of these conditions of tender.

F.2 Tenderer's obligations

F.2.1 Eligibility

F.2.1.1 Submit a tender offer only if the tenderer satisfies the criteria stated in the tender data and the tenderer, or any of his principals, is not under any restriction to do business with employer.

F.2.1.2 Notify the employer of any proposed material change in the capabilities or formation of the tendering entity (or both) or any other criteria which formed part of the qualifying requirements used by the employer as the basis in a prior process to invite the tenderer to submit a tender offer and obtain the employer's written approval to do so prior to the closing time for tenders.

F.2.2 Cost of tendering

F.2.2.1 Accept that, unless otherwise stated in the tender data, the employer will 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 complies with requirements.

F.2.2.2 The cost of the tender documents charged by the employer shall be limited to the actual cost incurred by the employer for printing the documents. Employers must attempt to make available the tender documents on its website so as not to incur any costs pertaining to the printing of the tender documents.

F.2.3 Check documents

Check the tender documents on receipt for completeness and notify the employer of any discrepancy or omission.

F.2.4 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.

F.2.5 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 not attached but which are incorporated into the tender documents by reference.

F.2.6 Acknowledge 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.

F.2.7 Clarification meeting

Attend, where required, a clarification meeting at which tenderers may familiarize themselves with aspects of the proposed work, services or supply and raise questions. Details of the meeting(s) are stated in the tender data.

F.2.8 Seek clarification

Request clarification of the tender documents, if necessary, by notifying the employer at least five working days before the closing time stated in the tender data.

F.2.9 Insurance

Be aware that the extent of insurance to be provided by the employer (if any) might not be for the full cover required in terms of the conditions of contract identified in the contract data. The tenderer is advised to seek qualified advice regarding insurance.

F.2.10 Pricing the tender offer

F.2.10.1 Include in the rates, prices, and the tendered total of the prices (if any) all duties, taxes (except Value Added Tax (VAT), and other levies payable by the successful tenderer, such duties, taxes and levies being those applicable 14 days before the closing time stated in the tender data.

F.2.10.2 Show VAT payable by the employer separately as an addition to the tendered total of the prices.

F.2.10.3 Provide rates and prices that are fixed for the duration of the contract and not subject to adjustment except as provided for in the conditions of contract identified in the contract data.

F.2.10.4 State the rates and prices in Rand unless instructed otherwise in the tender data. The conditions of contract identified in the contract data may provide for part payment in other currencies.

F.2.11 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.

F.2.12 Alternative tender offers

F.2.12.1 Unless otherwise stated in the tender data, submit alternative tender offers only if a main tender offer, strictly in accordance with all the requirements of the tender documents, is also submitted as well as a schedule that compares the requirements of the tender documents with the alternative requirements that are proposed.

F.2.12.2 Accept that an alternative tender offer may be based only on the criteria stated in the tender data or criteria otherwise acceptable to the employer.



F.2.12.3 An alternative tender offer may only be considered in the event that the main tender offer is the winning tender.

F.2.13 Submitting a tender offer

F.2.13.1 Submit one tender offer only, either as a single tendering entity or as a member in a joint venture to provide the whole of the works, services or supply identified in the contract data and described in the scope of works, unless stated otherwise in the tender data.

F.2.13.2 Return all returnable documents to the employer after completing them in their entirety, either electronically (if they were issued in electronic format) or by writing legibly in non-erasable ink.

F.2.13.3 Submit the parts of the tender offer communicated on paper as an original plus the number of copies stated in the tender data, with an English translation of any documentation in a language other than English, and the parts communicated electronically in the same format as they were issued by the employer.

F.2.13.4 Sign the original and all copies of the tender offer where required in terms of the tender data. The employer will hold all authorized signatories liable on behalf of the tenderer. Signatories for tenderers proposing to contract as joint ventures shall state which of the signatories is the lead partner whom the employer shall hold liable for the purpose of the tender offer.

F.2.13.5 Seal the original and each copy of the tender offer as separate packages marking the packages as "ORIGINAL" and "COPY". Each package shall state on the outside the employer's address and identification details stated in the tender data, as well as the tenderer's name and contact address.

F.2.13.6 Where a two-envelope system is required in terms of the tender data, place and seal the returnable documents listed in the tender data in an envelope marked "financial proposal" and place the remaining returnable documents in an envelope marked "technical proposal". Each envelope shall state on the outside the employer's address and identification details stated in the tender data, as well as the tenderer's name and contact address.

F.2.13.7 Seal the original tender offer and copy packages together in an outer package that states on the outside only the employer's address and identification details as stated in the tender data.

F.2.13.8 Accept that the employer will not assume any responsibility for the misplacement or premature opening of the tender offer if the outer package is not sealed and marked as stated.

F.2.13.9 Accept that tender offers submitted by facsimile or e-mail will be rejected by the employer, unless stated otherwise in the tender data.

F.2.14 Information and data to be completed in all respects

Accept that tender offers, which do not provide all the data or information requested completely and in the form required, may be regarded by the employer as non-responsive.

F.2.15 Closing time

F.2.15.1 Ensure that the employer receives the tender offer at the address specified in the tender data not later than the closing time stated in the tender data. Accept that proof of posting shall not be accepted as proof of delivery.

F.2.15.2 Accept that, if the employer extends the closing time stated in the tender data for any reason, the requirements of these conditions of tender apply equally to the extended deadline.

F.2.16 Tender offer validity



- F.2.16.1** Hold the tender offer(s) valid for acceptance by the employer at any time during the validity period stated in the tender data after the closing time stated in the tender data.
- F.2.16.2** If requested by the employer, consider extending the validity period stated in the tender data for an agreed additional period with or without any conditions attached to such extension.
- F.2.16.3** Accept that a tender submission that has been submitted to the employer may only be withdrawn or substituted by giving the employer's agent written notice before the closing time for tenders that a tender is to be withdrawn or substituted.
- F.2.16.4** Where a tender submission is to be substituted, submit a substitute tender in accordance with the requirements of F.2.13 with the packages clearly marked as "SUBSTITUTE".

F.2.17 Clarification of tender offer after submission

Provide clarification of a tender offer in response to a request to do so from the employer during the evaluation of tender offers. This may include providing a breakdown of rates or prices and correction of arithmetical errors by the adjustment of certain rates or item prices (or both). No change in the competitive position of tenderers or substance of the tender offer is sought, offered, or permitted.

Note: Sub-clause F.2.17 does not preclude the negotiation of the final terms of the contract with a preferred tenderer following a competitive selection process, should the Employer elect to do so.

F.2.18 Provide other material

- F.2.18.1** Provide, on request by the employer, any other material that has a bearing on the tender offer, the tenderer's commercial position (including notarized joint venture agreements), preferencing arrangements, or samples of materials, considered necessary by the employer for the purpose of a full and fair risk assessment. Should the tenderer not provide the material, or a satisfactory reason as to why it cannot be provided, by the time for submission stated in the employer's request, the employer may regard the tender offer as non-responsive.
- F.2.18.2** Dispose of samples of materials provided for evaluation by the employer, where required.

F.2.19 Inspections, tests and analysis

Provide access during working hours to premises for inspections, tests and analysis as provided for in the tender data.

F.2.20 Submit securities, bonds and policies

If requested, submit for the employer's acceptance before formation of the contract, all securities, bonds, guarantees, policies and certificates of insurance required in terms of the conditions of contract identified in the contract data.

F.2.21 Check final draft

Check the final draft of the contract provided by the employer within the time available for the employer to issue the contract.

F.2.22 Return of other tender documents

If so instructed by the employer, return all retained tender documents within 28 days after the expiry of the validity period stated in the tender data.

F.2.23 Certificates

Include in the tender submission or provide the employer with any certificates as stated in the tender data.

F.3 The employer's undertakings

F.3.1 Respond to requests from the tenderer



F.3.1.1 Unless otherwise stated in the tender Data, respond to a request for clarification received up to five working days before the tender closing time stated in the Tender Data and notify all tenderers who drew procurement documents.

F.3.1.2 Consider any request to make a material change in the capabilities or formation of the tendering entity (or both) or any other criteria which formed part of the qualifying requirements used to prequalify a tenderer to submit a tender offer in terms of a previous procurement process and deny any such request if as a consequence:

- a) an individual firm, or a joint venture as a whole, or any individual member of the joint venture fails to meet any of the collective or individual qualifying requirements;
- b) the new partners to a joint venture were not prequalified in the first instance, either as individual firms or as another joint venture; or
- c) in the opinion of the Employer, acceptance of the material change would compromise the outcome of the prequalification process.

F.3.2 Issue Addenda

If necessary, issue addenda that may amend or amplify the tender documents to each tenderer during the period from the date that tender documents are available until three days before the tender closing time stated in the Tender Data. If, as a result a tenderer applies for an extension to the closing time stated in the Tender Data, the Employer may grant such extension and, shall then notify all tenderers who drew documents.

F.3.3 Return late tender offers

Return tender offers received after the closing time stated in the Tender Data, unopened, (unless it is necessary to open a tender submission to obtain a forwarding address), to the tenderer concerned.

F.3.4 Opening of tender submissions

F.3.4.1 Unless the two-envelope system is to be followed, open valid tender submissions in the presence of tenderers' agents who choose to attend at the time and place stated in the tender data. Tender submissions for which acceptable reasons for withdrawal have been submitted will not be opened.

F.3.4.2 Announce at the meeting held immediately after the opening of tender submissions, at a venue indicated in the tender data, the name of each tenderer whose tender offer is opened and, where applicable, the total of his prices, number of points claimed for its B-BBEE status level and time for completion for the main tender offer only.

F.3.4.3 Make available the record outlined in F.3.4.2 to all interested persons upon request.

F.3.5 Two-envelope system

F.3.5.1 Where stated in the tender data that a two-envelope system is to be followed, open only the technical proposal of valid tenders in the presence of tenderers' agents who choose to attend at the time and place stated in the tender data and announce the name of each tenderer whose technical proposal is opened.

F.3.5.2 Evaluate functionality of the technical proposals offered by tenderers, then advise tenderers who remain in contention for the award of the contract of the time and place when the financial proposals will be opened. Open only the financial proposals of tenderers, who score in the functionality evaluation more than the minimum number of points for functionality stated in the tender data, and announce the score obtained for the technical proposals and the total price and any points claimed on B-BBEE status level. Return unopened financial proposals to tenderers whose technical proposals failed to achieve the minimum number of points for functionality.

F.3.6 Non-disclosure



Not disclose to tenderers, or to any other person not officially concerned with such processes, information relating to the evaluation and comparison of tender offers, the final evaluation price and recommendations for the award of a contract, until after the award of the contract to the successful tenderer.

F.3.7 Grounds for rejection and disqualification

Determine whether there has been any effort by a tenderer to influence the processing of tender offers and instantly disqualify a tenderer (and his tender offer) if it is established that he engaged in corrupt or fraudulent practices.

F.3.8 Test for responsiveness

F.3.8.1 Determine, after opening and before detailed evaluation, whether each tender offer properly received:

- a) complies with the requirements of these Conditions of Tender,
- b) has been properly and fully completed and signed, and
- c) is responsive to the other requirements of the tender documents.

F.3.8.2 A responsive tender is one that conforms to all the terms, conditions, and specifications of the tender documents without material deviation or qualification. A material deviation or qualification is one which, in the Employer's opinion, would:

- a) detrimentally affect the scope, quality, or performance of the works, services or supply identified in the Scope of Work,
- b) significantly change the Employer's or the tenderer's risks and responsibilities under the contract, or
- c) affect the competitive position of other tenderers presenting responsive tenders, if it were to be rectified.

Reject a non-responsive tender offer, and not allow it to be subsequently made responsive by correction or withdrawal of the non-conforming deviation or reservation.

F.3.9 Arithmetical errors, omissions and discrepancies

F.3.9.1 Check the highest ranked tender or tenderer with the highest number of tender evaluation points after the evaluation of tender offers in accordance with F.3.11 for:

- a) the gross misplacement of the decimal point in any unit rate;
- b) omissions made in completing the pricing schedule or bills of quantities; or
- c) arithmetic errors in:
 - i) line item totals resulting from the product of a unit rate and a quantity in bills of quantities or schedules of prices; or
 - ii) the summation of the prices.

F3.9.2 The employer must correct the arithmetical errors in the following manner:

- a) Where there is a discrepancy between the amounts in words and amounts in figures, the amount in words shall govern.
- b) If bills of quantities or pricing schedules apply and there is an error in the line item total resulting from the product of the unit rate and the quantity, the line item total shall govern and the rate shall be corrected. Where there is an obviously gross misplacement of the decimal point in the unit rate, the line item total as quoted shall govern, and the unit rate shall be corrected.
- c) Where there is an error in the total of the prices either as a result of other corrections required by this checking process or in the tenderer's addition of prices, the total of the



prices shall govern and the tenderer will be asked to revise selected item prices (and their rates if bills of quantities apply) to achieve the tendered total of the prices.

Consider the rejection of a tender offer if the tenderer does not correct or accept the correction of the arithmetical error in the manner described above.

F.3.10 Clarification of a tender offer

Obtain clarification from a tenderer on any matter that could give rise to ambiguity in a contract arising from the tender offer.

F.3.11 Evaluation of tender offers

F.3.11.1 General

Appoint an evaluation panel of not less than three persons. Reduce each responsive tender offer to a comparative offer and evaluate them using the tender evaluation methods and associated evaluation criteria and weightings that are specified in the tender data.

F.3.11.2 Method 1: Price and Preference

In the case of a price and preference:

- 1) Score tender evaluation points for price
- 2) Score points for preference
- 3) Add the points scored for price and preference

F.3.11.3 Method 2: Functionality, Price and Preference

In the case of a functionality, price and preference:

- 1) Score functionality, rejecting all tender offers that fail to achieve the minimum number of points for functionality as stated in the Tender Data.
- 2) No tender must be regarded as an acceptable tender if it fails to achieve the minimum qualifying score for functionality as indicated in the tender invitation.
- 3) Tenders that have received the minimum qualification score for functionality must be evaluated further in terms of the preference points system prescribed in paragraphs 4 and 5 below.

The 80/20 point system for acquisition of services, works or goods up to Rand value of R50 million.

The following formula must be used to calculate the points for price in respect of tender (including price quotation) with a rand value equal to, or above R30 000 and up to Rand value of R50 000 000 (all applicable taxes included):

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

Where:

P_s = Points scored for price of bid under consideration;

P_t = Price of bid under consideration; and

P_{min} = Price of lowest acceptable tender or offer.

- 1) (a)(1) A maximum of 20 points (80/20 preference points system) or 10 (90/10 preference points system), must be allocated for specific goals. These goals are :



- (i) contracting with persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of race, gender or disability;
 - (ii) Promotion of enterprises located in the municipal area (WCO24)
- 2) Regarding par 1(a)(1)(i) at least 50% of the 20 points must be allocated to promote this goal and points will be allocated in terms of the BBBEE scorecard as follows.

B-BBEE Status Level of Contributor	Number of Points for 80/20 Preference Points System
1	20
2	18
3	16
4	12
5	8
6	6
7	4
8	2
Non-compliant contributor	0

- A tenderer must submit proof of its BBBEE status level contributor.
 - A tenderer failing to submit proof of BBBEE status level of contributor may only score in terms of the 80/90-point formula for price; and scores 0 points out of 10/5 BBBEE status level of contributor, which is in line with section 2 (1) (d) (i) of the Act, where the supplier or service provider did not provide proof thereof.
- 3) Regarding par 1(a)(1)(ii) a maximum of 50% of the 20 points must be allocated to promote this goal. Maximum points will be allocated as follows.

Locality of supplier	Number of Points for 80/20 Preference Points System
Within the boundaries of the municipality	10
Outside of the boundaries of the municipality	0

The maximum will be proportionately adjusted depending on the number of points allocated for this goal. E.G., 40% will equate to 8/4 points.

- 4) An employer of state may apply the formula in paragraph (i) for price quotations with a value less than R30 000, if and when appropriate:
- 5) Subject to paragraph 4.3.8 of “Standard for Uniformity in Procurement, April 2017”, the contract must be awarded to the tender who scores the highest total number of points.



The 90/10 preference points system for acquisition of services, works or goods with a Rand value above R50 million

- 5) (a) The following formula must be used to calculate the points for price in respect of tenders with a Rand value above R50 000 000 (all applicable taxes included):

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

Where:

- P_s* = Points scored for price of bid under consideration;
P_t = Price of bid under consideration; and
P_{min} = Price of lowest acceptable bid.

- 6) (a)(i) A maximum of 20 points (80/20 preference points system) or 10 (90/10 preference points system), must be allocated for specific goals. These goals are :
- (ii) contracting with persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of race, gender or disability;
- (iii) Promotion of enterprises located in the municipal area (WCO24)
- 7) Regarding par 6(a)(i) at least 50% of the 20/10 points must be allocated to promote this goal and points will be allocated in terms of the BBBEE scorecard as follows.

B-BBEE status level of contributor	Number of points
1	10
2	9
3	6
4	5
5	4
6	3
7	2
8	1
Non-compliant contributor	0

- A tenderer must submit proof of its BBBEE status level contributor.
- A tenderer failing to submit proof of BBBEE status level of contributor may only score in terms of the 80/90-point formula for price; and scores 0 points out of 10/5 BBBEE status level of contributor, which is in line with section 2 (1) (d) (i) of the Act, where the supplier or service provider did not provide proof thereof.



- 8) Regarding par 6(a)(1)(ii) a maximum of 50% of the 20/10 points must be allocated to promote this goal. Maximum points will be allocated as follows.

Locality of supplier	Number of Points for 80/20 Preference Points System	Number of Points for 90/10 Preference Points System
Within the boundaries of the municipality	10	5
Outside of the boundaries of the municipality	0	0

The maximum will be proportionately adjusted depending on the number of points allocated for this goal. E.G., 40% will equate to 8/4 points.

- 5) (c) A maximum of 10 points may be allocated in accordance with subparagraph (5)(b).
- 5) (d) The points scored by tender in respect of B-BBEE contribution must be added to the points scored for price as calculated
- 5) (e) Subject to paragraph 4.3.8 of “Standard for Uniformity in Procurement, April 2017”, the contract must be awarded to the tender who scores the highest total number of points.

F.3.11.6 Decimal places

Score price, preference and functionality, as relevant, to two decimal places.

F.3.11.7 Scoring Price

Score price of remaining responsive tender offers using the following formula:

$$N_{FO} = W_1 \times A$$

Where:

N_{FO} = the number of tender evaluation points awarded for price.

W_1 = the maximum possible number of tender evaluation points awarded for price as stated in the Tender Data.

A = a number calculated using the formula and option described in Table F.1 as stated in the Tender Data.

Table F.1: Formulae for calculating the value of A

Formula	Comparison aimed at achieving	Option 1 ^a	Option 2 ^a
1	Highest price or discount	$A = \left(1 + \frac{P - P_m}{P_m}\right)$	$A = P / P_m$
2	Lowest price or percentage commission / fee	$A = \left(1 - \frac{P - P_m}{P_m}\right)$	$A = P_m / P$
	^a P_m = is the comparative offer of the most favourable comparative offer. P = is the comparative offer of the tender offer under consideration.		

F.3.11.8 Scoring preferences

Confirm that tenderers are eligible for the preferences claimed in accordance with the provisions of the tender data and reject all claims for preferences where tenderers are not eligible for such preferences. Calculate the total number of tender evaluation points for preferences claimed in accordance with the provisions of the tender data.

F.3.11.9 Scoring functionality



Score each of the criteria and sub-criteria for quality in accordance with the provisions of the Tender Data.

Calculate the total number of tender evaluation points for quality using the following formula:

$$N_Q = W_2 \times S_O / M_S$$

Where:

S_O = the score for quality allocated to the submission under consideration;

M_S = the maximum possible score for quality in respect of a submission; and

W_2 = the maximum possible number of tender evaluation points awarded for the quality as stated in the tender data

F.3.12 Insurance provided by the employer

If requested by the proposed successful tenderer, submit for the tenderer's information the policies and / or certificates of insurance which the conditions of contract identified in the contract data, require the employer to provide.

F.3.13 Acceptance of tender offer

Accept the tender offer; if in the opinion of the employer, it does not present any risk and only if the tenderer:

- a) is not under restrictions, or has principals who are under restrictions, preventing participating in the employer's procurement,
- b) can, as necessary and in relation to the proposed contract, demonstrate that he or she possesses the professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, experience and reputation, expertise and the personnel, to perform the contract,
- c) has the legal capacity to enter into the contract,
- d) is not insolvent, in receivership, under Business Rescue as provided for in chapter 6 of the Companies Act, 2008, bankrupt or being wound up, has his affairs administered by a court or a judicial officer, has suspended his business activities, or is subject to legal proceedings in respect of any of the foregoing,
- e) complies with the legal requirements, if any, stated in the tender data, and
- f) is able, in the opinion of the employer, to perform the contract free of conflicts of interest.

F.3.14 Prepare contract documents

F.3.14.1 If necessary, revise documents that shall form part of the contract and that were issued by the employer as part of the tender documents to take account of:

- a) addenda issued during the tender period,
- b) inclusion of some of the returnable documents, and
- c) other revisions agreed between the employer and the successful tenderer.

F.3.14.2 Complete the schedule of deviations attached to the form of offer and acceptance, if any.

F.3.15 Complete adjudicator's contract

Unless alternative arrangements have been agreed or otherwise provided for in the contract, arrange for both parties to complete formalities for appointing the selected adjudicator at the same time as the main contract is signed.

F.3.16 Notice to unsuccessful tenderers



F.3.16.1 Notify the successful tenderer of the employer's acceptance of his tender offer by completing and returning one copy of the form of offer and acceptance before the expiry of the validity period stated in the tender data, or agreed additional period.

F.3.16.2 After the successful tenderer has been notified of the employer's acceptance of the tender, notify other tenderers that their tender offers have not been accepted.

F.3.17 Provide copies of the contracts

Provide to the successful tenderer the number of copies stated in the Tender Data of the signed copy of the contract as soon as possible after completion and signing of the form of offer and acceptance.

F.3.18 Provide written reasons for actions taken

Provide upon request written reasons to tenderers for any action that is taken in applying these conditions of tender, but withhold information, which is not in the public interest to be divulged, which is considered to prejudice the legitimate commercial interests of tenderers or might prejudice fair competition between tenderers.

F3.19 Transparency in the procurement process

F3.19.1 The cidb prescripts require that tenders must be advertised and be registered on the cidb i-Tender system.

F3.19.2 The employer must adopt a transparency model that incorporates the disclosure and accountability as transparency requirements in the procurement process.

F3.19.3 The transparency model must identify the criteria for selection of projects, project information template and the threshold value of the projects to be disclosed in the public domain at various intervals of delivery of infrastructure projects.

F3.19.4 The client must publish the information on a quarterly basis, which contains the following information:

- Procurement planning process
- Procurement method and evaluation process
- Contract type
- Contract status
- Number of firms tendering
- Cost estimate
- Contract title
- Contract firm(s)
- Contract price
- Contract scope of work
- Contract start date and duration
- Contract evaluation reports

F3.19.5 The employer must establish a Consultative Forum which will conduct a random audit in the implementation of the transparency requirements in the procurement process.

F3.19.6 Consultative Forum must be an independent structure from the bid committees. F3.19.7 The information must be published on the employer's website.

F 3.19.8 Records of such disclosed information must be retained for audit purposes.



GENERAL CONDITIONS OF TENDER

1. Sealed tenders, with the “**Tender Number and Title**” clearly endorsed on the envelope, must be deposited in the **tender box** at the offices of the Stellenbosch Municipality, Plein Street, Stellenbosch.
2. The tender must be lodged by the Tenderer in the tender box in the Main Hall Entrance, Stellenbosch Municipal Offices, Plein Street, Stellenbosch

PLEASE NOTE:

- 2.1. Tenders that are deposited in the incorrect box will not be considered.
 - 2.2. Mailed, telegraphic or faxed tenders will not be accepted.
 - 2.3. Documents may only be completed in non-erasable ink.
 - 2.4. The use of correction fluid/tape is not allowed.
 - 2.4.1. In the event of a mistake having been made, it shall be crossed out in ink and be accompanied by an initial at each and every alteration.
 - 2.4.2. Alterations or deletions not signed by the Tenderer may render the tender invalid.
 - 2.5. All bids must be submitted in writing on the official forms supplied (not to be re-typed)
 - 2.6. All prices shall be quoted in South African currency and be **INCLUSIVE of VAT**.
- 3. Where the value of an intended contract will exceed R1 000 000, 00 (R1 million) it is the bidder’s responsibility to be registered with the South African Revenue Service (SARS) for VAT purposes in order to be able to issue tax invoices. The municipality will deem the price above R 1 000 000,00 (R1 million) to be VAT inclusive even if it is indicated that no VAT is charged. Please insure that provision is made for VAT in these instances.**
- 3.1 It is a requirement of this contract that the amount of value-added tax (VAT) must be shown clearly on each invoice.
 - 3.2 The amended Value-Added Tax Act requires that a Tax Invoice for supplies in excess of R3 000 should, in addition to the other required information, also disclose the VAT registration number of the recipient, with effect from 1 March 2005. The VAT registration number of the Stellenbosch Municipality is **4700102181**.
- 3 Any Tender received after the appointed time for the closing of Tenders shall not be considered but shall be filed unopened with the other Tenders received or may be returned to the Tenderer at his request.
 - 4 Tenders may not be telefaxed to the Municipality and therefore any tenders received by fax will **not** be considered.
 - 5 Tenders shall be opened in public at the Stellenbosch Municipal Offices as soon as possible after the closing time for the receipt of tenders.
 - 6 The Municipality shall have the right to summarily disqualify any Tenderer who, either at the date of submission of this tender or at the date of its award, is indebted to the Municipality in respect of any rental, levies, rates and/or service charges; ALTERNATIVELY;
 - 6.1 That an agreement be signed whereby the Tenderer agrees that a percentage or fixed amount at the discretion of the Municipality, be deducted from payments due to him for this tender, until the debt is paid in full.
 - 6.2 The tenderer shall declare **all** the Municipal account numbers in the Stellenbosch Area for which the enterprise or the proprietors or directors in their personal capacity is/ are responsible or co-



responsible.

7. Negotiations for a fair market related price

7.1 The award of the tender may be subject to price negotiation with the preferred tenderers.

8 This bid will be evaluated and adjudicated according to the following criteria:

- 8.1 Relevant specifications
- 8.2 Value for money
- 8.3 Capability to execute the contract
- 8.4 PPPFA & associated regulations

9 Service Level Agreement

The award of the tender is subject to the signing of a Service Level Agreement (SLA) between the successful bidder and Stellenbosch Municipality.

10 Centralised Supplier Database

No Bids will be awarded to a bidder who is not registered on the Centralised Supplier Database (CSD).

The CSD supplier number starting with (MAAA) number is automatically generated by the Central Database System after successful registration and validation of a prospective service provider. This number is now a mandatory requirement, as referred to in regulation 14(1) (b) of the Municipal Supply Chain Management Regulations, as part of the listing criteria for accrediting a prospective service provider. Prospective suppliers should self – register on the CSD website at www.csd.gov.za Registration on the CSD will be compulsory in order to conduct business with the STELLENBOSCH MUNICIPALITY. Registration on CSD can be done by contacting 021 808 8594 or Nicolene.Hamilton@stellenbosch.gov.za

Centralised Supplier Database No. MAAA.....



MBD 4 – DECLARATION OF INTEREST

1. No bid will be accepted from persons in the service of the state¹.
2. Any person, having a kinship with persons in the service of the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to persons in service of the state, it is required that the bidder or their authorised representative declare their position in relation to the evaluating/adjudicating authority and/or take an oath declaring his/her interest.
3. In order to give effect to the above, the following questionnaire must be completed and submitted with the bid:

3.1.	Full Name of bidder or his or her representative				
3.2.	Identity Number				
3.3.	Position occupied in the Company (director, shareholder ² etc.)				
3.4.	Company Registration Number				
3.5.	Tax Reference Number				
3.6.	VAT Registration Number				
3.7.	Are you presently in the service of the state?	YES		NO	
3.7.1.	If so, furnish particulars:				
3.8.	Have you been in the service of the state for the past twelve months?	YES		NO	
3.8.1.	If so, furnish particulars:				

¹ MSCM Regulations: "in the service of the state" means to be –

- a. a member of –
 - i. any municipal council;
 - ii. any provincial legislature; or
 - iii. the National Assembly or the National Council of Provinces;
- b. a member of the board of directors of any municipal entity;
- c. an official of any municipality or municipal entity;
- d. an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999);
- e. an executive member of the accounting authority of any national or provincial public entity; or
- f. an employee of Parliament or a provincial legislature.

² "Shareholder" means a person who owns shares in the company and is actively involved in the management of the company or business and exercises control over the company.



3.9.	Do you have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid?	YES		NO	
3.9.1.	If so, furnish particulars:				
3.10.	Are you aware of any relationship (family, friend, other) between a bidder and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid?	YES		NO	
3.10.1.	If so, furnish particulars:				
3.11.	Are any of the company's directors, managers, principal shareholders or stakeholders in the service of the state?	YES		NO	
3.11.1.	If so, furnish particulars:				
3.12.	Is any spouse, child or parent of the company's directors, managers, principal shareholders or stakeholders in the service of the state?	YES		NO	
3.12.1.	If so, furnish particulars:				
3.13.	Do you or any of the directors, trustees, managers, principal shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract?	YES		NO	
3.13.1.	If so, furnish particulars:				



3.14.	Please provide the following information on ALL directors/shareholders/trustees/members below:		
Full Name and Surname	Identity Number	Personal Income Tax Number	Provide State ³ Employee Number

NB:

a) PLEASE ATTACH CERTIFIED COPY(IES) OF ID DOCUMENT(S)
 b) PLEASE PROVIDE PERSONAL INCOME TAX NUMBERS FOR ALL DIRECTORS / SHAREHOLDERS / TRUSTEES / MEMBERS, ETC.

4. DECLARATION

I, the undersigned (name) _____, certify that the information furnished in paragraph 3 above is correct.

I accept that the state may act against me should this declaration prove to be false.

SIGNATURE		DATE	
NAME OF SIGNATORY			
POSITION			
NAME OF COMPANY			

³ MSCM Regulations: "in the service of the state" means to be –

- a. a member of –
 - i. any municipal council;
 - ii. any provincial legislature; or
 - iii. the National Assembly or the National Council of Provinces;
- b. a member of the board of directors of any municipal entity;
- c. an official of any municipality or municipal entity;
- d. an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999);
- e. an executive member of the accounting authority of any national or provincial public entity; or
- f. an employee of Parliament or a provincial legislature.



MBD5 – DECLARATION FOR PROCUREMENT ABOVE R10 MILLION (VAT INCLUDED)

For all procurement expected to exceed R10 million (VAT included), bidders must complete the following questionnaire:

1. Are you by law required to prepare annual financial statements for auditing?	YES		NO	
1.1. If yes, submit audited annual financial statements for the past three years or since the date of establishment if established during the past three years.				
2. Do you have any outstanding undisputed commitments for municipal services towards a municipality or any other service provider in respect of which payment is overdue for more than 30 days?	YES		NO	
2.1. If no, this serves to certify that the bidder has no undisputed commitments for municipal services towards a municipality or other service provider in respect of which payment is overdue for more than 30 days.				
2.2. If yes, provide particulars.				
3. Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract?	YES		NO	
3.1. If yes, furnish particulars				
4. Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality / municipal entity is expected to be transferred out of the Republic?	YES		NO	
4.1 If yes, furnish particulars				

CERTIFICATION

I, the undersigned (name) _____, certify that the information furnished on this declaration form is correct.

I accept that the state may act against me should this declaration prove to be false.

SIGNATURE		DATE	
NAME (PRINT)			
CAPACITY			
NAME OF FIRM			



MBD6.1 – PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022 – PURCHASES/SERVICES 80/20 or 90/10

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 and the Stellenbosch Preferential Procurement Policy 2022/23

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 and any other applicable preference.

1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to all bids:

- 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).

The value of this bid is estimated to not exceed R50 000 000 (all applicable taxes included) and therefore the 80/20 preference point system shall be applicable.

1.2 Points for this bid shall be awarded for:

- (a) Price;
- (b) B-BBEE Status Level of Contributor

1.3 The maximum points for this bid are allocated as follows:

	POINTS
PRICE	80
B-BBEE STATUS LEVEL OF CONTRIBUTOR	20
Total points for Price and BBEE (must not exceed 100)	100

1.4 Failure on the part of a bidder to submit proof of B-BBEE Status level of contributor together with the bid, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

1.5 Failure on the part of a bidder to submit proof of Locality together with the bid, will be interpreted to mean that preference points for Locality are not claimed. **(N/A)**

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

2. DEFINITIONS

- (a) **“B-BBEE”** means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;
- (b) **“B-BBEE status level of contributor”** means the B-BBEE status of an entity in



5. POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTOR

5.1 In terms of Regulation 4 (2) and 5 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining a specific goal specified for the tender.

5.2 The tendering conditions will stipulate the specific goals, as contemplated in section 2(1)(d)(ii) of the Preferential Procurement Act, be attained.

5.3 A maximum of 20 points (80/20 preference points system) must be allocated for specific goals. These goals are:

(a) contracting with persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of race, gender or disability;

(b) Promotion of enterprises located in the municipal area (WCO24) **(N/A)**

5.4 Regarding par 5.3 (a) at least 50% of the 20/10 points must be allocated to promote this goal and points will be allocated in terms of the BBEE scorecard as follows.

B-BBEE Status Level of Contributor	Number of Points for 80/20 Preference Points System	Number of Points for 90/10 Preference Points System
1	20	10
2	18	9
3	16	8
4	12	5
5	8	4
6	6	3
7	4	2
8	2	1
Non-compliant contributor	0	0

5.5 A tenderer must submit proof of its BBEE status level contributor.

5.6 A tenderer failing to submit proof of BBEE status level of contributor –

5.6.1 may only score in terms of the 80/90-point formula for price; and

5.6.2 scores 0 points out of 10/5 BBEE status level of contributor, which is in line with section 2 (1) (d) (i) of the Act, where the supplier or service provider did not provide proof thereof.

5.7 Regarding par 5.3 (b) a maximum of 50% of the 20/10 points must be allocated to promote this goal. Maximum points will be allocated as follows.

Locality of supplier	Number of	Number of
-----------------------------	------------------	------------------



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	Points for 80/20 Preference Points System	Points for 90/10 Preference Points System
Within the boundaries of the municipality	N\A	N\A
Outside of the boundaries of the municipality	0	0

The maximum will be proportionately adjusted depending on the number of points allocated for this goal. E.G., 40% will equate to 8/4 points.

6. BID DECLARATION

6.1 Bidders who claim points in respect of B-BBEE Status Level of Contribution must complete the following:

7. B-BBEE STATUS LEVEL OF CONTRIBUTOR CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 4.1

7.1 B-BBEE Status Level of Contributor: . = (maximum of 20 points)
 (Points claimed in respect of paragraph 7.1 must be substantiated by relevant proof of B-BBEE status level of contributor.)

7.2 Within the boundaries of Stellenbosch Municipality (WC024)? **(N/A)**

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

Business Address -

(Points claimed in respect of paragraph 7.2 must be substantiated by relevant proof that the business premises are situated in the Municipal area of Stellenbosch (WC024). A valid municipal account or proof of valid lease agreement must be attached) **(N/A)**

8. SUB-CONTRACTING

8.1 Will any portion of the contract be sub-contracted?

(Tick applicable box)

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

8.1.1 If yes, indicate:

- i) What percentage of the contract will be subcontracted.....%
- ii) The name of the sub-contractor.....
- iii) The B-BBEE status level of the sub-contractor.....
- iv) Whether the sub-contractor is an EME or QSE



(Tick applicable box)

YES		NO	
-----	--	----	--

v) Specify, by ticking the appropriate box, if subcontracting with an enterprise

Designated Group: An EME or QSE which is at last 51% owned by:	EME √	QSE √
Black people		
Black people who are youth		
Black people who are women		
Black people with disabilities		
Black people living in rural or underdeveloped areas or townships		
Cooperative owned by black people		
Black people who are military veterans		
OR		
Any EME		
Any QSE		

9. DECLARATION WITH REGARD TO COMPANY/FIRM

9.1 Name of company/firm:

9.2 VAT registration number:

9.3 Company registration number:

9.4 TYPE OF COMPANY/ FIRM

- Partnership/Joint Venture / Consortium
- One-person business/sole propriety
- Close corporation
- Company
- (Pty) Limited

[TICK APPLICABLE BOX]

9.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

.....

9.6 COMPANY CLASSIFICATION

- Manufacturer
- Supplier
- Professional service provider
- Other service providers, e.g., transporter, etc.

[TICK APPLICABLE BOX]



9.7 **MUNICIPAL INFORMATION**

Municipality where business is situated:

Registered Account Number:

Stand Number:

9.8 Total number of years the company/firm has been in business:

9.9 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contributor indicated in paragraphs 1.4 and 6.1 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we 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 6.1, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;
- iv) If the B-BBEE status level of contributor has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –
 - (a) disqualify the person from the bidding 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 bidder or contractor, its shareholders, and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted by the National Treasury 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
 - (e) forward the matter for criminal prosecution.



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SIGNATURE OF BIDDER(S):			
WITNESS 1:		WITNESS 2:	
DATE:			
ADDRESS:			



PLEASE COMPLETE IN FULL TO CLAIM POINTS

SWORN AFFIDAVIT – B-BBEE EXEMPTED MICRO ENTERPRISE – GENERAL **DRAFT**

EXAMPLE

(DO NOT USE. USE NEW/APPLICABLE TEMPLATE)

I, the undersigned,

Full name & Surname	
Identity number	

Hereby declare under oath as follows:

- The contents of this statement are to the best of my knowledge a true reflection of the facts.
- I am a Member / Director / Owner (**Select one**) of the following enterprise and am duly authorised to act on its behalf:

NB!

Enterprise Name:	
Trading Name (If Applicable):	
Registration Number:	
Vat Number (If applicable)	
Enterprise Physical Address:	
Type of Entity (CC, (Pty) Ltd, Sole Prop etc.):	
Nature of Business:	
Definition of “Black People”	<p>As per the Broad-Based Black Economic Empowerment Act 53 of 2003 as Amended by Act No 46 of 2013 “Black People” is a generic term which means Africans, Coloureds and Indians –</p> <ul style="list-style-type: none"> (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- <ul style="list-style-type: none"> i. before 27 April 1994; or ii. on or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalization prior to that date;”



Definition of “Black Designated Groups”	<p>“Black Designated Groups means:</p> <ul style="list-style-type: none"> (a) unemployed black people not attending and not required by law to attend an educational institution and not awaiting admission to an educational institution; (b) Black people who are youth as defined in the National Youth Commission Act of 1996; (c) Black people who are persons with disabilities as defined in the Code of Good Practice on employment of people with disabilities issued under the Employment Equity Act; (d) Black people living in rural and under developed areas; (e) Black military veterans who qualifies to be called a military veteran in terms of the Military Veterans Act 18 of 2011;”
------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

3. I hereby declare under Oath that:

- The Enterprise is _____% Black Owned using the flow-through principle as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- The Enterprise is _____% Black Female Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- The Enterprise is _____% Black Designated Group Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- Black Designated Group Owned % Breakdown as per the definition stated above:
 - Black Youth % = _____%
 - Black Disabled % = _____%
 - Black Unemployed % = _____%
 - Black People living in Rural areas % = _____%
 - Black Military Veterans % = _____%

- Based on the Audited Financial Statements/Financial Statements and other information available on the latest financial year-end of _____ (DD/MM/YYYY), the annual Total Revenue was R10,000,000.00 (Ten Million Rands) or less
- Please Confirm on the below table the B-BBEE Level Contributor, **by ticking the applicable box.**

NB!

100% Black Owned	Level One (135% B-BBEE procurement recognition level)	
At least 51% Black Owned	Level Two (125% B-BBEE procurement recognition level)	
Less than 51% Black Owned	Level Four (100% B-BBEE procurement recognition level)	

4. I know and understand the contents of this affidavit and I have no objection to take the prescribed oath and consider the oath binding on my conscience and on the



Owners of the Enterprise which I represent in this matter.

- The sworn affidavit will be valid for a period of 12 months from the date signed by commissioner.

Deponent Signature: _____

Date : _____

NB! ORIGINALLY CERTIFIED/ NOT COPY

 Commissioner of Oaths

Signature & stamp

Date:

EXAMPLE OF POINT SCORING AND ALLOCATION OF PREFERENCE POINTS (80/20) WHERE LOCALITY AS A GOAL IS INCLUDED. STELLENBOSCH PREFERENTIAL PROCUREMENT POLICY. (n/a)

BIDDER	PRICE	BBBEE LEVEL (VALID)	BUSINESS PREMISES (IN WC024)
TENDERER A	R 80 000	1	NO
TENDERER B	R 75 000	1	YES
TENDERER C	R 70 000	2	NO

BIDDER	PRICE POINTS (Out of 80)	BBBEE POINTS (Out of 10)	LOCALITY POINTS (Out of 10)	TOTAL POINTS (Out of 100)
TENDERER A	68.57	10	0	78.57
TENDERER B	74.29	10	10	94.29
TENDERER C	80	9	0	89



MBD 8 – DECLARATION OF BIDDER’S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

1. This Municipal Bidding Document must form part of all bids invited.
2. It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.
3. The bid of any bidder may be rejected if that bidder, or any of its directors have:
 - 3.1. abused the municipality’s / municipal entity’s supply chain management system or committed any improper conduct in relation to such system;
 - 3.2. been convicted for fraud or corruption during the past five years;
 - 3.3. willfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years; or
 - 3.4. been listed in the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004).
4. In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

4.1	Is the bidder or any of its directors listed on the National Treasury’s database as a company or person prohibited from doing business with the public sector? <i>(Companies or persons who are listed on this database were informed in writing of this restriction by the National Treasury after the audi alteram partem rule was applied).</i>	Yes	No
4.1.1	If so, furnish particulars:		
4.2	Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)? <i>(To access this Register enter the National Treasury’s website, www.treasury.gov.za, click on the icon “Register for Tender Defaulters” or submit your written request for a hard copy of the Register to facsimile number (012) 3265445).</i>	Yes	No
4.2.1	If so, furnish particulars:		
4.3	Was the bidder or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes	No



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4.3.1	If so, furnish particulars:		
4.4	Does the bidder or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?	Yes	No
4.4.1	If so, furnish particulars:		
4.5	Was any contract between the bidder and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes	No
4.5.1	If so, furnish particulars:		

5. CERTIFICATION

I, the undersigned (full name), _____, certify that the information furnished on this declaration form true and correct.

I accept that, in addition to cancellation of a contract, action may be taken against me should this declaration prove to be false.

SIGNATURE:		NAME (PRINT):	
CAPACITY:		DATE:	
NAME OF FIRM:			



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MBD 9 – CERTIFICATE OF INDEPENDENT BID DETERMINATION

1. This Municipal Bidding Document (MBD) must form part of all bids invited.
2. Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging).⁴ Collusive bidding is a *per se* prohibition meaning that it cannot be justified under any grounds.
3. Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:
 - 3.1. take all reasonable steps to prevent such abuse;
 - 3.2. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and
 - 3.3. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.
4. This MBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of bid-rigging.
5. In order to give effect to the above, the attached Certificate of Bid Determination (MBD 9) must be completed and submitted with the bid:

CERTIFICATE OF INDEPENDENT BID DETERMINATION:

In response to the invitation for the bid made by:

STELLENBOSCH MUNICIPALITY

I, the undersigned, in submitting the accompanying bid, hereby make the following statements that I certify to be true and complete in every respect:

1. I have read and I understand the contents of this Certificate;
2. I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect;
3. I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder;
4. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign, the bid, on behalf of the bidder;
5. For the purposes of this Certificate and the accompanying bid, I understand that the word "competitor" shall include any individual or organization, other than the bidder, whether or not

⁴ *Bid rigging (or collusive bidding) occurs when businesses, that would otherwise be expected to compete, secretly conspire to raise prices or lower the quality of goods and / or services for purchasers who wish to acquire goods and / or services through a bidding process. Bid rigging is, therefore, an agreement between competitors not to compete.*



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affiliated with the bidder, who:

- 5.1. has been requested to submit a bid in response to this bid invitation;
 - 5.2. could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and
 - 5.3. provides the same goods and services as the bidder and/or is in the same line of business as the bidder
6. 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 consortium⁵ will not be construed as collusive bidding.
 7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
 - 7.1. prices;
 - 7.2. geographical area where product or service will be rendered (market allocation)
 - 7.3. methods, factors or formulas used to calculate prices;
 - 7.4. the intention or decision to submit or not to submit, a bid;
 - 7.5. the submission of a bid which does not meet the specifications and conditions of the bid; or
 - 7.6. bidding with the intention not to win the bid.
 8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this bid invitation relates.
 9. 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.
 10. 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.

SIGNATURE:		NAME (PRINT):	
CAPACITY:		DATE:	
NAME OF FIRM:			

⁵ 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.



MBD 10 – CERTIFICATE FOR PAYMENT OF MUNICIPAL SERVICES

DECLARATION IN TERMS OF CLAUSE 112(1) OF THE MUNICIPAL FINANCE MANAGEMENT ACT (NO.56 OF 2003)

I, _____, _____ (full name and ID no.), hereby acknowledge that according to SCM Regulation 38(1)(d)(i), the Municipality may reject the tender of the tenderer if any municipal rates and taxes or municipal service charges owed by the Tenderer or any of its directors/members/partners to the Stellenbosch Municipality, or to any other municipality or municipal entity, are in arrears for more than 3 (three) months.

I declare that I am duly authorised to act on behalf of _____ (name of the firm) and hereby declare, that to the best of my personal knowledge, neither the firm nor any director/member/partner of said firm is in arrears on any of its municipal accounts with any municipality in the Republic of South Africa, for a period longer than 3 (three) months.

I further hereby certify that the information set out in this schedule and/or attachment(s) hereto is true and correct. The Tenderer acknowledges that failure to properly and truthfully complete this schedule may result in the tender being disqualified, and/or in the event that the tenderer is successful, the cancellation of the contract.

PHYSICAL BUSINESS ADDRESS(ES) OF THE TENDERER	MUNICIPAL ACCOUNT NUMBER

FURTHER DETAILS OF THE BIDDER’S Director / Shareholder / Partners, etc.:

Director / Shareholder / partner	Physical address of the Business	Municipal Account number(s)	Physical residential address of the Director / shareholder / partner	Municipal Account number(s)

NB: Please attach certified copy (ies) of ID document(s) and Municipal Accounts If the entity or any of its Directors/Shareholders/Partners, etc. rents/leases premises, a copy of the rental/lease agreement or sworn affidavit must be submitted with this tender.

- PLEASE SUBMIT MUNICIPAL ACCOUNTS FOR THE FOLLOWING TWO MONTHS AFTER BID CLOSURE TO THE RELEVANT SCM PRACTITIONER SHOULD THE BID NOT BE AWARDED YET.

Signature	Position	Date



COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT, 1993 (ACT 130 OF 1993)

COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT, 1993 (ACT 130 OF 1993)

Stellenbosch Municipality has legal duty in terms of Section 89 of the said Act to ensure that all contractors with whom agreements are entered into for the execution of work are registered as employers in accordance with the provisions of this Act and that all the necessary assessments have been paid by the contractor.

In order to enter into this agreement, the following information is needed regarding the above-mentioned:

Contractor's registration number with the office of the Compensation Commissioner:

NOTE:
A copy of the latest receipt together with a copy of the relevant assessment OR a copy of a valid Letter of Good Standing must be handed in, in this regard.

PRINT NAME:			
CAPACITY:		Name of firm	
SIGNATURE:		DATE:	



PART B – SPECIFICATIONS AND PRICING SCHEDULE

18. SPECIFICATIONS

DESCRIPTION OF THE WORKS

1 EMPLOYER'S OBJECTIVES

The Employer's objectives are to undertake Traffic Signal repairs, upgrades and installation within the Stellenbosch Municipal Area. The Municipality will, compile a Works Project Specifications for subsequent individual appointments. Works will be carried out at the tendered rates provided by the Contractor in the Schedule of Rates. This contract, as well as any individual appointments aligned to this contract, is valid for three (3) years until 30 June 2027.

It is anticipated that this tender will exceed the value of R10 million (VAT included).

The description of the project contained in the Scope of Work is merely an outline of the Contract Works and shall not limit the work to be carried out by the Contractor under this Contract. Details of some of the major items are given in this section and approximate detailed quantities for each type of work to be carried out in accordance with the Contract Documents are included in the Bill of Quantities.

2 OVERVIEW OF THE WORKS

2.1 General Description

This tender involves Traffic Signal repairs, upgrades and installation - as and when required by the Municipality.

A general description for each individual appointment will be provided for in a Works Project Specification.

General work items under this contract shall include any one or more of the following:

- i) New Construction: The installation of new traffic signals where none has existed before.
- ii) Recabling and Upgrades: The refurbishment of and alteration or additions to existing traffic signal installations.
- iii) Vehicle detection devices such as Inductive loops, Trafficams and/or Magnetometers: The installation of vehicle detection devices at new sites or the testing and repair of detection devices at existing traffic signal installations.
- iv) Telecommunication system such as 4G/5G modem wireless connection, Radio link via router connection and/or future fibre connection. The installation of telecommunication systems at new sites or the testing and repair of detection devices at existing traffic signal installations.
- v) Repair and Maintenance of Traffic Signals infrastructure that was damage due to vehicle accidents or malicious damage.
- vi) General: General traffic signal related work items

2.2 Boundaries of the site

The successful tenderer(s) will be required to work in road reserve, within the boundaries of the Stellenbosch municipal area. The construction areas will be pointed out by the authorized Municipal Official as and when required.

2.3 Occupation of the site

Access to the site of the works will be given to the Contractor on the Commencement Date of an Individual Appointment.

The site of the works is on public open space and public roads, which will remain in use during the course of the work. No road may be closed and traffic shall be accommodated as shown on the drawings.

3. EXTENT OF THE WORKS

The location and extent of works for each individual appointment will be provided. Work that is to be carried out under the contract is as provided for in the bill of quantities. However, if during the course of construction conditions are found to differ from those anticipated, the Municipality reserves the right to modify the extent of the work to suit the prevailing conditions and circumstances. Variations introduced in this manner will be measured and paid for at the rates tendered for appropriate items listed elsewhere in the schedule of quantities or in the absence of such rates, as extra work.

The work to be undertaken by the Contractor shall include the following:

General:

- (i) The establishment on site of the Contractor's campsite.
- (ii) The supply of plant, labour, tools, equipment and materials necessary to complete the work.
- (iii) Setting out of the works.
- (iv) Accommodation of traffic.

Works on Traffic Signals

The works included under this contract consists mainly of the following:

- i) New Construction: The installation of new traffic signals where none has existed before.
- ii) Recabling and Upgrades: The refurbishment of and alteration or additions to existing traffic signal installations.
- iii) Vehicle detection devices such as Inductive loops, Trafficams and/or Magnetometers: The installation of vehicle detection devices at new sites or the testing and repair of detection devices at existing traffic signal installations.
- iv) Telecommunication system such as 4G/5G modem wireless connection, Radio link via router connection and/or future fibre connection. The installation of telecommunication systems at new sites or the testing and repair of detection devices at existing traffic signal installations.
- v) Repair and Maintenance of Traffic Signals infrastructure that was damage due to vehicle accidents or malicious damage.
- vi) General: General traffic signal related work items

4. CONTRACTOR'S CAMP SITE, POWER SUPPLY AND OTHER SERVICES

The Municipal will identify an area that can be used as a camp site. For minor works a campsite shall be fenced off and comprise of a sheltered area that can be used by workers as a rest area, a mobile toilet and an area to stockpile materials. For all other works a campsite shall be fenced off and comprise of a container (to be utilized contractors office), ablution facilities, a sheltered area for workers and an area to stockpile materials. The Contractor is responsible for making all the necessary arrangements for the acquisition, establishment and subsequent removal and reinstatement of his camp site. He is responsible for ensuring that the requirements of the relevant land owner and all competent authorities having powers of sanction over the area on

which the camp site is established are met. The final location and layout of the camp site shall be approved by the Municipality before establishment commences.

The contractor shall make his own arrangements concerning the provision of water, electricity and other services for the campsite and office facilities.

No direct payment will be made for the provision of electrical and other services. The cost thereof shall be deemed to be included in the rates and amounts tendered for the various items of work for which these services are required.

5. CONSTRUCTION IN CONFINED AREAS

It will be necessary for the Contractor to work within confined and restricted areas. No additional payment will be made for work done in such areas, despite indications to the contrary in the Standard Specifications.

6. WATER FOR CONSTRUCTION PURPOSES

The Contractor must make adequate provision in his tender for all negotiations and procurement of water for construction activities and all related costs will be deemed to be included in his tendered rates.

7. WAYLEAVES AND PERMITS

The Contractor shall be responsible for ensuring that he obtains all wayleaves and permits from the relevant service authorities for working over, under or near services. In order to facilitate such approval, the Employer will provide all available details, plans and drawings of the services on the site to the Contractor. The Employer will assist the Contractor to obtain necessary wayleaves, however this will not limit the Contractors obligations in terms of the Contract, to comply with the provisions or by-laws of any local statutory body.

8. EXISTING SERVICES

Before the Contractor commences operations, he must discuss with and have the approval of the Employer, authority or owner concerned regarding the method he proposes to use for relocating or safe-guarding any services and existing works he may encounter during construction.

Any details of existing services shown on drawings may not be accurate therefore, where required, the Contractor shall arrange with authority concerned to point out services on site.

The Contractor shall locate all known services and safeguard any existing services or works he locates or may encounter during construction. The Contractor shall obtain clearance from the authority concerned before commencement of work in the proximity of the existing services.

The Contractor shall be responsible for any damage to such existing services or existing works in the execution of this contract and shall reimburse the Employer, authority or the owner concerned for any repairs required or damages incurred.

The Contractor shall be responsible for immediately notifying the Employer and the authorities concerned regarding and damage caused to public services and existing works.

Any alteration to public services shall be carried out by the Authority concerned unless the Contractor is instructed otherwise.

The Contractor shall provide the necessary assistance during any operations necessary in connection with the removal, alteration or safeguarding of any public service.

The Contractor is not permitted to cut off and roots from protected vegetation or tree roots which may cause the trees to become unstable, before consulting the local Green Services authority.

The Contractor shall assume full responsibility where any person in his service either directly or indirectly causes and damage to known services. The Contractor shall bear the cost of repair of any such damage.

9. ACCOMMODATION OF TRAFFIC

Work, including the erection and removal of traffic control facilities, shall be executed, where appropriate, between sunrise and sunset on Mondays to Saturday, inclusive. Occupation of existing traffic lanes will only be allowed during daylight hours on normal working days, which are defined as Monday to Saturday, inclusive. The existing number of lanes for each traffic movement affected by construction shall not be reduced without the written authorization of the Employer.

It should be noted that Sundays are specified as “Special non-working days” in the Contract data. In terms of Clause 38 of the General Conditions of contract the Employers permission has to be obtained for work to be carried out on special non-working days, for which permission shall be applied for at least one (1) week prior to the day.

The traveling public has 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 public roads.

Failure to maintain road signs, warning signs or flicker lights, etc., in good condition shall constitute ample reason for the Employer to bring the works to a stop until the road signs, etc., has been repaired to his/her satisfaction.

The Contractor may not commence constructional activities before adequate provision has been made to accommodate traffic in accordance with the requirements of these specifications and Chapter 13 of Volume 2 of the South African Road Traffic Signs Manual (SARTSM).

The Contractor shall submit proposals in connection with all signs and accommodation of traffic to the Employer for approval.

The traffic shall be accommodated on the existing surfaced carriageway and shoulders. No bypasses or temporary deviations shall be constructed. Accommodation of traffic will generally be carried out by closing off one lane of traffic at a time and accommodating the traffic on the other lane(s). During non-working days and the period from the 16th December to 5th January, the contractor will be required to shut down normal construction activities and ensure that the total surfaced width is available to public traffic. Only emergency work will be allowed. Where necessary, the traffic safety officer will be required to patrol during these non-working periods and ensure that all temporary traffic-control facilities are in place and functional. The accommodation of traffic team will be required to be on standby.

The penalty, for each incident or event that deviates from the approved Traffic Accommodation Plans, shall be R10 000.00.

10. CONTRACTOR’S GENERAL RESPONSIBILITIES

The Contractor shall with due care and diligence execute the repair and maintenance work in accordance with the provisions of the Contract.

Contractors shall stay abreast with technology of all types of controllers and stay abreast of hardware or software technology.

The Contractor shall supply and provide all the superintendence, constructional tools, machinery, labour, consumables, specialized equipment and facilities required, transport to and

from the sites and anything else required for the repair or maintenance work required on the Ekurhuleni traffic signal controllers and associated cabling.

The maintenance work shall include tasks such as running diagnostic tests, replacing defective or damaged modules as well as printed circuit boards. The Contractor shall closely follow the advice and instructions of the manufacturer on maintenance and repair procedures, including testing and diagnostic procedures.

Contractors shall ensure that adequate resources and spare parts are available to allow maintenance work.

The Contractor shall at all times the safety of both the public and his personnel during the entire period of the Contract.

The Contractor shall ensure that all relevant duties, obligation and prohibitions imposed in terms of the Occupational Health and Safety Act, 1993 (Act85 of 1993), and Regulations will be fully complied with at all times. A written agreement in accordance with the Occupational Health and Safety Act must be entered into on award of Bid.

All work carried out must comply with the following:

- Occupational Health and Safety Act (Act 85 of 1993) (OHS Act);
- SANS 1200: Standard Specification for Civil Engineering Construction, latest
- South African National Standard specifications SANS 1507: Electric Cables with extruded solid dielectric insulation for fixed installation (SANS 1507);
- SANS 1547: Standards for Traffic Signal Controllers, latest;
- SANS 10142: Standards for electrical connection, latest
- South African National Standard specifications SANS 1459: Traffic lights (SANS 1459);
- SANS 10313: Standards for surge and lighting protection, latest
- SANS 10199: Standards for earthing, latest
- The South African Road Traffic Signs Manual Volume 3: Traffic Signal Design, April 2001 (SARTSM)

11. **Unbundling of Municipal Infrastructure Assets**

The unbundling or componentization of the Property, Plant and Equipment (PPE) assets is required to update the Fixed Asset Register (FAR) as well as for effective asset maintenance and provision of services. The FAR will annually be updated for all assets and components. All new assets to be recorded on the FAR would there for have to be unbundled into its constituent components and all components be recorded on the FAR under the parent asset. The unbundling of primary assets into secondary components will be to a level that is sufficient for GRAP 17 compliance. Generally, the componentization of the PPE assets will be based on the component value, type of component (civil, electrical & mechanical) as well as anticipated lifespan of the component.

The unbundling of projects may only commence once the project is complete, all cost is known, including retention fees, and the following documents are available:

- Final bill of quantities;
- As-built plans;
- Completion certificate; and
- Final payment certificate.

All capital expenditure per project or per capital suspense must be verified in order to ensure that the total expenditure on a project is included, that is professional fees, actual cost, retention fees and all other relevant expenditure.

Once the final cost is determined, then the unbundling of the project commences. The total project cost should be broken down to a component level.

The following information should be provided for each component of the capital asset once the project has been unbundled:

- Asset description;
- Original cost;
- Capital suspense account;
- WIP Asset code;
- Expected useful life;
- Acquisition date (Equal to the date of last expenditure, except retention);
- Start depreciation date;
- Asset Class as per Asset hierarchy

All unbundled capital assets must be captured spatially by geo referencing it in ESRI or Arcmap or a compatible spatial program

In doing so the replaced or upgraded capital assets must be identified.

When a replacement or upgrade is identified, the following information must be provided, the asset code, the portion in units that is replaced or in the case of a complete replacement an indication to this extend.

The GIS layer for as-built plans must be updated independently for the capital asset register layer. All information must be made available in electronic format to the Asset and IT section

Find below list of generic components per asset type is listed below for ROADS, but additional/ special components would however also have to be considered when unbundling assets.

NB FAILURE TO COMPLY WITH THE ABOVE REQUIREMENTS THE BID WILL BE CONSIDERED AS NON RESPONSIVE.AND WILL BE DISQUALIFIED.



USEFUL LIFE IN YEARS		
MIN		MAX

ROADS (Roads, Pavements, Bridges & Storm Water)

BRIDGES

Vehicle

Bridges - Concrete

Bridges - Steel

Bridges - Timber

Pedestrian

Bridges - Concrete

Bridges - Steel

Bridges - Timber

Railway

Bridges - Concrete

Bridges - Steel

Bridges - Timber

Reinforced retaining walls

Earth

Concrete

Expansion and construction joints

60	-	80
40	-	50
25	-	40
60	-	80
40	-	50
25	-	40
60	-	80
40	-	50
25	-	40
10	-	15
25	-	30
15	-	20

STORM WATER

Culverts

Concrete

Armco

Drains

Earthworks

Concrete lining

Stop banks

Pipes

Coastal

Structure (Retaining walls)

Piers

Storm water outfalls

25	-	40
40	-	60
25	-	40
80	-	100
25	-	50
40	-	50
25	-	50
20	-	40
60	-	80
60	-	80

Specifications

ROADS

Kerb and channels
Municipal roads - Asphalt surface
 - Asphalt layer
 - Concrete surface
 - Concrete layer
 - Gravel surface
National roads - Asphalt surface
 - Asphalt layer
 - Concrete surface
 - Concrete layer
 - Gravel surface
Provincial roads - Asphalt surface
 - Asphalt layer
 - Concrete surface

40	-	50
10	-	20
30	-	50
10	-	30
30	-	50
3	-	10
10	-	20
30	-	50
10	-	30
30	-	50
3	-	10
10	-	20
30	-	50
10	-	30

 - Concrete layer
 - Gravel surface
Crash barriers
Retaining walls
Overload control centres
 Electronic hardware
 Other equipment
Pedestrian footpaths
Street lighting
Subways
Traffic islands
Traffic lights
Traffic lights – coastal
Traffic signs
Toll road plazas

USEFUL LIFE IN YEARS		
MIN		MAX
30	-	50
3	-	10
10	-	30
30	-	60
15	-	20
10	-	15
10	-	20
15	-	30
25	-	40
40	-	50
40	-	50
15	-	20
10	-	15
5	-	15
20	-	30

Example of a Capital Works Project Form to be completed once project is completed

CAPITAL WORKS PROJECT

CAPITAL PROJECT DETAIL/ DESCRIPTION	

BUSINESS UNIT	DEPARTMENT

CONTRACT NUMBER	VOTE

SUPPLIER

PROJECT START DATE	PROJECT FINISH DATE

PROJECT COST	MAINTENANCE PLAN COST	MAINTENANCE VOTE

PROJECT MANAGER:	GM/PROCESS MANAGER:
NAME:	NAME:
SIGNATURE:	SIGNATURE:
CONTACT NUMBER:	CONTACT NUMBER:

ASSET CONTROL

ASSET NUMBER/PROJECT NUMBER

DATE RECEIVED	DATE RECORDED IN FAR

ASSET CONTROL:
NAME:
SIGNATURE:

ENGINEERING DRAWINGS

The work shall be carried out in accordance with these standard drawings which can be made available on request.

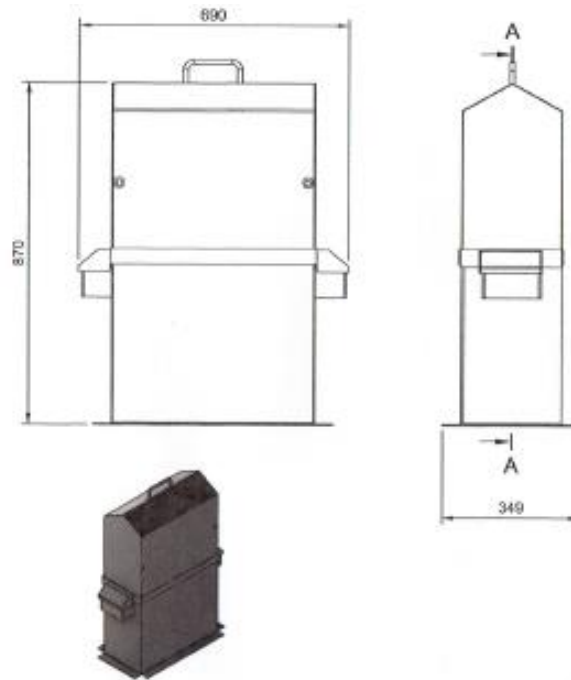
LIST OF DRAWINGS:

CP-1 CONNECTION PILLAR BOX (PLASTIC)
 CP-2 VANDAL RESISTANCE CONNECTION PILLAR BOX (METAL)
 OHP-1 OVERHEAD POLE
 OHP-2 OVERHEAD POLE – BOOM CONNECTION DETAIL
 OHP-3 OVERHEAD MOUNTING BRACKET
 OHP-4 OVERHEAD POLE – DETAIL 2
 OHP-5 OVERHEAD POLE – RC BASE CONSTRUCTION AND REINFORCEMENT
 NPC 1 NYLON POLE CAP
 SPPB-1 STANDARD PEDESTRIAN PUSH BUTTON
 TSA-1 THREE AND FIVE ASPECT TRAFFIC LIGHT
 TSA-2 PEDESTRIAN ASPECT
 TSB-1 BACKING BOARDS -SCREENS
 TSP-1 STANDARD POLE FOR MOUNTING TRAFFIC LIGHTS
 TSP-2 EXTENDED POLE FOR MOUNTING TRAFFIC LIGHTS
 TSP-3a POLE MOUNTING BRACKET
 TSP-3b POLE MOUNTING BRACKET
 TSP-3c POLE MOUNTING BRACKET
 UPS TITANIC CABINET ROOT ASSEMBLY
 SG-1 CONTRACT SIGNBOARD
 SPPB-2 PEDESTRIAN TACTILE SIGNAGE PRINT SET
 TSPR-1 TYPICAL REMOVABLE SIGNAL POLE DETAIL
 SMARTLOCK CHAMBER FOR CONNECTION PILLAR (STUBBY)
 SMARTLOCK CHAMBER FOR UPS SYSTEMS (RHINODE 1000, IP68)
 SMARTLOCK CHAMBER FOR TRAFFIC CONTROLLER (RHINODE 1000, IP68)
 SMARTLOCK CHAMBER COMPOSITE RETROFIT COVER DESIGN
 OVERHEAD R/C BASE DETAILS
 GALVANISHED POLE FOR SOLAR INSTALLATION
 REINFORCEMENT STEEL IN CONCRETE FOR OVERHEADS

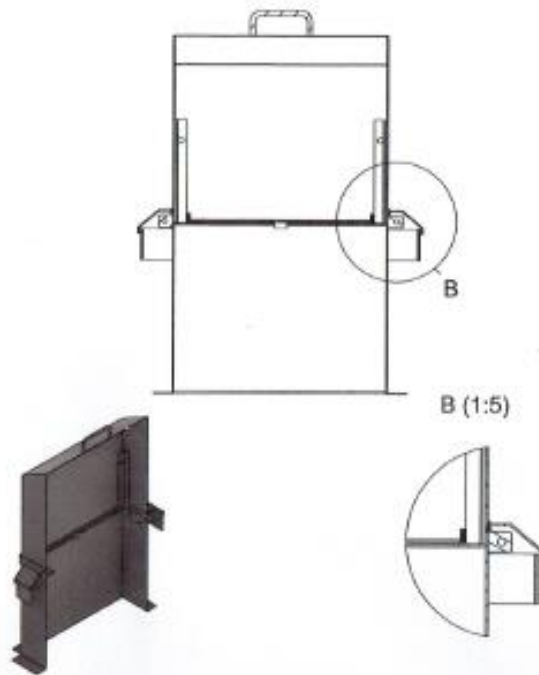
CP-2 VANDAL RESISTANCE CONNECTION PILLAR BOX (METAL)
DETAIL 1/4



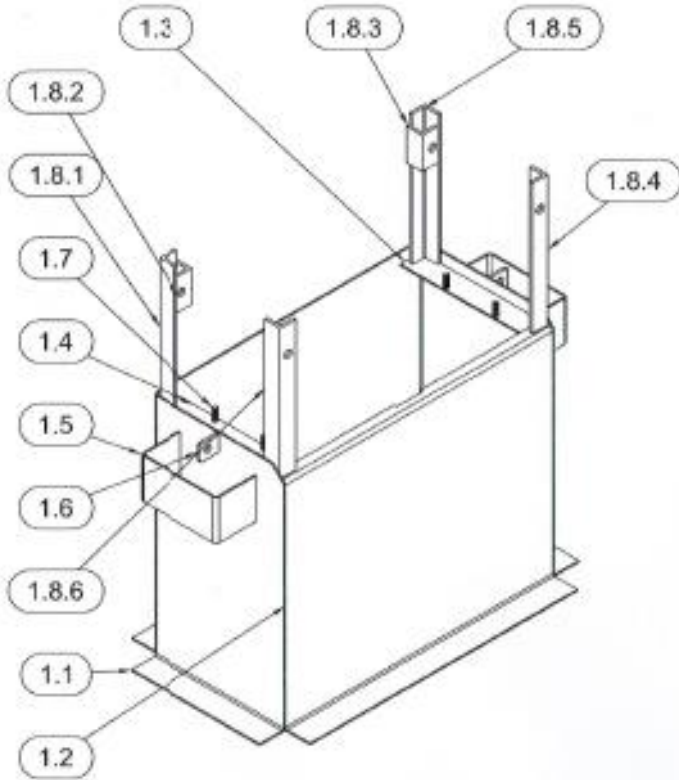
CP-2 VANDAL RESISTANCE CONNECTION PILLAR BOX (METAL)
DETAIL 2/4



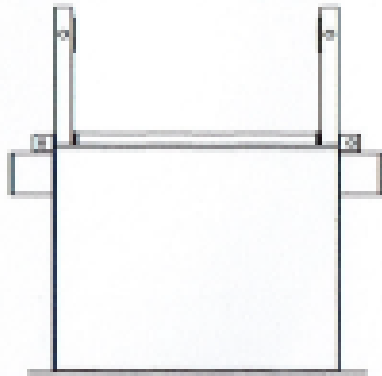
A-A (1:8)



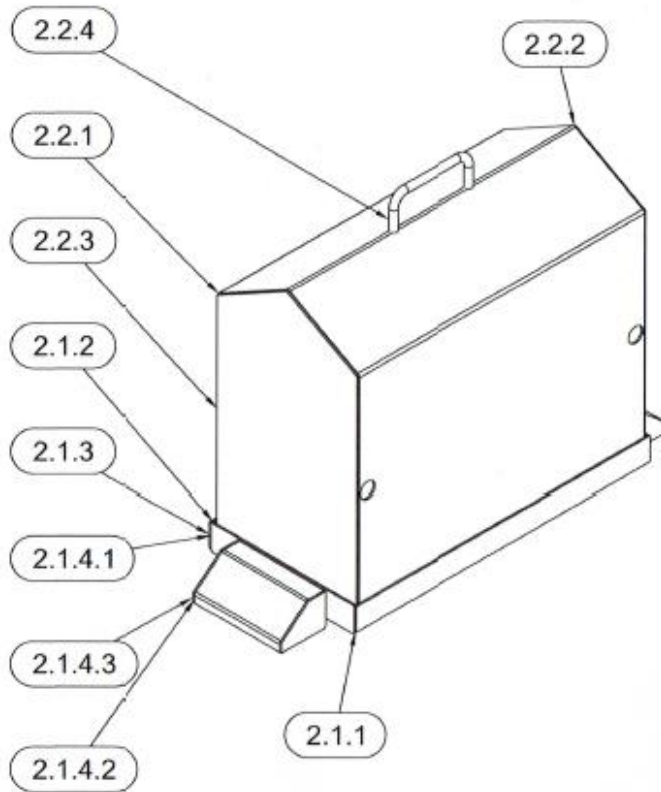
CP-2 VANDAL RESISTANCE CONNECTION PILLAR BOX (METAL)
 DETAIL 3/4



Item	Description	Quantity
1	Lower Body Assembly	1
1.1	Bottom Outer Shell	1
1.2	Top Front Panel	1
1.3	RHS Flat	1
1.4	LHS Flat	1
1.5	U Bracket	2
1.6	Bottom Mount Lug	2
1.7	M8x25 threaded Rod	4
1.8	Mount Pillar Assembly	1
1.8.1	Angle 30x30x5	1
1.8.2	Angle 30x30x5	1
1.8.3	Angle 30x30x5	1
1.8.4	Angle 30x30x5	1
1.8.5	Angle 30x30x5	1
1.8.6	Angle 30x30x5	1



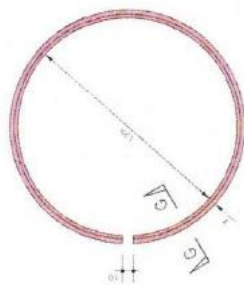
CP-2 VANDAL RESISTANCE CONNECTION PILLAR BOX (METAL)
 DETAIL 4/4



Item	Description	Quantity
2	Upper Body Assembly	1
2.1	Locating Frame Assembly	1
2.1.1	Rear Flat	1
2.1.2	Front Frame Spacer	1
2.1.3	Front Frame flat	1
2.1.4	Side Cover Assembly	2
2.1.4.1	Side Frame	1
2.1.4.2	Side Cover Assembly	1
2.1.4.3	Side Cover Cap	2
2.1.4.4	Frame Mount Lug	2
2.2	Top Shell	1
2.2.1	Top Cover	1
2.2.2	Top Side Panel RHS	1
2.2.3	Top Side Panel LHS	1
2.2.4	Handle	1



Drawing: OHP-3

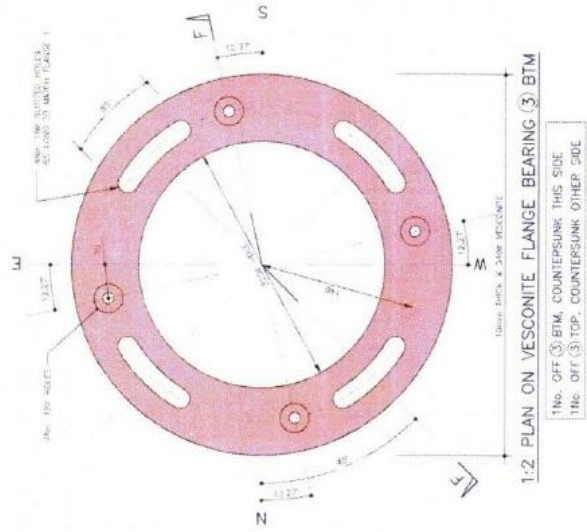


1.5 X 7 VESCONITE SPLIT RING

1:2 VESCONITE SPLIT RING BEARING DETAIL

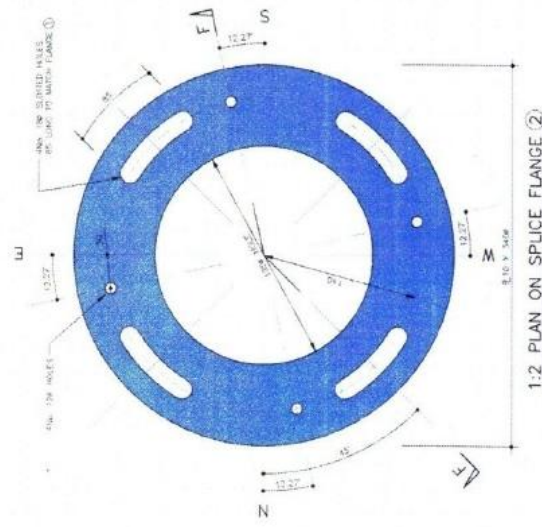


1:1 SECTION G-G



1:2 PLAN ON VESCONITE FLANGE BEARING (3) BTM

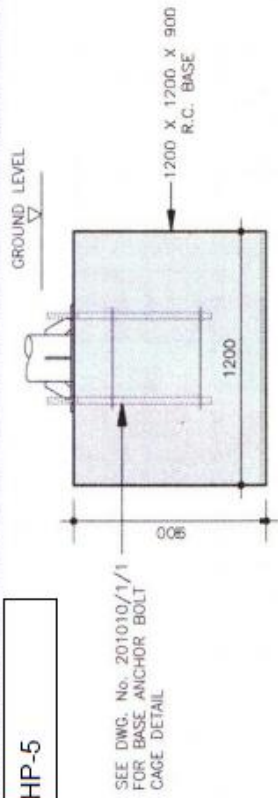
1 ING. OFF (3) B/M. COUNTERSUNK THIS SIDE
1 ING. OFF (3) T/D. COUNTERSUNK OTHER SIDE



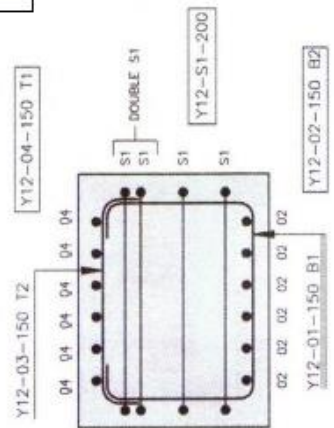
1:2 PLAN ON SPLICE FLANGE (2)

1 ING. OFF (3) B/M. COUNTERSUNK THIS SIDE
1 ING. OFF (3) T/D. COUNTERSUNK OTHER SIDE

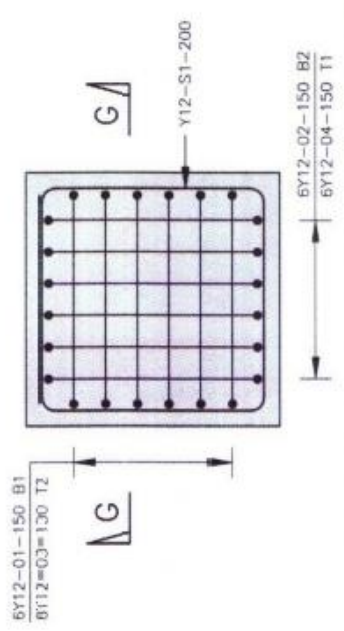
Drawing: OHP-5



1:20 ELEVATION SHOWING R.C. BASE CONSTR.



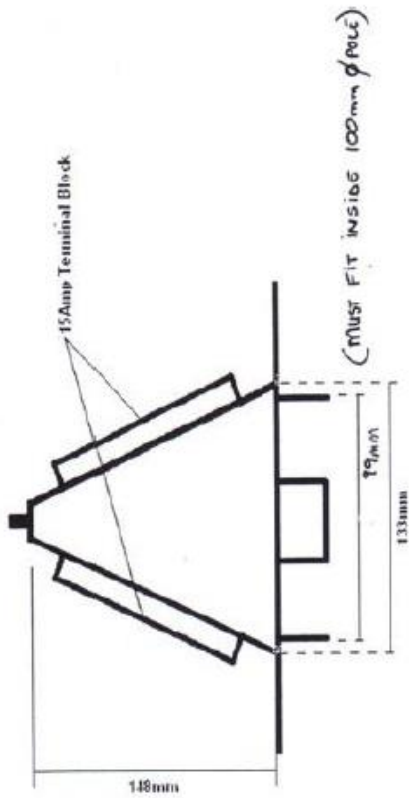
1:20 SECTION G-G SHOWING BASE REINF.



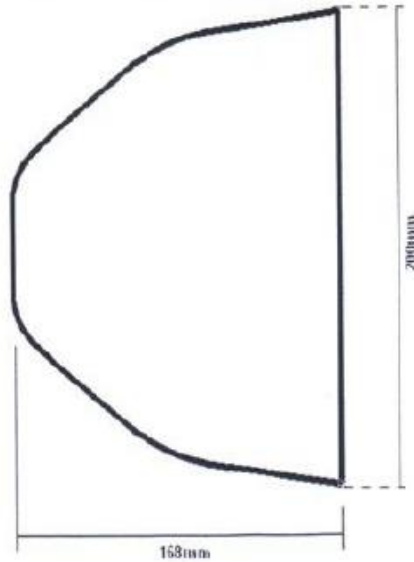
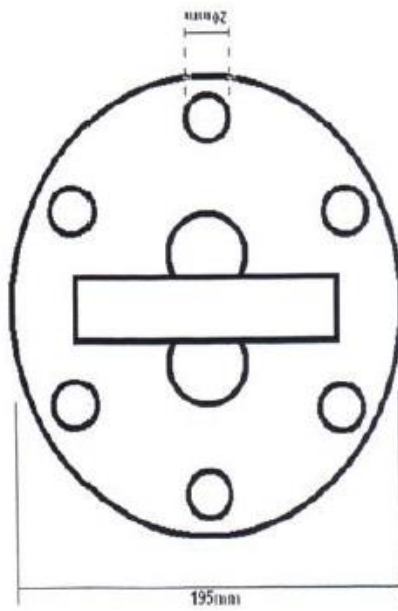
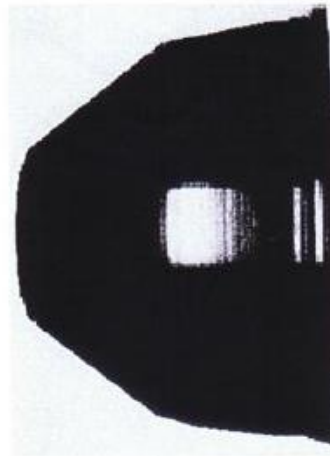
1:20 PLAN SHOWING BASE REINF.

BENDING SCHEDULE

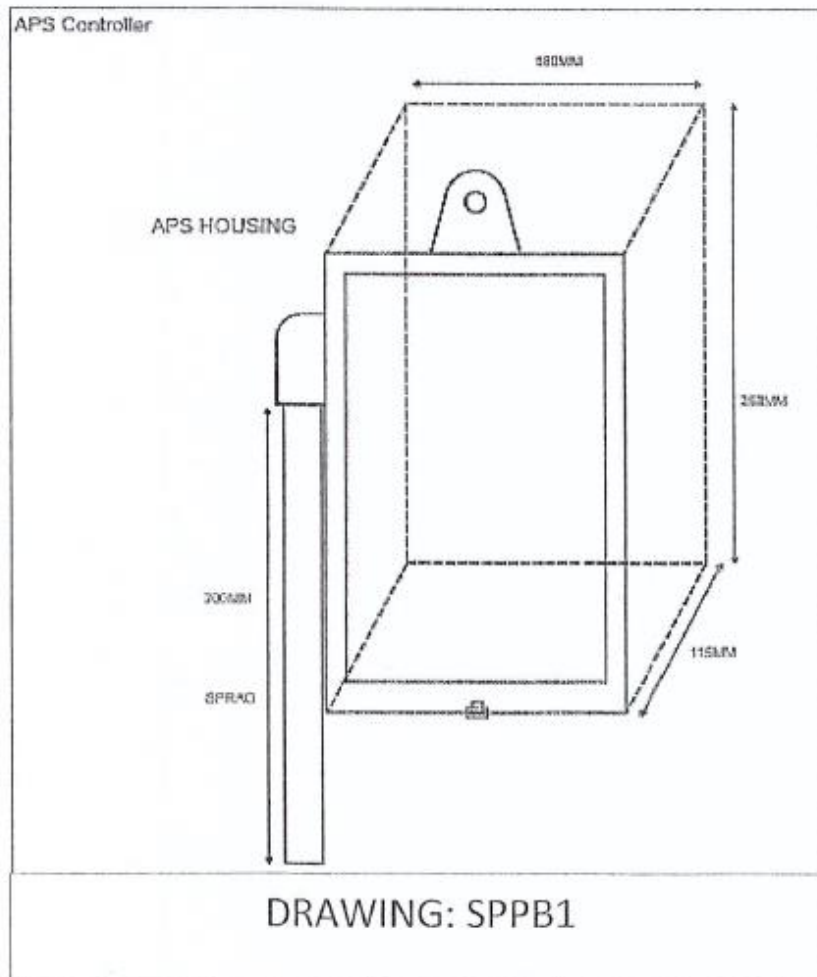
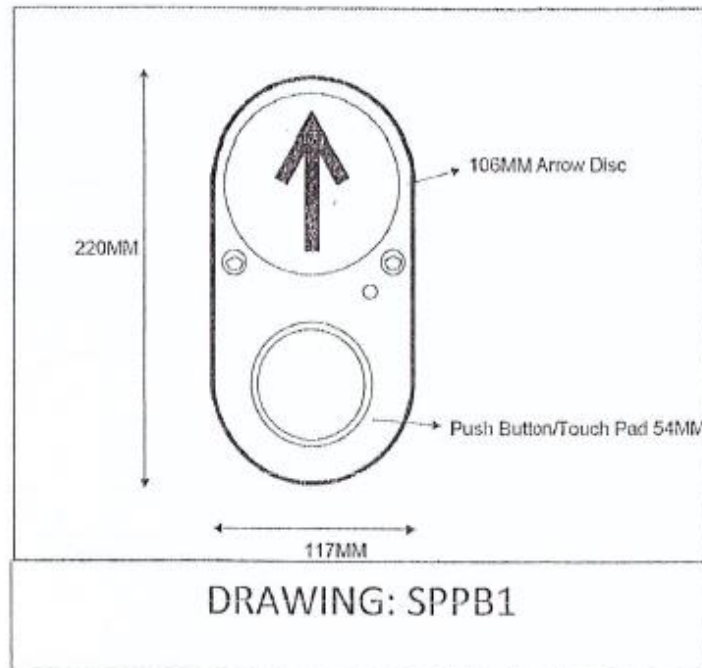
Member	No. Off	Bars to Each	Diarn	Length	Tot. Bars	Mark	SC	A	B	C	D	E	REV
TRAFFIC SIGNAL POLE R.C. BASE REINF.	1	6	Y12	2800	6	01	55	150	735	1025	735		
		6	Y12	2800	6	02	55	150	735	1025	735		
		6	Y12	1350	6	03	38	150	1025				
		6	Y12	1350	6	04	38	150	1025				
	4	Y12	2800	6	S1	60	1050	1050					
DIA	R8	R10	Y10	Y12	Y16	Y20	Y25	Y32					
MASS	0	0	0	60	0	0	0	0	0	0	0	0	
							TOTAL					60	



- The Polecap exterior made from 2mm
- The Interior Structure manufactured from 0.9mm Electro galvanised Steel
- Both items powder coated using an exterior quality polyester powder

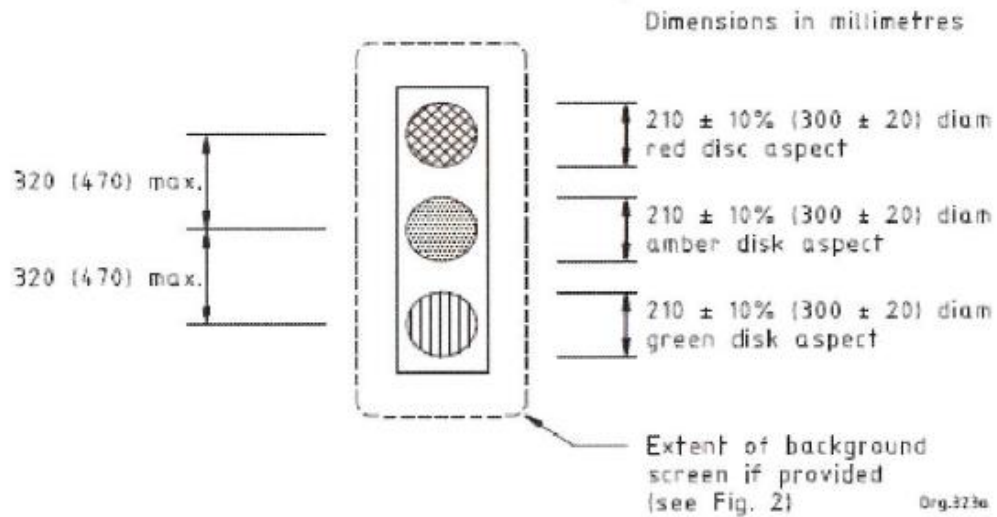


NPC 1 NYLON POLE CAP – 100MM

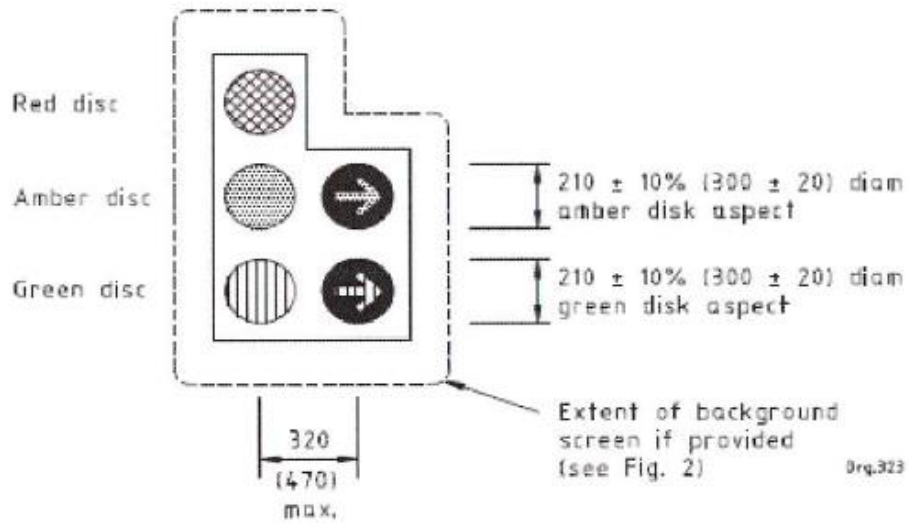


THREE AND FIVE ASPECT TRAFFIC SIGNAL - TSA_1

SANS 1459:2015
Edition 2



a) Three-aspect traffic light

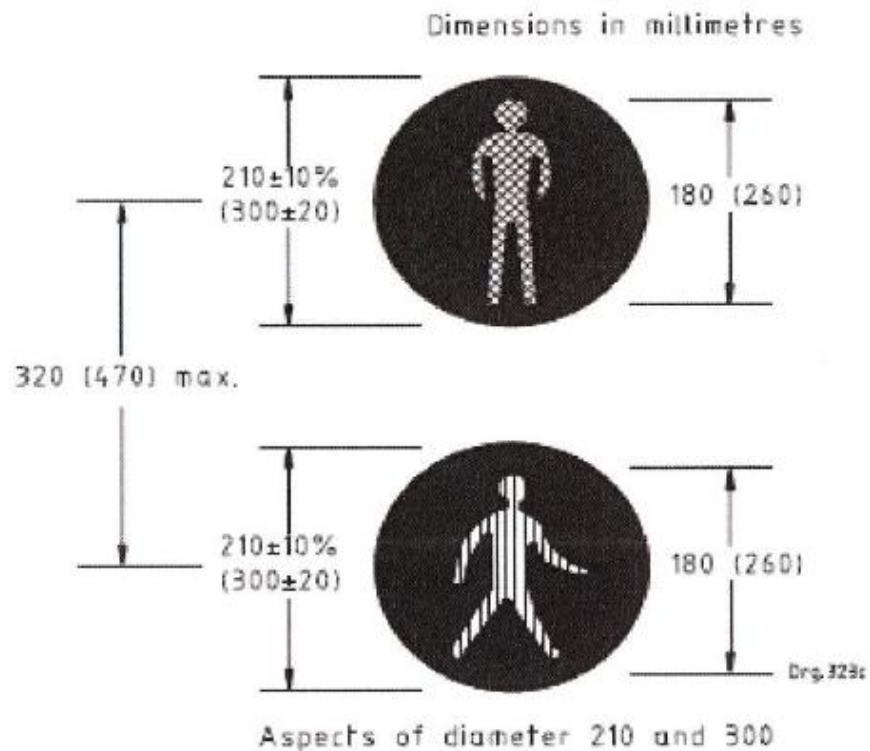


b) Traffic light with filter arrows

NOTE Dimensions are given for aspects of diameter 210 mm. Where applicable, alternative dimensions for aspects of diameter 300 mm are given in brackets.

PEDESTRIAN ASPECT - TSA_2

SANS 1459:2015
Edition 2



Unless otherwise stated, permitted tolerances on dimensions shall be $\pm 5\%$.

NOTE Figures given in brackets are dimensions applicable to aspects of diameter 300 mm.

Figure 3 — Dimensions of typical pedestrian traffic lights

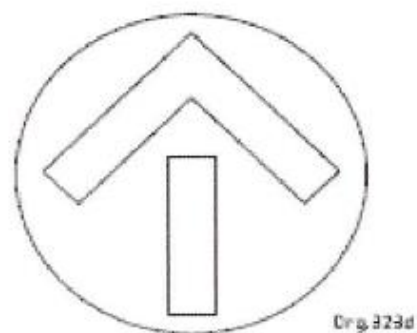
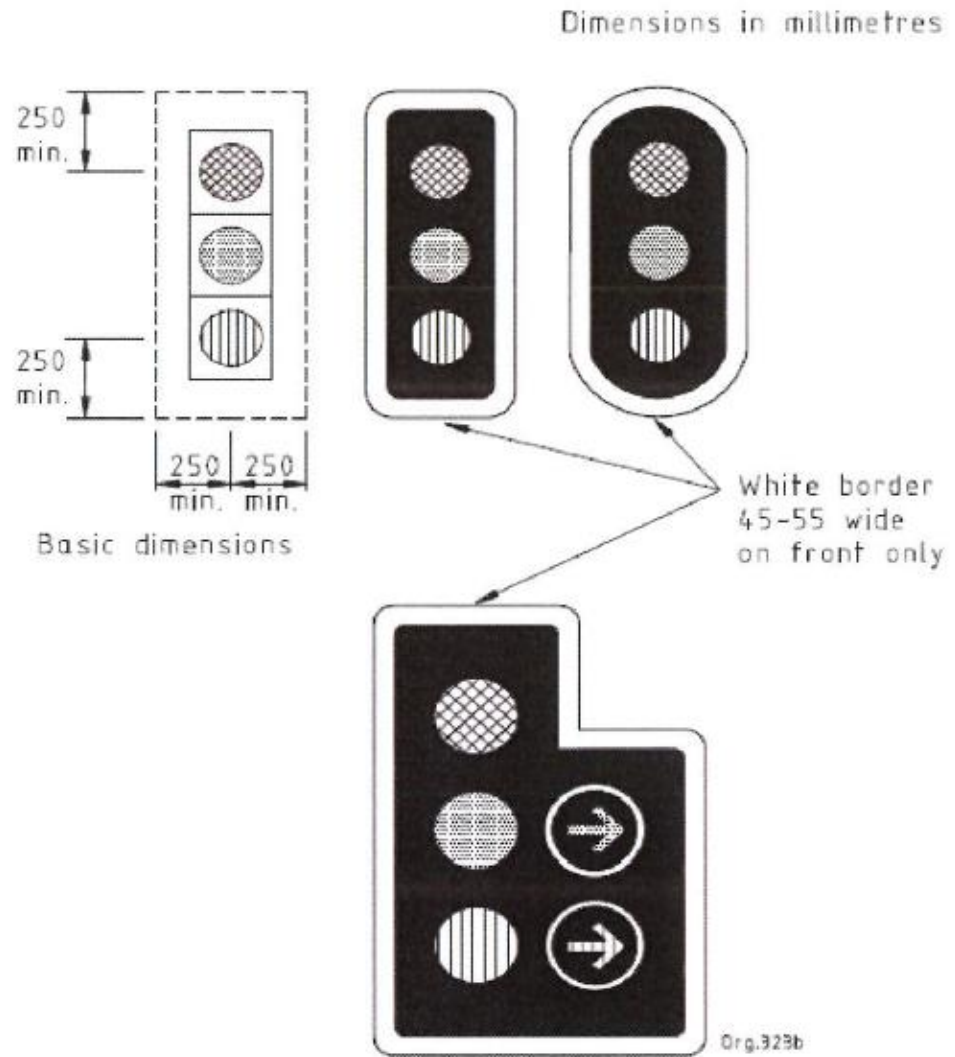


Figure 4 — Shape of arrow symbol

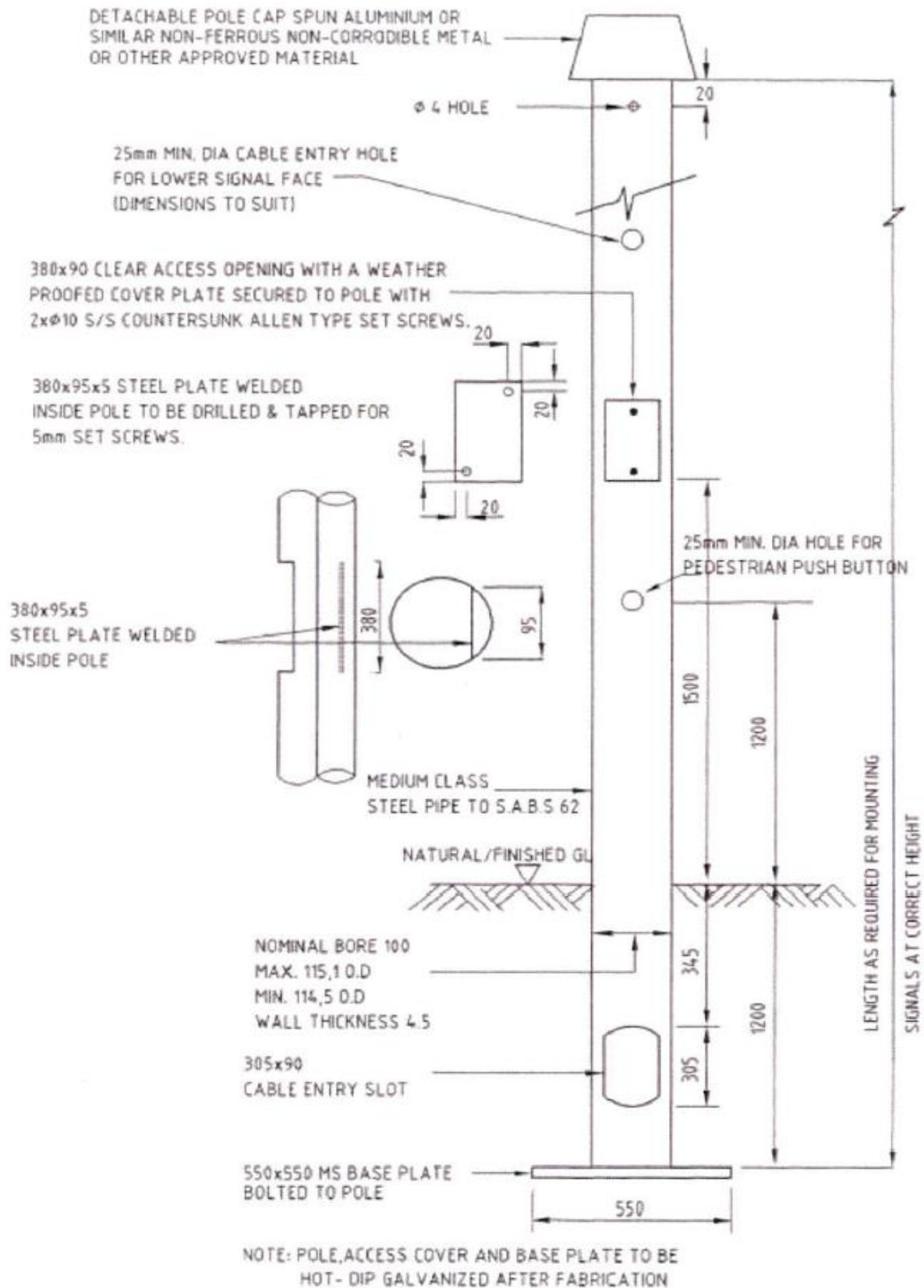
BACKING BOARDS/SCREENS - TSB_1

SANS 1459:2015
Edition 2

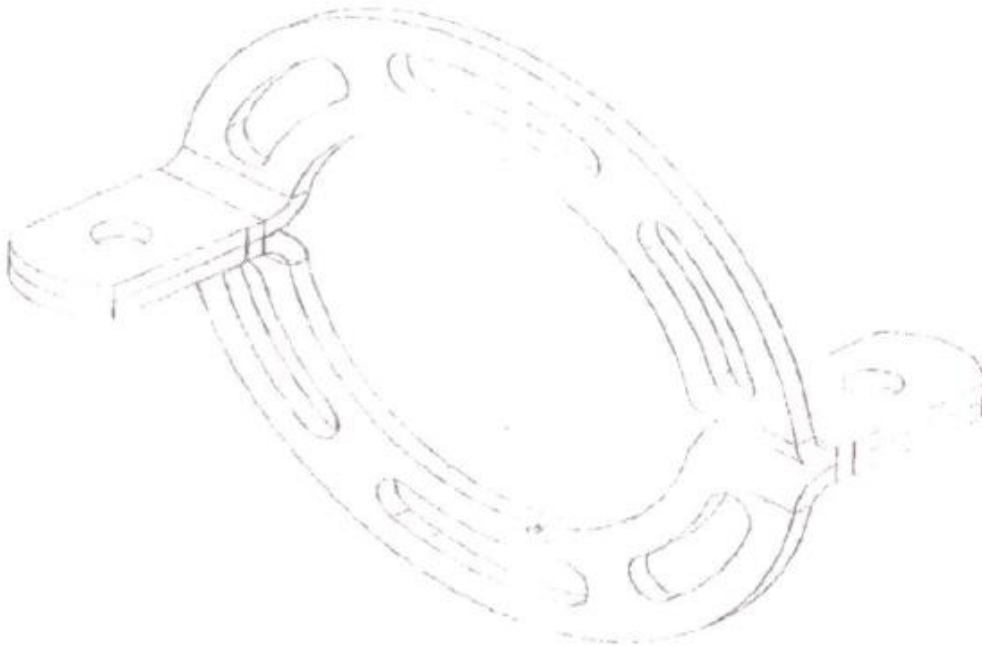


NOTE Matt black finish with white border.

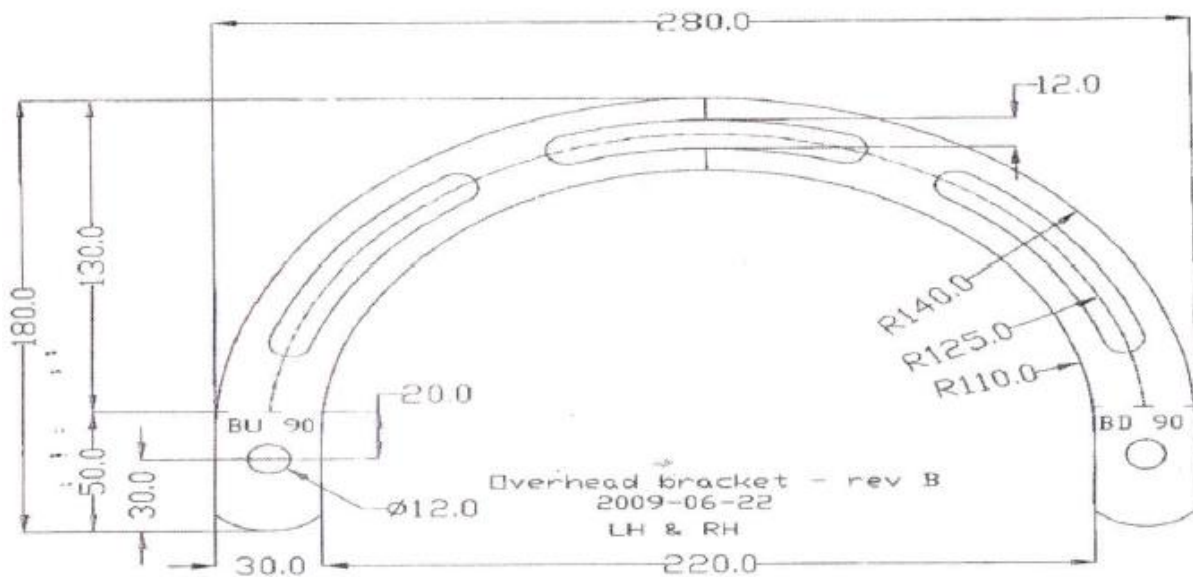
STANDARD POLE FOR MOUNTING TRAFFIC SIGNALS – TSP_2



OVERHEAD MOUNTING BRACKET – TSP_ 3A



Combination Lantern Bracket - Assembled
View without fasteners

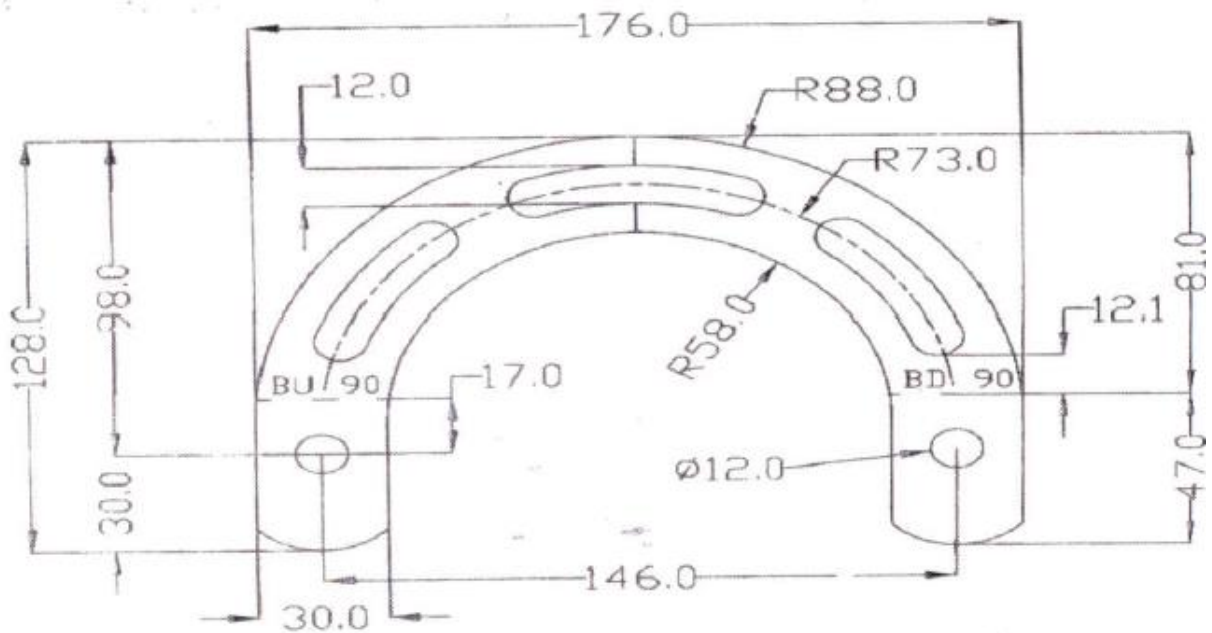


Overhead Pole Mounting Bracket Dimensions

POLE MOUNTING BRACKET – TSP_ 3B

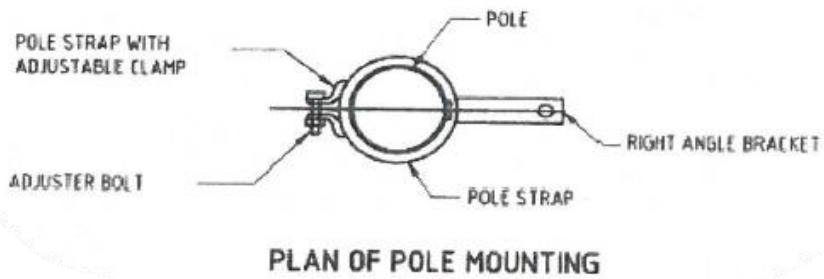
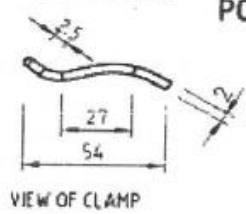
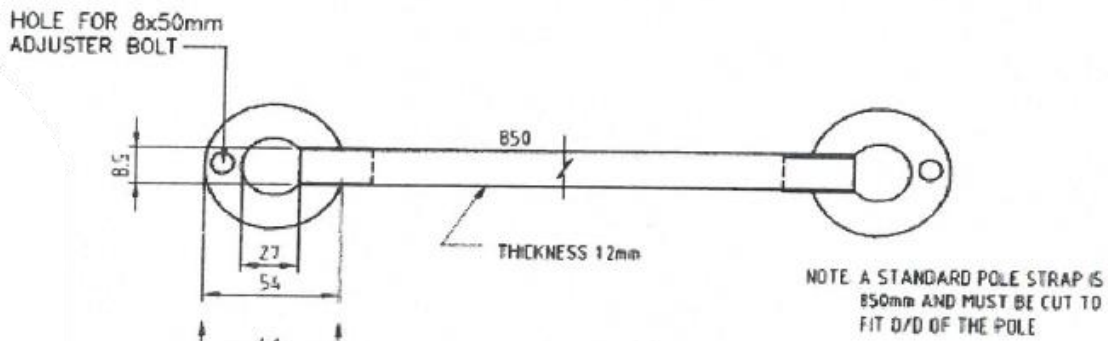
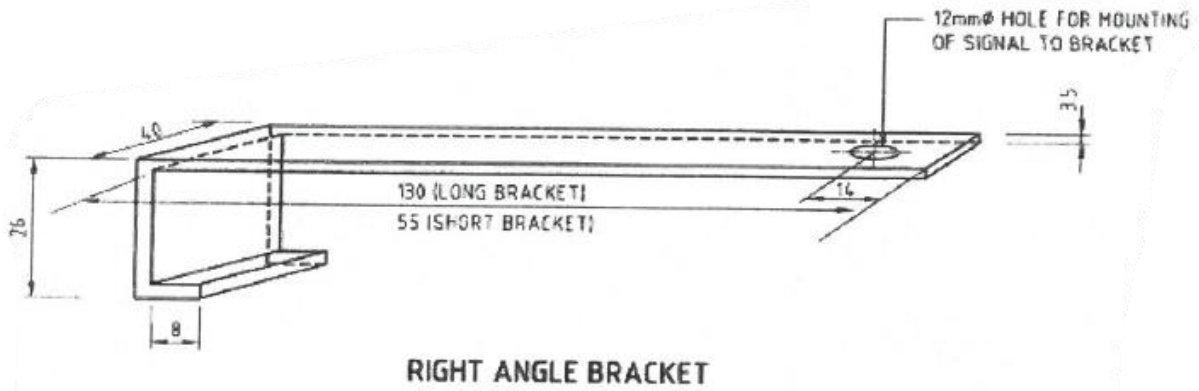


Combination Lantern Bracket - Assembled
View without fasteners

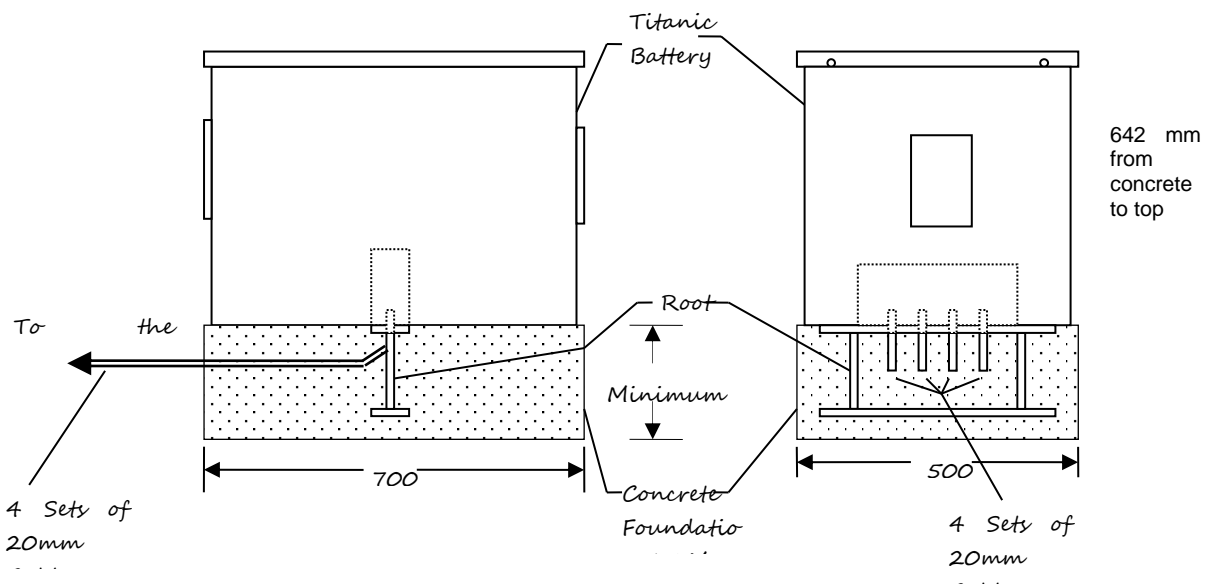
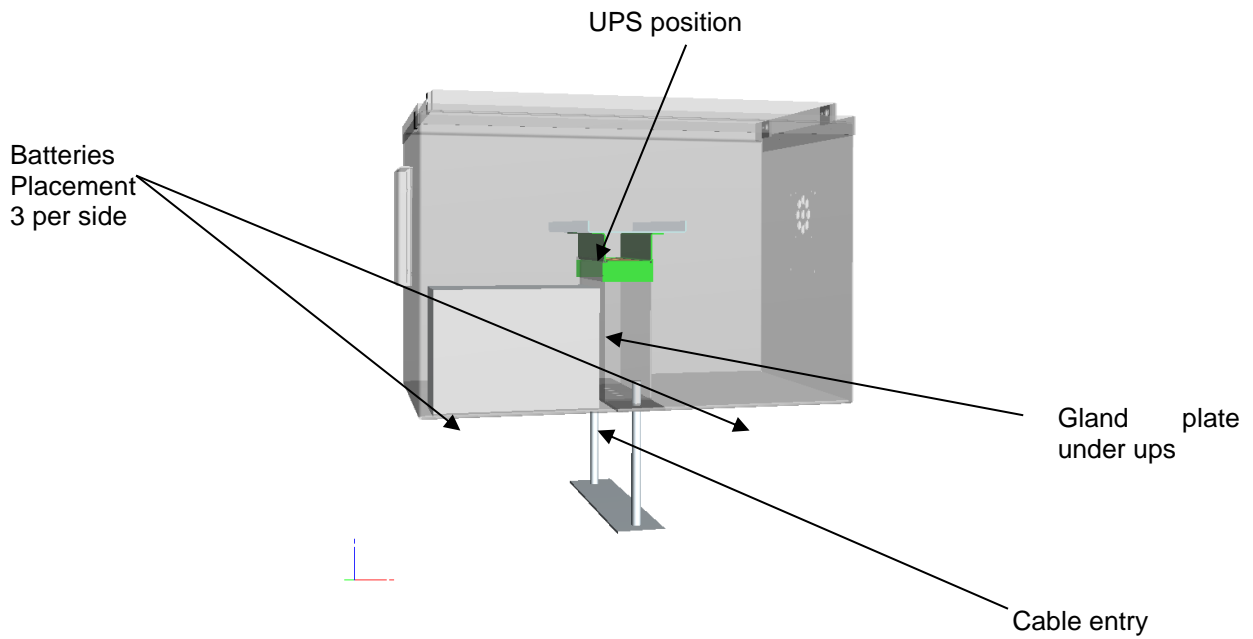


Pole Mounting Bracket Dimensions

POLE MOUNTING BRACKETS TSP_3C

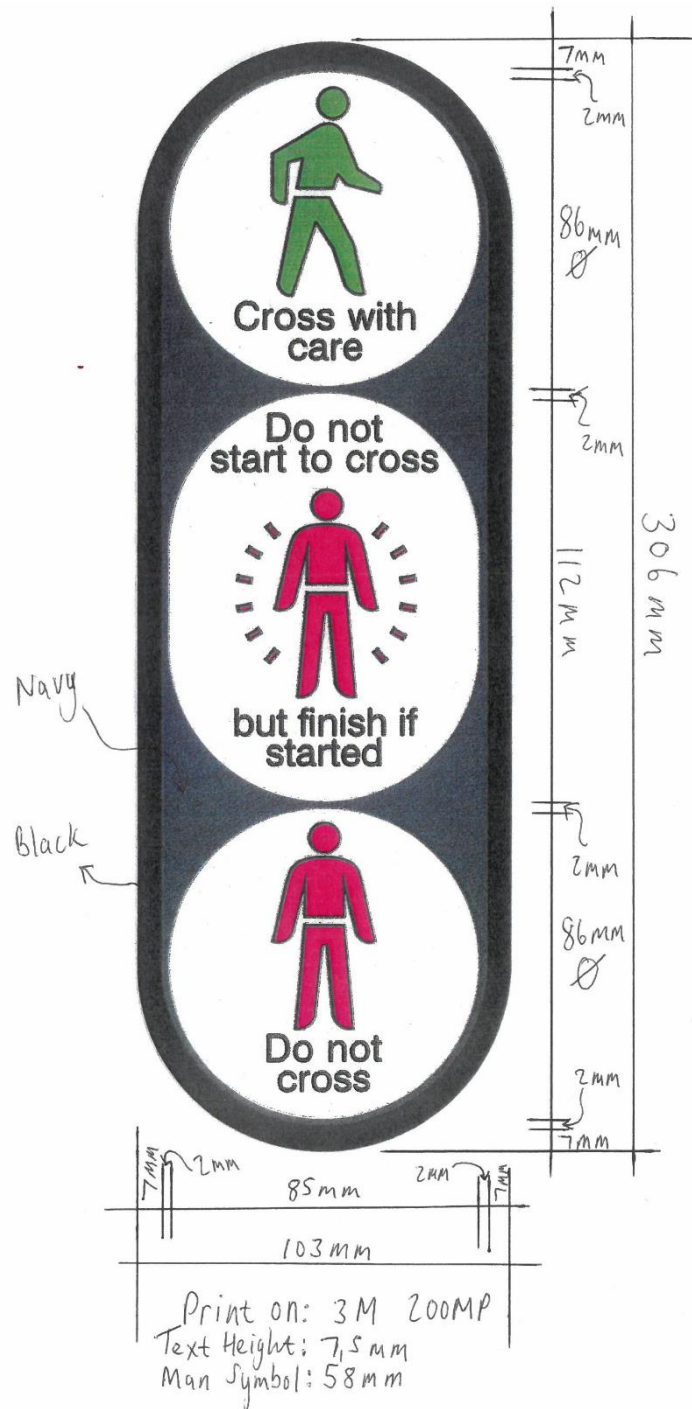


UPS TITANIC CABINET ROOT ASSEMBLY

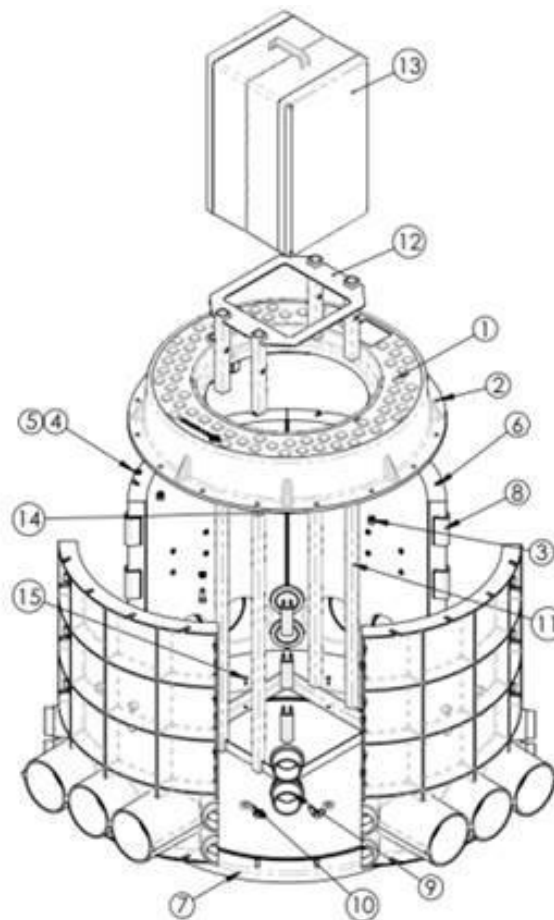


Note: Feed the cables or cable trunking through the holes of the root.

SPPB-2 PEDESTRIAN TACTILE SIGNAGE PRINT SET

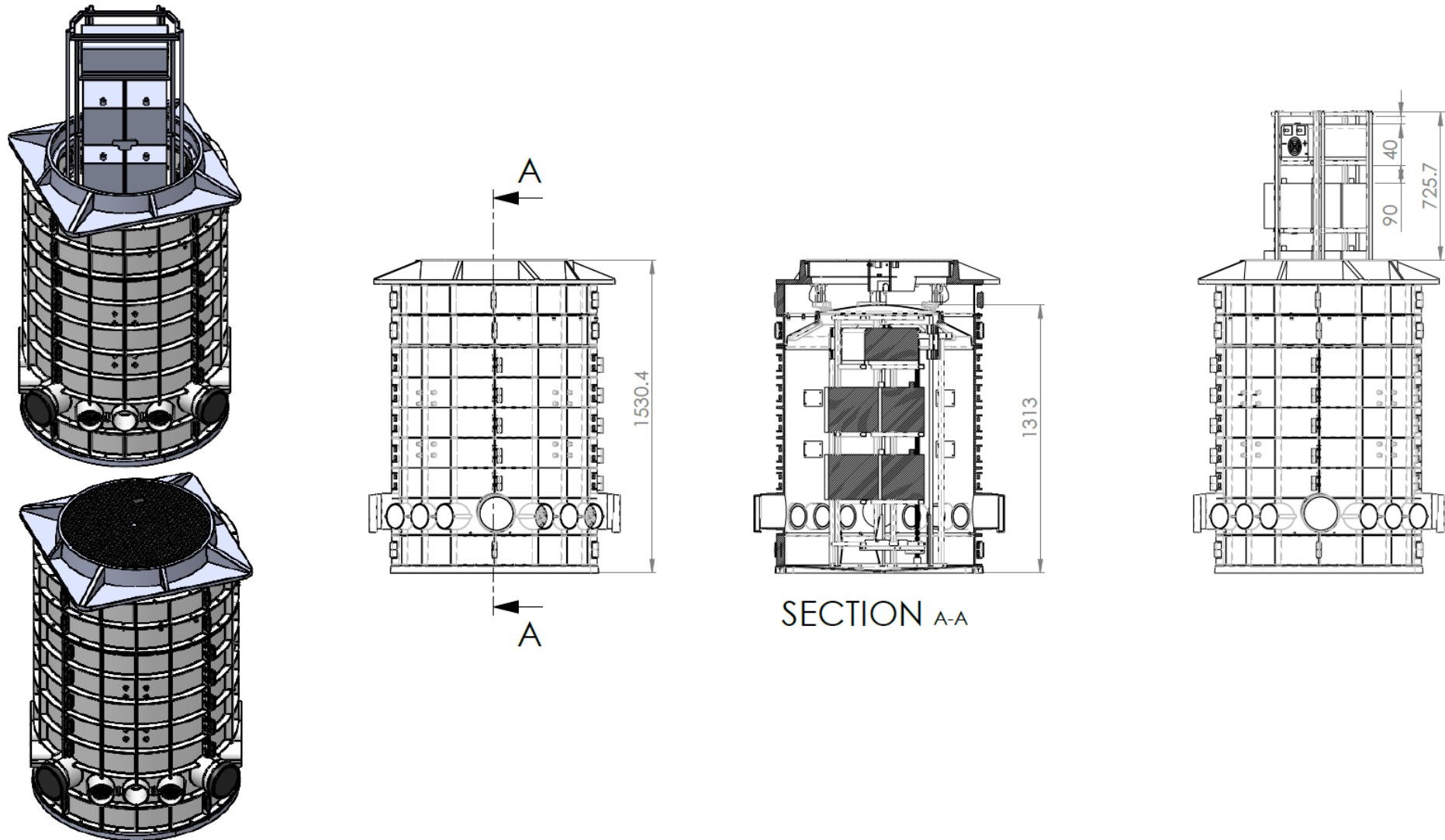


SMARTLOCK CHAMBER FOR CONNECTION PILLAR (STUBBY)

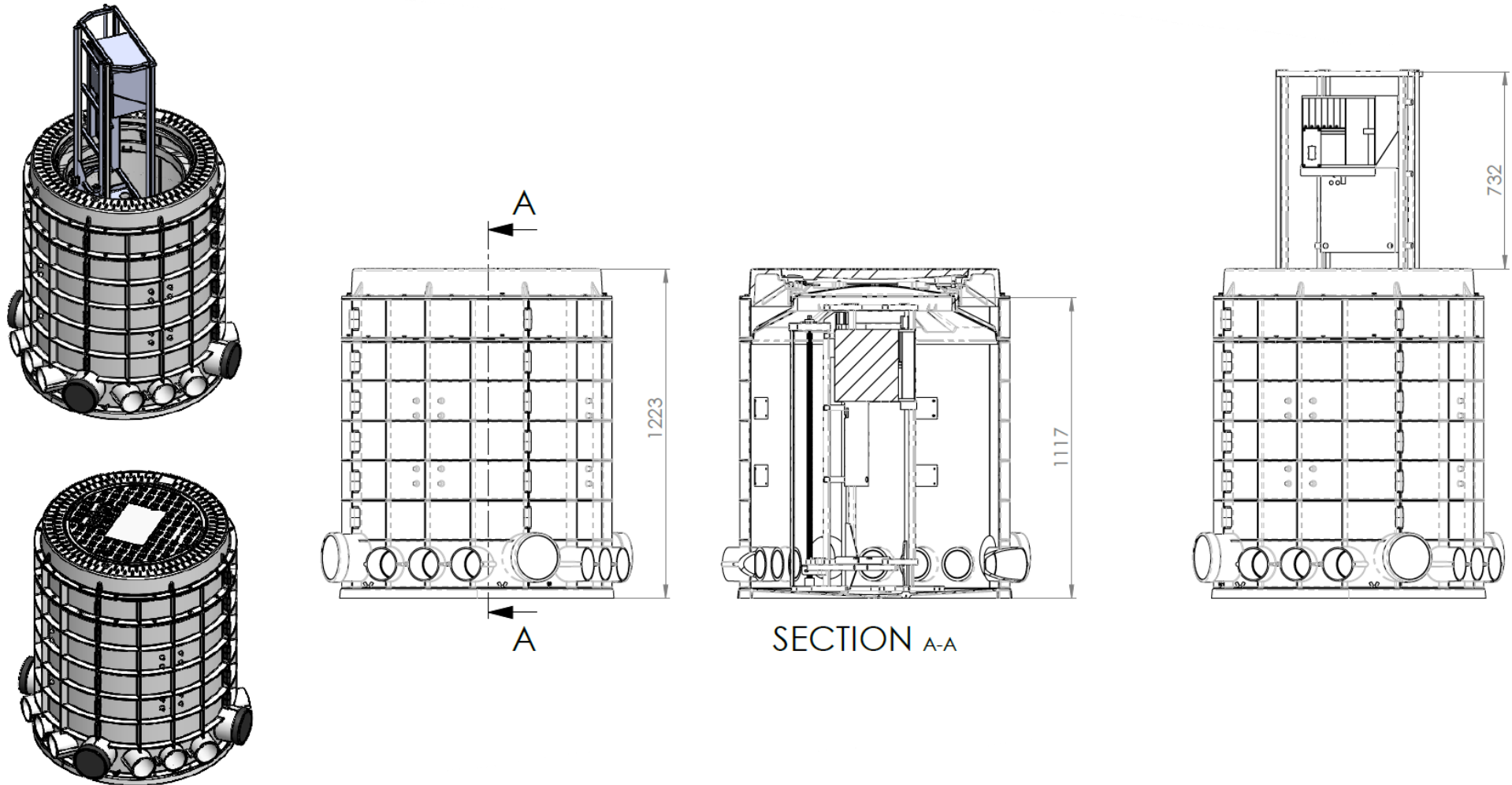


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	MHL-002-5100-02-01	FRAME ASSEMBLY, RHINODE 600	1
2	NSS8H	NUT, HEX, M8 S/STEEL	12
3	NSHSS8H	NUT, SHEAR, M8 S/STEEL	4
4	FWSS8H	WASHER, FLAT, M8 S/STEEL	16
5	CAPSS825H	M8X25 SET SCREW S/STEEL	16
6	MHL-002-0003-01-01	SIDE PANEL, RHINODE 600	4
7	MHL-002-0005-01-01	BASE PLATE, RHINODE 600	1
8	MHL-002-0008-01-01	CLIP, RHINODE 600	12
9	MHL-002-0007-01-01	SERVICE HOLE PLUG	8
10	NUT, WINGED M8	NUT, WINGED M8	8
11	CON-003-0059-02-01	INNER FIXED FRAME	1
12	CON-003-0056-02-01	TOP FRAME ASM	1
13	CON-003-0064-02-01	IP68 ENCLOSURE ASSEMBLY	1
14	629-0120	TUBE PLUGS (RS COMPONENT P/N: 629-0120)	4
15	STCPSS4819H	POZI DRIVE 4.8 X 19 S/STEEL	4

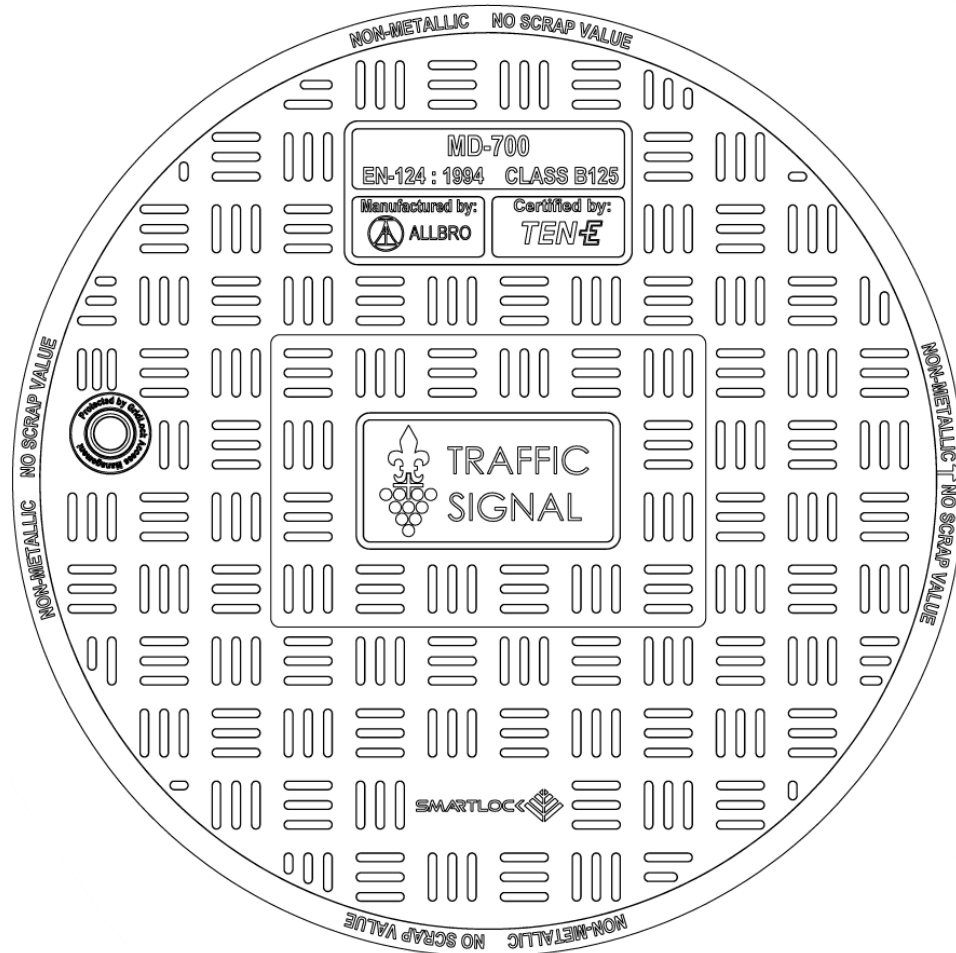
SMARTLOCK CHAMBER FOR UPS SYSTEMS (RHINODE 1000, IP68)



SMARTLOCK CHAMBER FOR TRAFFIC CONTROLLER (RHINODE 1000, IP68)

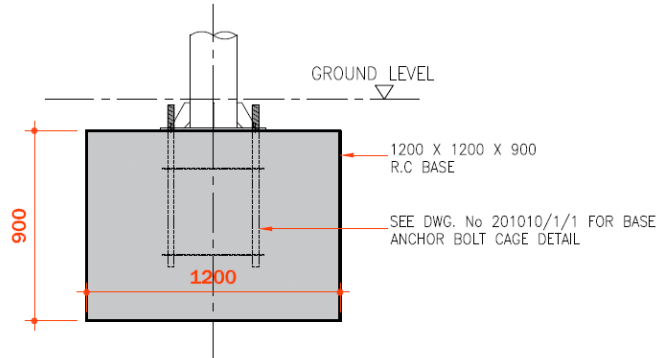


SMARTLOCK CHAMBER COMPOSITE RETROFIT COVER DESIGN

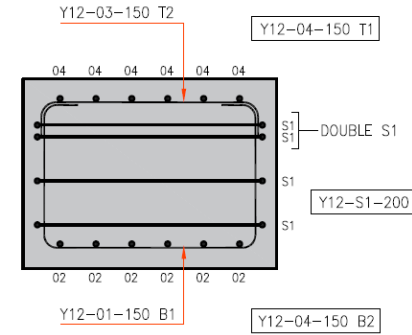


RHINODE 1000

OVERHEAD R/C BASE DETAILS

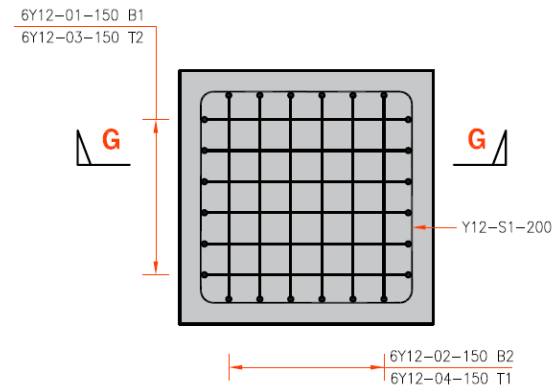


1 : 2 0 ELEVATION SHOWING R.C. BASE CONSTRUCTION



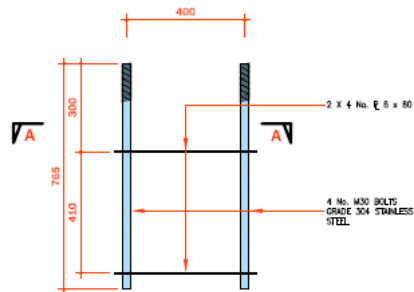
1 : 2 0 SECTION G-G SHOWING BASE REINF.

BENDING SCHEDULE													
Member	No. Off	Bars to Each	Diam.	Length	Total Bars	Mark	SC	A	B	C	D	E	REV
TRAFFIC SIGNAL POLE R.C. BASE REINF.	1	6	Y12	2800	6	01	55	150	735	1025	735		
		6	Y12	2800	6	02	55	150	735	1025	735		
		6	Y12	1350	6	03	38	150	1025				
		6	Y12	1350	6	04	38	150	1025				
		6	Y12	2800	6	S1	60	1050	1050				
DIAM.	R8	R10	Y10	Y12	Y16	Y20	Y25	Y32					
MASS	0	0	0	60	0	0	0	0					
TOTAL												60	

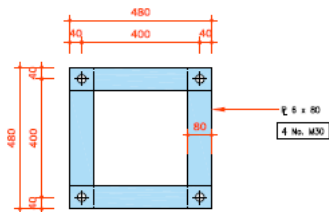


1 : 2 0 PLAN SHOWING BASE REINF.

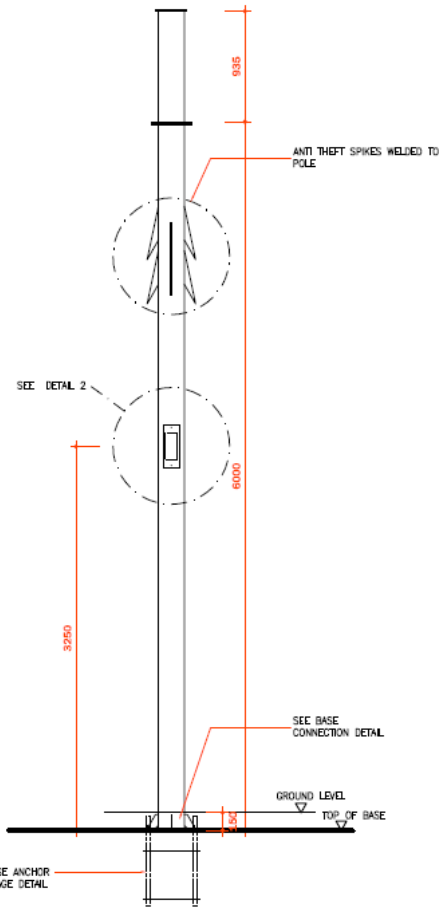
GALVANIZED POLE FOR SOLAR INSTALLATION



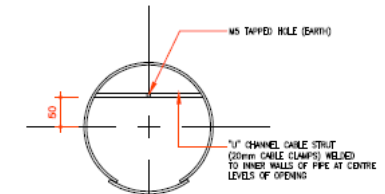
1:10 BASE ANCHOR BOLT CAGE DETAIL



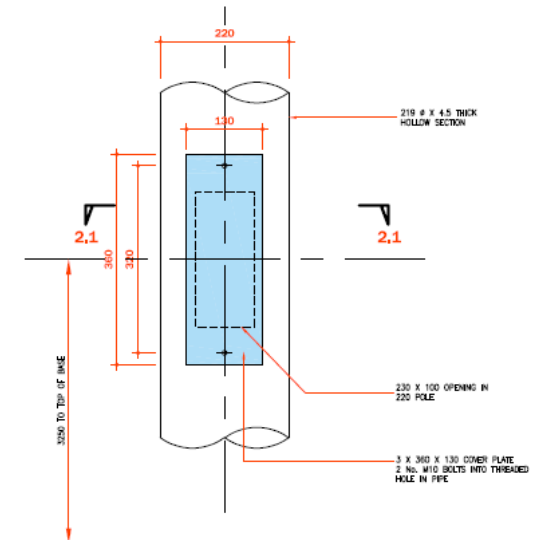
1:10 SECTION A - A



1:25 ELEVATION OF SOLAR TRAFFIC POLE

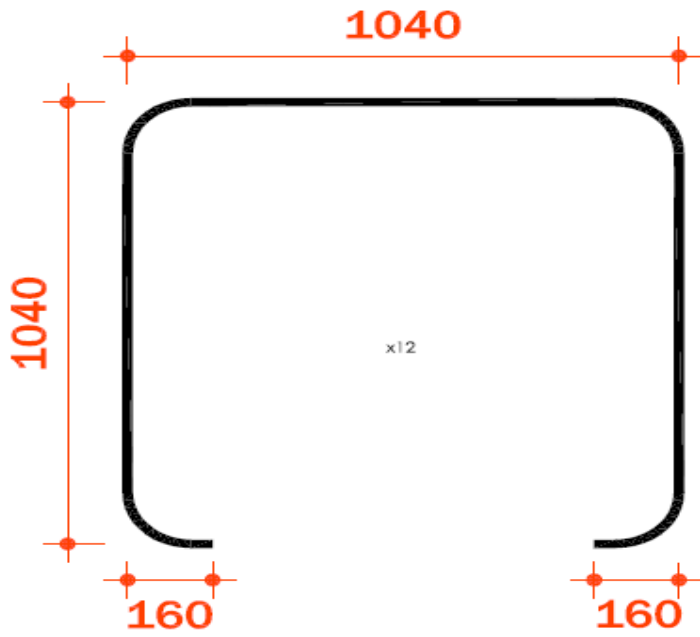


1:5 SECTION 2.1 - 2.1

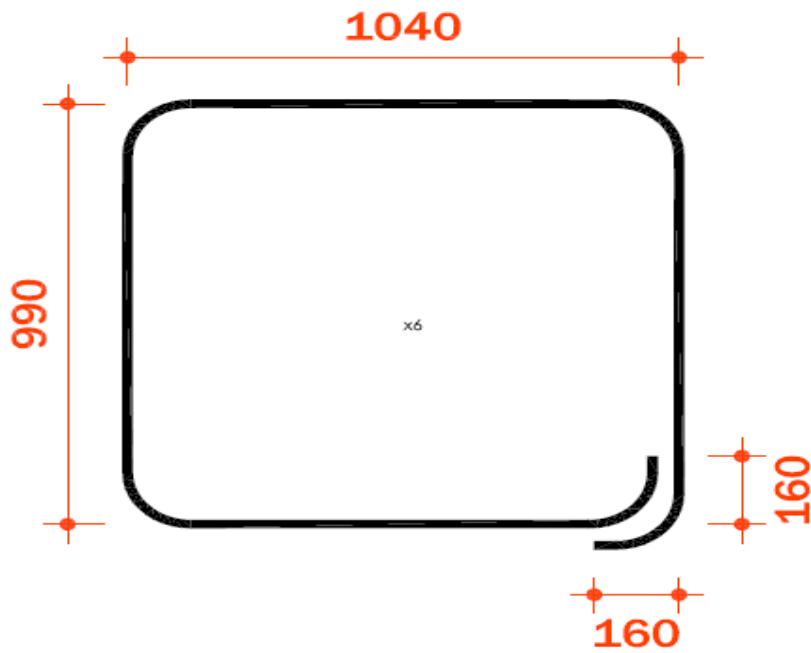


1:5 DETAIL 2

REINFORCEMENT STEEL IN CONCRETE FOR OVERHEADS



This is for one hole:
For overhead.



CONSTRUCTION WORK SPECIFICATIONS

PART A: STANDARD SPECIFICATIONS

Although not bound in or issued with this document, relevant SANS Standardised Specification for Civil Engineering Construction (SANS) 1200 and South African Road Traffic Signs Manual - Volume 3: Traffic Signal Design, as detailed in the Bill of Quantities / Schedule of rates, shall apply

SCOPE OF SPECIFICATION	
GENERAL NOTES	
Ref 1	<p>Work shall be in accordance with the following standards where applicable:</p> <ul style="list-style-type: none"> • Traffic control devices shall comply in all respects with the requirements of the National Road Traffic Act 1996 (Act No. 93 of 1996) and the National Road Traffic Regulations 2000, promulgated in terms of the Act. • For all forms of traffic control devices reference should be made to latest edition of the South Africa Development Community Road Traffic Signs Manuals (SADC-RTSM). Volume 1: Uniform Traffic Control Devices (SADC-RTSM) detailing signing policies and design principles together with specific information on the meaning and application of all traffic control devices. Volume 2: Traffic Control Device Applications (SARTSM). This volume covers the use of sets of signs, markings and signals for specific applications. Volume 3: Traffic Signal Design (SARTSM). Detailing in depth, requirements for the selection and installation of traffic signals and their methods of control. Volume 4: Traffic Signs Design (SADC-RTSM). Dimensional details for all road traffic signs and sign face components.
	<p>There are three (3) main categories of work for this tender:</p> <ul style="list-style-type: none"> • Supply and Installation of Traffic Signals (Section 1 of BOQ) • New construction: The installation of new traffic signals where none has existed before • Re-cables and Upgrades: The refurbishment of and alteration or additions to existing traffic signal installation • Vehicle detection devices such as Inductive loops, Traficams and/or Magnetometers: The installation of vehicle detection devices at new sites or the testing and repair of detection devices at existing traffic signal installations. • Telecommunication system such as 4G/5G modem wireless connection, Radio link via router connection and/or future fibre connection. The installation of telecommunication systems at new sites or the testing and repair of detection devices at existing traffic signal installations. • Repair and Maintenance of Traffic Signal infrastructure that was damage due to vehicle accidents and/or malicious damage. • Repairs to ITS equipment (Section 2 of BOQ) • General repairs to ITS equipment on and off site such as control cards, MX controller mother boards, various spares, configuration tools and equipment • Installation only of Traffic Signals Equipment (Section 3 of BOQ) • New construction: The installation of new traffic signals where none has existed before • Re-cables and Upgrades: The refurbishment of and alteration or additions to existing traffic signal installation • Vehicle detection devices such as Inductive loops, Traficams and/or Magnetometers: The installation of vehicle detection devices at new sites or the testing and repair of detection devices at existing traffic signal installations. • Telecommunication system such as 4G/5G modem wireless connection, Radio link via router connection and/or future fibre connection. The installation of telecommunication systems at new sites or the testing and repair of detection devices at existing traffic signal installations.

Specifications

	<ul style="list-style-type: none"> • Repair and Maintenance of Traffic Signal infrastructure that was damage due to vehicle accidents and/or malicious damage. • Local labour provided from the local community, must be utilised for all unskilled Labour requirements • A database of unskilled labourers will be made available to all contractors on the panel • Contractors are to utilise unskilled labour for work package that have unskilled labour components such as trenching.
1.1	Tenderers must submit a certificate of accreditation from respective vendors and suppliers for items involving Movac and/or MX Traffic Controllers, detection equipment (Traficams and/or Magnetometers), UPS equipment upon commencement of this contract.
1.2	The standard traffic controller set by Stellenbosch Municipality is the Syntell MX traffic controller. The standard pedestrian controller set by Stellenbosch Municipality is the MX traffic controller. Traffic Signal network <u>currently</u> consist of 48 sites of 38x signalised intersections and 10x signalised ped crossing
1.3	Occupational Health and Safety Act, 1983.
1.4	SABS 0198 – The selection, handling and installation of electric cables.
1.5	South African National Standard specifications SANS 1507: Electric Cables with extruded solid dielectric insulation for fixed installation (SANS 1507);
1.6	SANS 1547: Standards for Traffic Signal Controllers, latest
1.7	South African National Standard specifications SANS 1459: Traffic lights (SANS 1459);
1.8	SANS 10142: Standards for electrical connection, latest
1.9	SANS 10199: Standards for earthing, latest
1.10	SANS 10313: Standards for surge and lightning protection, latest
1.11	SABS 1200 – Standardized specification for civil engineering construction.
1.12	SARTSM Manual – Volume 3 Traffic Signal Design
1.13	A certificate of compliance must be issued after any electrical work.
1.14	All work must be done such that the equipment is rendered fully functional on completion.
1.15	All work to be checked and correct operation verified before leaving site.
1.16	Completion of work to be reported to Project Manager or his duly authorized representative.
1.17	Contractors will be responsible for all faults during the construction period from fuses onwards. Faults verified by the Project Manager as not being in the scope of work of the project, will be paid for at tendered call out rates. Controller faults on newly supplied controllers will be for the contractors account.
1.18	The first call will go to the municipality's faults man. Fault will be verified by the municipality and passed on, via the Project Manager, to the contractor responsible for the site if needed.
1.19	All construction jobs must be completed within the agreed timeframe between the project manager and contractor.
Ref 2	AVAILABILITY OF MATERIAL
2.1	All material will be supplied by the Contractor including for 1) the cutting of loops. The contractor must supply all material, plant and tools. 2) The contractor must also supply all sand, stone and cement for the installation of poles, cantilever bolt group foundations and plinths. 3) Contractor must supply all materials for painting of street furniture.
2.2	The Contractor will be responsible for the security of all uninstalled material from the time of collection and will be liable for any los howsoever arising.
2.3	The Contractor will be responsible for returning all unused material to the area depot or the Main Stores and the Contractor will be required to obtain a signature for the receipt of the material by the

	Stores personnel. The cost of all unused material not returned to the Stores will be deducted from payment to be made to the Contractor.
Ref 3	ACCOMMODATION OF PEDESTRIAN TRAFFIC
3.1	Open trenches shall be barricaded on both sides at all times by using orange meshed barrier screen up to a height of 1200mm above ground.
3.2	The contractor shall be responsible for the safety of the public and liable for any accident or injury to any member of the public as a direct result of on-going contract work.
Ref 4	ALLOCATION OF WORK
4.1	No work shall be undertaken without prior approval on the Directorate's Representative.
4.2	Successful tenderers will be required, if requested, to prepare and submit a construction program for the approval for each project. Failure to adhere to such a program may lead to other contractors being appointed to achieve the agreed deadlines. Resultant cost increases may be recovered from outstanding payments due to the original contractor.
4.3	For each particular job, the contractor scoring the highest adjudication points calculated for that job, will be given first option to do work. If this contractor cannot start with a reasonable workforce within two working days of the notification, the work may be offered to another contractor.
Ref 5	SITE SECURITY FOR MATERIALS
5.1	The Contractor will be responsible for the security of all uninstalled material (and any equipment being used by him on site, which belongs to this Directorate) from the time of collection and will be liable for any loss howsoever arising.
5.2	The Contractor will be responsible for the security of exposed services existing on site and will be liable for the cost of replacing and repairing any such services that may be lost or damaged on his work site.
5.3	The Contractor shall employ reliable security guards at short notice as deemed necessary to ensure that he can comply with the abovementioned requirements. A fixed daily rate for security services shall be quoted on the Form of Tender for the purpose.
Ref 6	TOOLS AND EQUIPMENT
6.1	All tools and equipment must be supplied and transported to site by the Contractor.
6.2	The Contractor is required to provide a list detailing tools and equipment which will be used during the contract period.
Ref 7	WORKMANSHIP AND BEHAVIOR
7.1	The quality of work must be of the highest standard, and shall be guaranteed for a minimum period of 12 months.
7.2	Employees of the Contractor are required to be courteous and professional on site, and are to be dressed neatly in a uniform manner that would reflect professionalism.
7.3	Any potential inconvenience to any member of public e.g. drive-way crossings must be discussed with the member of public in question before the commencement of work.
Ref 8	CONTRACTABILITY OF SITE SUPERVISION
8.1	Site supervisors must be provided with cell phones to facilitate easy communication with members of the Directorate. The Directorate must be provided with a list of all phone numbers on commencement of the contract.
Ref 9	SUBMISSION OF INVOICES
9.1	The Contractor will be required to submit invoices and prescribed checklists on completion of the work for which he will be held responsible. Attention is drawn to the payment conditions laid down by the Municipality.
Ref 10	ADDITIONAL WORK
10.1	On occasion the Contractor may be required to undertake work outside the scope of this tender. In these instances the Contractor must be prepared to undertake the work at the rate quoted, and additional costs will be by mutual agreement.

ITEM	SPECIFICATION
1	EXCAVATIONS, EARTHWORKS
	<p>The Tenderer/Contractor must ensure that ALL requirements of all way leaves are adhered to before any earthworks are commenced. Even when work is being funded by the Stellenbosch Municipality, wayleaves from Electricity department, Roads and Stormwater, Water and Sewer, Neotel, DFA, Eskom, Telkom and all other Optic Fibre Owners (like Stellenbosch Municipality, CWDM and Higher Learning institutions must be obtained by the Contractor.</p> <p>When work is being performed through a consultant or by others outside of the municipal area, way leaves will have to be supplied by that other party. The contractor is responsible for the respective permits acquisition.</p> <p>Prior to commencement of the work the successful Tenderer shall ensure that permission for the proposed work is obtained from:</p> <ul style="list-style-type: none"> - The owner(s) of the land (private, municipal or government). - The owner(s) of services existing on the property (water, sewer, roadway, Telkom, etc.) - All parties affected by the construction work. <p>All condition and requirements specified by the local authority and the owners of affected properties and services shall be strictly complied with.</p>
1.1	TRENCH EXCAVATION 500MM WIDE BY 700MM
	<ul style="list-style-type: none"> • Local labour provided from the local community, must be utilised for all unskilled Labour requirements • A database of unskilled labourers will be made available to all contractors on the panel • Contractors are to utilise unskilled labour for work package that have unskilled labour components such as trenching. <p>In pricing for trench excavations, the following must be taken into consideration:</p> <p>Trenching must be professionally and neatly carried out and shall be 500mm wide and 700mm deep. Or as indicated by the Project Manager. The trench shall be positioned between the even boundaries and the kerb lines as will be specified by the project manager before construction commences. The trench must then be backfilled and thoroughly compacted in 150 mm layers with the original material. All cables under roadways and paved surfaces must be laid in 110 mm PVC/HDPE ducts to facilitate maintenance.</p> <p>Roads and driveways are to be thrust-bored unless specified otherwise by the project manager. Where thrust-boring is not possible or viable, the surface cut of roads and footways shall be neatly made and shall be wide enough to allow trenching without undermining or subsiding of the tar edge to facilitate adequate joining of bitumen reinstated surfaces.</p> <p>Where grass sods or plants are removed, they shall be neatly packed adjacent to the trench. The Contractor shall keep the grass sods or plants damp after removal by watering or otherwise to ensure that they remain alive. The contractor must ensure that all vegetation is replanted after the trench is properly backfilled and compacted. The contractor will have to make good at his own cost, any vegetation damaged during the excavation and not restored to its original condition.</p> <p>Brick paving shall be neatly removed and stacked adjacent to the area excavated at a location that is acceptable to the user of such brick paved surface. Any breakage of bricks will be the responsibility of contractor. The contractor will be responsible for reinstallation of the removed bricks to the satisfaction of the user. The same method of operation shall apply for paving slabs. The cost of re-instatement is measured separately.</p> <p>When trenching through kerbs, channels, edgings or any other edge unit, these shall be carefully removed up to the nearest whole unit and replaced. If the existing units are damaged, they shall be replaced with similar approved new units.</p> <p>All excavated trenches shall be in a straight line, where possible, and marked out by using a line.</p>

	<p>While excavating, the contractor shall remove tar pieces, stones and sharp objects from the unearthed soil and arrange for removal of such material from site on a daily basis. No stones, tar pieces or sharp objects may be put back in the trench.</p> <p>The bottom of the cable trench shall be even and free of stones and sharp objects before installation of cables.</p> <p>No excavated trenches or holes shall be left open for longer than 3 days or over a weekend.</p> <p>The contractor may not dump or store excavated material against boundary walls or on landscaped gardens before consulting owners of the properties. Restoration of defaced property will be the responsibility of the contractor. Where excavated material is placed on road surfaces care should be taken not to block the stormwater drains or open channels.</p> <p>Particular care must be taken to ensure that effective barriers are erected around all trenches and excavations to ensure the safety of the general public. In this regard the contractor is required to install an orange meshed barrier screen up to at least 1.2meter in height along the entire length of the trench or excavation. The barrier is to be secured in such a way that it will not be disturbed by adverse weather conditions. Where the general public requires access across the excavation, suitable, safe crossings must be provided</p> <p>Any liability arising out of the activities of the contractor shall be his responsibility. This includes the safety of the public while the trenches are open.</p> <p>The contractor will be required to consult with owners of properties who will be burdened by the activities of the contractor eg. Driveways, well maintained verges or gardens.</p> <p>Contractor is responsible for removal and dumping of rubble from work site to dedicated dumping sites.</p> <p>Where sleeves are not available, trenching across existing roadways or excavations for crossings of existing streets will be required for the installation of sleeves. This include excavations of a 400-600mm wide trench to a depth of 600mm-800mm, stock piling of re-usable material, if any and the removal of spoil material, laying of sleeves, backfilling and compaction of material. Compaction of a mixture of approved crusher dust and cement must be done in layers and must past a DCP test.</p> <p>At no time must trenches be left unprotected. Orange netting must be used; danger tape is not allowed.</p>
1.1	SOFT (NORMAL) MATERIAL EXCAVATION:
	Material that can be loosened and removed using pick and shovel (such as grass covered sand, soft clay, dry earth, small stones in sand which can be removed by hand, or thin layers of "koffieklip").
1.2	INTERMEDIATE MATERIAL EXCAVATION:
	Material that is difficult to loosen and remove using pick and shovel (such as large layers of "koffieklip", hard dry clay, ground containing boulders and layers of tar or where progress is slow and other services are affected. The cost of any mechanical plant used to assist in loosening the material is to be included in the given rate.
1.3	HARD MATERIAL EXCAVATION:
	A solid mass of material, 1m or longer, which can only be broken using a paving breaker or jackhammer and where progress is very slow. Excavation in this material to be measured as difficult with the cost of the plant included in costing (under the extra plant and equipment items on the schedule)
	The Directorate's Representative must authorise any hard and intermediate excavation before it is done.
1.4 to 1.6	INSTALLATION OF DUCTS (Road Crossing And Thrust Boring Or Directional Drilling)

	<p><u>Road Crossing</u> Road crossing will be measured in meters and tender rates shall include supply of different sleeves types and bedding sand. (Reinstatement to be measured and priced separately. Item 1.5.5) Trench specifications will be 500mm wide by 700mm deep unless specified otherwise by the project manager.</p> <p>Number of sleeves to be laid in trench will be 3x 110mm diameter PVC/HDPE pipe unless specified otherwise by the project manager.</p> <p>Contractor must supply a proposed traffic accommodation plan to be approved by the relevant local authority representative for approval before commencement of work.</p> <p>Contractor must ensure all wayleave permits have been obtained before commencement of work.</p> <p>The surface cut of tarred roads shall be made using a circular saw cutting machine and be wide enough to allow trenching without undermining or subsiding of the neatly made bitumen tar edge.</p> <p>Ducts shall be laid on a 100 mm thick bed of suitable cement stabilized material. (1:20 ratio).</p> <p>Sealing caps to be used on all ends to prevent soil from blocking sleeves and draw wire to be installed with 1-meter slack on both sides.</p> <p>A weak sand cement mixture (16:1) shall be made and used to cover the pipes to a height of 250mm; above the orange PVC marker tape shall be installed.</p> <p>The remaining backfill shall consist of the excavated material mixed with cement and be compacted in layers of 150 mm. Special care must be taken in compacting the backfill layers.</p> <p>After backfill and compaction and prior to the road crossing being subjected to vehicular traffic, a temporary gravel surface not less than 50mm thick shall be laid down by the Contractor to protect the unsealed road surface.</p> <p>Final reinstatement of the bitumen road surface must be completed atleast one week after compaction of gravel and to the specification of the relevant roads authority. (Reinstatement to be measured separately)</p> <p>The Contractor will be responsible for maintenance of the road surface and liable for repair work required as a direct result of his road excavation for up to 1 year after completion of the work.</p> <p><u>Thrust Boring or Directional Drilling</u> Drilling will be measured in meters and tender rates shall include supply of different sleeves types.</p> <p>Sleeves must be drilled between 500mm and 1000mm.</p> <p>Sleeves must be installed at least 2m beyond the edge of the road into the walkway with a marker to indicate sleeves positions.</p> <p>Contractor must ensure all wayleave permits have been obtained before commencement of work.</p> <p>Number of sleeves to be laid in trench will be 3x 110mm diameter PVC/HDPE pipe unless specified otherwise by the project manager.</p> <p><u>Import Material</u> – Only for use where import is required and pre- approved by Project Manager. Supply and deliver to site – Import and placing of material. NOTE ON BACKFILLING (Compacted) – acceptable material to be backfilled in layers no thicker than 150mm and then compacted. Final surface reinstatement measured separately</p>
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1.7	PLINTHS AND REINSTATEMENTS
	PLINTHS
	<p>The price tendered must be per each complete plinth and should include supply of cement and sand where necessary.</p> <p>The plinth must be a concrete slab of which the size will be determined on site by the Project Leader.</p> <p>The slab must be 50 mm thick and the ratio of stone, sand and cement must be 4 to 4 to 1.</p> <p>The slab must be level and smooth, but NOT slippery, and must taper outwards to enable water running off.</p> <p>Where a controller and a stubby or controller + stubby+ UPS cabinet are next to each other, the plinths should all be neatly merged together.</p> <p>On completion there shall be no gaps between the plinth and controller.</p> <p>The price tendered must be per each complete plinth.</p>
	REINSTATEMENT OF ROAD SURFACES AND SIDEWALK
	<p>Tender rates should include the supply of all materials and labour.</p> <p>Reinstatement will be measured in m² as will be measured and calculated by the project manager onsite.</p> <p>Reinstatement of sidewalks after backfilling of trenches shall be measured separately at tendered rates. Reinstatement must be of the same thickness and quality of surrounding surfaces. (brick, cement or premix)</p>
1.8	SUPPLY, INSTALLATION AND REMOVAL OF KERB STONES AND PAVING
	<p>Tender rates shall include the supply of kerb stones for installation of kerb stones. Tender rates shall include the supply of bubble blocks where installation requires to drop existing kerbs and/or new installations.</p> <p>Kerb installation shall be priced per meter of installation.</p> <p>In addition to the requirement for installation of kerb stones, dipped kerbs should be installed with bubble paving blocks with the following spec;</p> <ol style="list-style-type: none"> 1. Thickness of paving : 65mm 2. Size of paving : 450mm x 450mm 3. Spacing of bubbles: 50mm centre-to-centre. Diameter of bubble at its base is 30mm. <p>Dipped kerbs must be flushed with the road surface - for wheel chair usage.</p> <p>Loop indicator stones, where needed, will be specified by the project manager and shall constitute a marker block on the side of the kerb indicating the position of the loops and sleeves.</p>
2	INSTALLATION OF STREET FURNITURE
	<p>Tender rates for the installation of Street furniture shall include the following: 1) excavation of holes to all type materials at prescribed depths, 2) erection to correct height and ensuring equipment is vertical, 3) backfilling and compaction 4) casting of foundations and stabilization of poles with concrete where necessary 5) the collection from stores and delivery to site, and the return of unused and scrap thereafter.</p> <p>It excludes the following (which is measured separately): 1) cable installations 2) re-instatements 3) painting of street furniture</p>
2.1	INSTALLATION OF CABINETS

	<p>Cabinets here refer to items 2.1.1 to 2.1.32 in the price schedule and shall comply to the following specifications:</p> <p>The project manager will locate and position all cabinets onsite.</p> <p>Street furniture shall be installed neatly and professionally at the required depth, location and manner in accordance with job proposal drawing.</p> <p>The contractor must ensure that the installed cabinets are horizontal and vertically aligned.</p> <p>The contractor will be liable for all costs incurred if the connection pillar or controller has to be moved or turned around after being wrongly installed.</p>
	<p>TYPICAL INSTALLATION OF CONTROLLERS</p>
	<p>Controllers shall conform to the SANS 1547:2013.</p> <p>The standard traffic controller set by Stellenbosch Municipality is the MX Traffic Controller. The standard pedestrian controller set by Stellenbosch Municipality is the MX traffic controller. The contractor is obligated to supply the controllers listed in Clause 4.2 a) and 4.2 c) or the equivalent thereof.</p> <p>The Traffic Controllers configuration tool shall be windows based. The configurations produced shall be stored in a recognised database. Where the contractor supplies a Traffic Controller that the Stellenbosch Municipality does not possess the configuration tool for, the Contractor will then provide the Configuration tool along with the necessary training free of charge. The Traffic Controller shall connect to the Stellenbosch Municipality RMS system and comply with the below mentioned:</p> <p>Real time monitoring</p> <p>Data to be returned by the traffic controller on change or as configured.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Current stage, plan, mode and offset. <input type="checkbox"/> Detector failures <input type="checkbox"/> Controller status (Normal, Flashing, Manual Control, Lamps Off etc.) <input type="checkbox"/> Controller PSU output voltages alarms <input type="checkbox"/> Controller internal Temperature <input type="checkbox"/> Lamp failures <input type="checkbox"/> HHU port access alarm (when controller is accessed via laptop by user) <input type="checkbox"/> Power failure detect (GPRS controllers only) <input type="checkbox"/> Time Deviations alarm on time sync <input type="checkbox"/> Controller software versions <input type="checkbox"/> GSM MODEM firmware version (GPRS controllers only) <input type="checkbox"/> Vehicle Count, Speed and Occupancy information <input type="checkbox"/> Monitoring of Compatible UPS units (Battery / Voltage and UPS Status) Traffic Control Facilities <input type="checkbox"/> Force Plan Change <input type="checkbox"/> Force Mode Change <input type="checkbox"/> Change Offset <input type="checkbox"/> Set the Real Time Clock <input type="checkbox"/> Set the Real Time Clock Day (Mon, Tues, etc) <input type="checkbox"/> Part time Flash enable <input type="checkbox"/> Revert to time table <input type="checkbox"/> Force a common demand to a stage <input type="checkbox"/> Hurry Call to a stage <input type="checkbox"/> Emergency Call to a stage <input type="checkbox"/> Set a Switched sign <input type="checkbox"/> Enable / disable Manual panel <input type="checkbox"/> Declare a Public Holiday <input type="checkbox"/> Set and Get Special condition Variables <input type="checkbox"/> Upload Event and Fault lists for viewing <input type="checkbox"/> GSM/GPRS stats – Data transfer signal strength (GSM controllers only)

In addition, the software is able to send a controller real time clock a synchronizing pulse / message at a scheduled time.

Remote Controller Data Configuration Loading

It should be possible to program the controller from the central computer using the Download Facility.

The Download Facility can be used in one of two ways;

The download of the complete configuration data that will cause the controller to be completely reconfigured. When this facility is used, the controller will change to the Flash Mode until a maintenance technician on site has reset it.

The Download facility can be used to send only that non-critical data which is to be changed. In this instance, the controller will accept the changes while continuing to function normally.

Non Critical Configuration Changes

Fixed Time plan data:

- Change waypoint i.e. Stage durations
- Add Stage to Plan
- Remove Stage from Plan

Vehicle Actuated plan data:

- Change stage min's and max's
- Add Stage to Plan
- Remove Stage from Plan

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Event Time Table data:

- Change event time
- Add a new event
- Delete an event

Special Days:

- Edit existing special days
- Add special day
- Remove Special day

Adding a new Plan is not allowed without a full reset for security and safety reasons. The user is thus advised to add a few "unused" plans which can then be modified as required should the need arise for a plan which needs' are not catered for by any of the existing plans in the configuration.

For example, add:

- Plan 1 = Unpopulated VA Plan
- Plan 2 = Unpopulated Semi VA Plan
- Plan 3 = Unpopulated Fixe Time Plan

These Plans can then be populated as required, and either added to the Event Timetable or run by sending an RMS command to invoke it.

Modes of Operation

Fixed Time, Semi Vehicle Actuated, full Vehicle Actuated, Manual, Operation (optional), part Time Flashing, Hurry Call, Emergency, Vehicle Call, Manual Flash Mode, fault Flash Mode and UTC and SCOOT

Number of available Plans

Configurable up to a minimum 50, based on time of day, day of week, selected week days, public holiday, special days to a resolution of 1 minute

Number of Streams

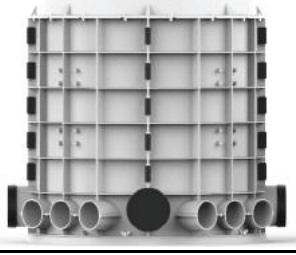
Configurable up to a minimum of 4 Streams available with ability to operate independently

Number of Stages

Configurable up to a minimum of 32 Stages including All Red

	<p>Phases Configurable up to a minimum of 24 phases in either 2, 4, 6 or 8 phase increments</p> <p>Time Graduation - Plans : Cycle time : 0-255 sec resolution 1 sec - Phases : Min Green : 0-255 sec resolution 1 sec - Yellow : 0-25.5 sec resolution 0.1 sec standard - Red : 0-25.5 sec resolution 0.1 sec - Vehicle Detector : Extension Timer : 0-25.5 sec resolution 0.1 sec - Gap Timer : 0-25.5 sec resolution 0.1 sec - Call Delay : 0-25.5 sec resolution - Cancel Delay : 0-25.5 sec resolution 0.1 sec - Emergency Call : 0-255 sec resolution 1 sec - Hurry call : 0-255 sec resolution 1 sec - Manual Time-out : 0-60 minutes resolution 1 min - Start-up Flash : 0-25.5 sec resolution 0.1 sec</p> <p>Safety Monitoring Green/Green conflict: Continuous monitoring on multiple levels, cable and system faults Aspect monitoring: Continuous monitoring of aspect conformance for all colours including lost neutrals Lamp monitoring: Current monitoring <3 W to 750 W Including last Red out faulting System faults: Supply monitoring, module errors, software integrity, and Conflict data integrity. Errors result in fail to flashing.</p> <p>Error and conflict conditions clearly displayed for review.</p> <p>Electrical Nominal Voltage: 230Vac 80% to 115% Voltage withstand: 150Vac to 400Vac Frequency: 50 Hz, range 48 Hz to 52 Hz Interruptions : > 50 ms Transients : 6 kV 1,2/50 microseconde</p> <p>Environnemental Description Test Conditions Specifications Equipment housing IP 55S SANS 60529 MTBF IEC 60050-191 & EC 60300-3-4 Cold -100C, 16 Hrs IEC 60068-2-1 Ab Dry Heat 550C, 16 Hrs IEC 60068-2-2 Bb Bump 1000 Bumps IEC 60068-2-27 Ea Vibration 5 – 33 Hz IEC 60068-2-64 Fc Solar radiation 10 days at 400C IEC 60068-2-5 Sa Salt Fog 1000 hours SANS 7253 Humidity 400C, 95% 24Hrs Protective Coatings SABS 1274</p> <p>Mounting Several cabinet types should be available i.e. pole or Plinth mount Cabinets constructed from Stainless steel or Aluminum powder coated material and IP55s or better rating with secure recessed door with multi point locking</p> <p>GENERAL a) Easy access to be provided to all parts of the controller and ancillary equipment. b) Doors to housings shall each be provided with a clampable door stay to hold the door in the open position during maintenance and repairs.</p>
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	<p>c) Mounted on a high vented base with a minimum cross-sectional dimension the same as the cabinet.</p> <p>d) Be ventilated at the bottom and top to facilitate circulating airflow.</p> <p>e) Include a document holder, capable of holding 4 A4 laminated sheets, securely fixed to the inside of the door.</p> <p>f) A shelf installed across the full width of the cabinet but with 50 mm clearance from the front face.</p> <p>g) Have sufficient mounting rails to secure all field wiring terminations and internal hardware.</p> <p>h) Have all cables entering into the Controller through a gland plate and the base must be vermin proof/sealed.</p> <p>i) Be fitted with a service lamp to illuminate the inside of the cabinet.</p> <p>j) Have sufficient terminal block assemblies to accommodate required outputs</p> <p>k) Controllers must be able to function with only LED aspects fitted as a load.</p> <p>l) Traffic signal controllers must be capable of interfacing with traffic maintenance system.</p> <p>m) The units should also include an accurate real time clock to facilitate cable less linking.</p> <p>CABINET TYPE The cabinet shall be large enough to house the controller type set as above. The cabinet shall be robust and corrosion resistant steel, grade 3CR12.</p> <p>GLAND PLATE Each cabinet is to be supplied with a “stainless steel” gland plate. The gland plate is to be used for the termination of all cables inside the cabinet. The cabinet will be mounted on the gland plate and then the whole assemble will be bolted onto the concrete plinth of the controller chamber using 10 mm X 75 mm “stainless steel” raw bolts with fender washers</p>
	<p>Excavate hole and install controller with plinth at correct depth.</p> <p>Ensure that horizontal and vertical alignment is correct.</p> <p>Install, terminate and connect all cables (including power supply cable and communication cable) and connect as per phase diagram.</p> <p>All cables to be properly identified, permanently labelled and records to be submitted to the Project leader.</p> <p>Insert all modules and links as per configuration documents.</p> <p>Install earth spike as specified.</p> <p>Test the power supply cable and all earthing and issue a certificate of compliance as specified in SANS 10142.</p> <p>Arrange with power supply authority through project manager to terminate and connect the other end of the cable and switch “ON”.</p> <p>Test the installation and ensure that the phasing is correct.</p> <p>Check and verify with installation that the communication is up and running and controller is fully functional.</p> <p>Arrange for the pre-commissioning of the installation with Project Leader.</p> <p>Traffic Coverage must be arranged by the Contractor.</p> <p>SMARTLOCK Chamber Specifications</p>



1.RHI-NODE 1000(GLAM)

PRECAST POLYMER COVERS/CHAMBERS

Supply of Lockable Glass Reinforced Manhole Cover and Frame with Machinal Locking Mechanism (135Kn Load Rating)/650mm Daylight Opening (SMC)

Lid and Frame Construction

- A Sheet Molding Compound Glass Reinforced lockable polymer (Minimum 30% Glass Fiber) cover.
- Load And Impact Strength: Sans 558:2009 Heavy Duty Roadway Applications (13.5 Ton).
- Sans558: EN -124 B125 (125 KN).
- The Lid and Frame to be UV stabilized to ensure no UV degradation takes place
- Latch and lid locator thermoplastic
- Metal Components and fasteners to be fabricated out of 304 stainless steel
- The manufacturing facility and techniques to comply with ISO 9001 quality standards.
- The locking mechanism lid and frame lid and frame must have mechanical locking System complete with tamper proof key.
- Lid surface must be raised and Have A non-slip pattern
- RFID Tag for geolocation purposes
- Supply, Deliver & Commission of access control system.

Chamber Specifications	Rhi-node 1000 Chamber
Features	Secondary Sealed Lid (Re-enterable) 19" Extractable Sliding Equipment Rack
Security & Access	GLAM Lock
Monitoring	Smartsense Environmental Unit
IP Rating	67
Installation Type	Underground
Chamber Material	SMC
Colour	Light Grey



2.RHI-NODE 1000 DUDC(GLAM)

Supply, Delivery and Installation of Dry Underground Distribution Chamber (IP67) with Electronic/Bluetooth Locking Mechanism (135Kn Load Rating) 650mm Daylight Opening - Depth 1000mm

Lid, Frame and Chamber Construction

- A Sheet Molding Compound Glass Reinforced lockable polymer (Minimum 30% Glass Fiber) cover.
- Load And Impact Strength: Sans 558:2009 Heavy Duty Roadway Applications (13.5 Ton).
- Sans 558: EN -124 B125 (125 KN).
- The Lid and Frame to be UV stabilized to ensure no UV degradation takes place
- Latch and lid locator thermoplastic
- Metal Components and fasteners to be fabricated out of 304 stainless steel
- The manufacturing facility and techniques to comply with ISO 9001 quality standards.
- The locking mechanism lid and frame lid and frame must have mechanical locking System complete with tamper proof key.
- Lid surface must be raised and Have A non-slip pattern
- SMC Material (Chamber & Secondary Sealed Lid)
- 19" Extractable Sliding Rack—304 S/Steel
- Front mounting 17" Profile
- Incoming & outgoing connection management
- Multiple 110mm Entry Knockouts
- Compression Glands Entry /Exit
- UL 94 Flammability Compliant
- Ip 68 rating
- RFID Tag for geolocation purposes
- Supply, Deliver & Commission of access control system.



3.RHI-NODE 600

PRECAST POLYMER COVERS/CHAMBERS

Supply of Lockable Glass Reinforced Manhole Cover and Frame with Machinal Locking Mechanism (40Kn Load Rating)/350mm Daylight Opening (SMC)

Lid and Frame Construction

- A Sheet Molding Compound Glass Reinforced lockable polymer (Minimum 30% Glass Fiber) cover.
- Load And Impact Strength: Sans 558:2009 Medium Duty Applications (40KN).
- Sans558 MD (40 KN).
- The Lid and Frame to be UV stabilized to ensure no UV degradation takes place
- Latch and lid locator thermoplastic
- Metal Components and fasteners to be fabricated out of 304 stainless steel
- The manufacturing facility and techniques to comply with ISO 9001 quality standards.
- The locking mechanism lid and frame lid and frame must have mechanical locking System complete with tamper proof key.
- Lid surface must be raised and Have A non-slip pattern
- RFID Tag for geolocation purposes
- Supply, Deliver & Commission of access control system.



HD 700 GLAM
PRECAST POLYMER COVERS/CHAMBERS

Supply of Lockable Glass Reinforced Manhole Cover and Frame with Machinal Locking Mechanism (135Kn Load Rating)/650mm Daylight Opening (SMC)

Lid and Frame Construction

- A Sheet Molding Compound Glass Reinforced lockable polymer (Minimum 30% Glass Fiber) cover.
- Load And Impact Strength: Sans 558:2009 Heavy Duty Roadway Applications (13.5 Ton).
- Sans 558: EN -124 B125 (125 KN).
- The Lid and Frame to be UV stabilized to ensure no UV degradation takes place
- Latch and lid locator thermoplastic
- Metal Components and fasteners to be fabricated out of 304 stainless steel
- The manufacturing facility and techniques to comply with ISO 9001 quality standards.
- The locking mechanism lid and frame lid and frame must have mechanical locking System complete with tamper proof key.
- Lid surface must be raised and Have A non-slip pattern
- Top slab to be casted into a concrete top slab to fit existing chambers.
- RFID Tag for geolocation purposes
- Supply, Deliver & Commission of access control system.

Eccentric Key Application

This eccentric key works when friction is created between the key and the locking spindle. The spindle is installed into the manhole cover. The spindle is attached to a spring-loaded locking mechanism on the inside of the manhole.

The spindle has a smooth surface where the key locates, so the spindle cannot be unlocked without the specific key, each spindle has a unique key to unlock it, and no key that is not assigned to the specific spindle will be able to unlock the spindle.

The key has a rotatable pin, which rotates when inserted into the spindle, and the top handle is rotated in a clockwise or anticlockwise direction, depending on the requirement and the direction the spindle needs to turn to lock or unlock. The rotatable pin will rotate until it “locks” into the spindle. The key and the spindle rotate together, turning the spring-loaded locking mechanism to lock or unlock.



Spindle installed in manhole



Spindle

Key

The GLAM (Gridlock Access Management) system is a centralised access management application authorising access requests to remote locations, which have been equipped with electronic locking devices.

With the addition of IoT monitoring devices, infrastructure is now monitored continuously for any state changes. Having all information centralized, allows for effective alarm filtering and analysis

FEATURES & BENEFITS

- SMC Material (Chamber & Secondary Sealed Lid)
- 19" Extractable Sliding Rack—304 S/Steel
- Front mounting 19" Profile
- Incoming & Outgoing Fibre Management
- Multiple 110mm Entry Knock-outs
- Compression Glands Fibre Entry /Exit
- Inland and Coastal application
- UL 94 Flammability Compliant
- UV Stabilised

Construction	ABS plastic housing with potted electronics.
Dimensions	80mm x 80mm x 60mm.
Environmental	Tested to IEC 60068-2 and IEC 60529 Operating temperature: -10°C to 55°C Ingress protection: IP67 Drop and Impact: 1m and 20.0 Joule.
Power Source	None, powered via inductive circuit from Smartkey.

The GLAM Lock is an encapsulated electronic deadlock. It requires no power connection or communication infrastructure to operate. This device is water, dust and grit proof, contains no active energy source and is certified to IP67. It is housed in ABS plastic which makes it maintenance free and provides high physical strength. This device is also resistant to a wide range of chemicals.

The GLAM Lock uses proven technology and large numbers have been installed in the harshest and remote environments with high reliability. The GLAM Lock is energised by a Smartkey, through induction, whilst communication is wireless. The GLAM Lock can be customised for a wide variety of access management applications.



The Smartkey BLE uses Android® and iOS® smart handsets to operate Smartlock’s electronic locks and seals. The Smartkey BLE energises these locks with its internal power source.

The Smartkey BLE also manages all communication with the lock to authenticate the user and operate the system. The user interface is provided through proprietary software installed on a mobile phone. Data communication to the software is provided by pairing the mobile phone to the Smartkey BLE via a Bluetooth® interface. Access requests are pre-authorized and downloaded to users.

The Smartkey BLE captures all events in a log file and updates the management software of all activity and statuses via the mobile phone. As a hardware protection feature, the Smartkey BLE can be disabled from the central platform, should the need arise. In addition, users can be GPS located by the solution.

Construction	ABS plastic with stainless steel antenna housing.
Dimensions	60mm x 26mm x 113mm (various antenna lengths available)
Communication	Bluetooth modem – Mobile communication via phone
Power source	2000mAh lithium ion battery
Mobile operating system	Android and iOS



TYPICAL INSTALLATION – CONNECTION PILLAR 2.1.21 – 2.1.25

Excavate hole and install base of connection pillar at a depth of at least 200mm. Secure power cables (37 –core, 19 core etc. and earth wire (minimum 10mm) to rail in connection pillar using K-clamps.
 Secure loop /demand cables (8-pair I/O screened APL cable or equivalent and up to 5x 2-core cables) to the connection pillar rail using K-clamps.
 Terminate and connect all cables to cables to connector strips in numbering order and ensure sound earth continuity.

	<p>Terminate cores of traffic signal cables onto connector strips and onto correct cores for traffic signals.</p> <p>Terminate pairs of Mylar screen cables onto connector strips and onto correct loop/demand cables.</p> <p>All cables to be permanently labelled and cores marked.</p> <p>Close connection pillar and secure rod using the locks supplied.</p> <p>Positioning of connection pillars to be determined on site in conjunction with the project leader.</p>
<p>2.2</p>	<p>INSTALLATION OF POLES AND POLE TOPS</p>
	<p>Poles are to be installed neatly and professionally at the location and in the manner as indicated on the drawing or by the Directorate's Representative (price includes backfilling) Separate excavation rates will apply.</p> <p>Backfill and compact the soil around the pole properly (stabilize soil with G5 natural gravel approved by council).</p> <p>Vertical alignment of the pole to be done properly by using a spirit level.</p> <p>Level off the area around the pole and remove all rubble.</p> <p>Terminate cores onto connector strip in numbering order as well as the earthing.</p> <p>Secure cradle to pole mechanically and secure cap to cradle using a wing nut.</p> <p>Allow for at least 1 m cable slack at the pole base for future use.</p> <p>Secure pole with concrete block (about 20 liters).</p> <p><u>STANDARD POLES</u></p> <p>A 4 meter poles must be planted at a depth of 750mm unless otherwise stipulated and top of the pole to be at least 3.25m above ground level.</p> <p>A 5 and 6 meter poles must be planted at 1000mm deep unless otherwise stipulated and the top of the pole to be at least 4m and 5m respectively above ground level.</p> <p><u>REMOVABLE OF POLES</u></p> <p>Removal poles shall be installed as specified in approved drawing. The removable pole adaptor will be installed separately in cast concrete foundation of 30 to 40 liters of Class 30/19 mass concrete base with a connecting sleeve of 110mm in the entry hole. Rates should include the concrete foundation.</p> <p>The removable pole will be installed with its bolts sticking out of the pavement for ease removal without damaging to the sidewalk surface.</p> <p><u>CANTILEVER POLES Refer to drawing OHP-1 to OHP-5</u> Tender rates to include supply of reinforced steel cage and concrete mix. It excludes supply of cherry picker which is measured separately.</p> <p>Cantilever poles should be installed in such a manner that the hatch cover must be easily accessible and facing the sidewalk.</p> <p>The bolt group of the cantilever pole should be installed in such a manner as indicated on the drawings with a steel cage to stabilize the pole foundation.</p> <p>Bolt group to be inserted level and in the centre of the foundation base.</p> <p>Top of bolt group to be 50mm under pavement surface.</p>

	<p>Hole for the cantilever pole base shall be 1200mm x 1200mm x 1200mm.</p> <p>Cast foundation base and bolt group and insert a 110mm duct with a slow bend for the cable entry.</p> <p>Allow concrete to cure to at least 5 days and 26 MPa before erecting the pole.</p> <p><u>8m Pole</u> An 8m pole to be installed at a depth of 1200mm and secured with concrete mix of about 40 liters.</p> <p><u>Pole Tops</u> Pole tops installation shall include the termination of cores (usually 19 core cable) to a connector block.</p> <p><u>Fluorescent Tape:</u> must be 3M, Class 4 Diamond Grade Fluorescent yellow (FY) with a minimum width of 122mm x 3 lines.</p> <p>This item includes the cost of the material, transport and labour (and any related costs) applicable to the installation, repair and maintenance of the above item.</p> <p>Retro-reflective strips must be provided on traffic signal posts to increase the conspicuity of the posts at night, particularly when there is a loss in the electricity supply.</p> <p>Three horizontal yellow retro reflective strips to be fitted on ALL yellow signal posts. The width of the strips may be between 120 and 150 mm.</p> <p>The width of the openings should be about the same as that of the strips. The bottom strip should not be installed lower than 1.2 m and the top strip not higher than 2.1 m above the ground level.</p>
3	<p>INSTALLATION (HANGING AND MOUNTING) OF STREET FURNITURE</p>
	<p>The tender rates for installation of Lanterns shall include: 1) collection of lanterns from stores or depot 2) assembling of lantern 3) erection to correct height and ensuring equipment is vertically and horizontally aligned, 4) cable terminations to pole tops and cable entry boxes, 5) neat strapping of lanterns hoses with cable ties, 6) installation of brackets</p>
	<p>Lanterns and other equipment must be mounted according to SARTSM specs. No lights must be visible between the lantern and backing screen.</p>
	<p><u>Three aspect traffic signal lantern. Refer to drawing TSA_1</u></p> <ul style="list-style-type: none"> a) The signal head must be manufactured from TSA nylon and be matt black in colour. b) Each signal face shall contain three optical systems arranged vertically. c) Lanterns must be corrosion resistant and all parts must be stainless steel grade A4. d) The optical system shall be rainproof, dust-proof and manufactured from materials that are neither corrodible nor brittle. It shall be of such form as to resist deterioration due to the effects of sunlight and sea air. The diameter of the optical system is to be 210mm and must make allowance for a 210mm “LED” module. e) A hinged “door” opening from the front of the head assembly must be provided for maintenance and repair of the LED module/wiring. To prevent theft of the LED module, the opening of this door must require a special tool and a simple clip system will not be accepted. The hinged “door” opening must also not be removable without the use of a special tool and/or the removal of the backing board first. The led module may be installed inside the hinged “door” opening or inside the head assemble. f) All the necessary brackets for mounting the heads on the traffic signal pole must be supplied. All screws and fixings shall be non-corrodible. The pole diameter is 115mm. g) The signal head, fixing brackets and the necessary parts thereof shall be so designed that, when installed, the signals shall be capable of adjusting horizontally. The brackets will operate with clamps held together with a nut and bolt arrangement and crimping of straps will not be allowed. The signal head assembly shall be capable of being locked securely after adjustment. h) A suitable polythene visor shall be provided on each signal aspect. The visor shall have a length of at least 160mm at the top and have a matt black finish at the top and bottom. i) No visible light is allowed to pass anywhere between the lantern and background screen interface.

	<p><u>Five aspect traffic signal lantern.</u> Refer to drawing TSA_1 In addition to requirements detailed in clauses a) to i) above, the five-aspect signal heads must have the following features:</p> <p>a) Two aspect subsidiary signal heads capable of attachment to either side of the three aspect signal heads.</p> <p>b) All the brackets necessary for the attachment of the three-aspect head and two-aspect head to make up the five aspect head must be provided.</p> <p><u>Two aspect pedestrian signal head.</u> Refer to drawing TSA_2 Each signal face shall contain two optical systems arranged vertically and meet the requirements detailed in above section, Clauses a) and c) to i).</p> <p>TRAFFIC SIGNAL BACKING BOARDS <u>Three aspect traffic signal head backing board.</u> Refer to drawing TSB_1</p> <ul style="list-style-type: none"> • The backing board shall be manufactured from glass-reinforced plastic or approved UV-resistant plastic. • All backing boards must be standard round type as used by the Stellenbosch Municipality. • The backing board shall extend between 250mm and 270mm from the centre of the optical system. • The backing board shall have a white border to be retro reflective and pigmented, 50mm wide on the front face only. All other parts of the backing board shall be finished matt black. • The backing board shall consist of one single unit and to allow the replacement of broken backing boards on existing intersections, must be installed onto the head from the front. • The back of the backing board should be coated with black flow coat to cover all exposed fibres. • The entire backboard should be free of voids, blisters or cracks. • There shall be no gap through which light can shine between the screen and the signal head. <p><u>Five aspect traffic signal head backing board.</u> Refer to drawing TSB_1 In addition to requirements detailed in the above clause, the five aspect signal heads must have the following features: A separate two-aspect subsidiary backing board.</p> <p>Visors: A suitable black pigmented, polyethylene visors projecting 160mm from the signal face must be used on each aspect. The visor may not obscure the lenses. Visor compliance with SABS 1459.</p> <p>Lenses: Each aspect shall be fitted with a pigmented, high impact, UV stabilized polycarbonate diffuser-lenses. The lenses moulding shall be of high quality and pigmentation must not fade or discolour over extended periods.</p> <ul style="list-style-type: none"> • The lenses/reflector combination shall display an evenly distributed light at the specified wavelengths distributed to the full 200 mm disc and must be free from excessive bright or dark spots over the whole of the lens. • The light emission shall comply with SANS 1459:2004 (normal intensity vehicular acceptable) • The outside diameter of the lens shall be 209 mm and shall be suitable for use with high intensity halogen signals or normal intensity incandescent signals as currently used by the Stellenbosch Municipality. <p>Bezel: A bezel consists of the following parts, a lamp compartment door/gate, a visor, a lens or LED module, an anodized aluminium reflector (incandescent & halogen only) screws and split pins.</p> <p>These item includes the cost of the material, transport and labour (and any related costs) applicable to the installation, repair and maintenance of the above item.</p>
	<p>Lanterns shall conform to the SANS 1459:2015.</p>

	<p>The signal lamp power supply shall be a single continuous ring-feeder comprising one 37-core cable.</p> <table border="0"> <tr> <td style="padding-right: 20px;">Conductor:</td> <td>Multi-strand Copper Wire.</td> </tr> <tr> <td>Armour</td> <td>Galvanised Steel</td> </tr> <tr> <td>Diameter:</td> <td>1,5mm</td> </tr> <tr> <td>Number of cores:</td> <td>37 core</td> </tr> <tr> <td>Conductor Insulation:</td> <td>PVC Nitrile (flame retardant grade). The insulation material shall withstand a temperature of up to 70°C continuously and be resistant to oils, greases, acids, alkalis and most commercial chemicals.</td> </tr> <tr> <td>Sheath Colour:</td> <td>Black</td> </tr> <tr> <td>Voltage Rating:</td> <td>600 V – 1000 V</td> </tr> </table> <p>Signal lamp circuits from the connection pillars to the distribution terminal at the signal light pole shall be 12 core or 19-core cable depending on the number of signal lamps per pole.</p> <p>Supply various LED clear signal modules for traffic signal heads as follows:</p> <ul style="list-style-type: none"> • 210mm LED “vehicle” clear green traffic signal module. • 210mm LED “vehicle” clear amber traffic signal module. • 210mm LED “vehicle” clear red traffic signal module. • 210mm LED “bus” clear green traffic signal module. • 210mm LED “bus” clear amber traffic signal module. • 210mm LED “bus” clear red traffic signal module. • 210mm LED “vehicle” clear green arrow signal module. • 210mm LED “vehicle” clear amber arrow signal module. • 210mm LED “pedestrian” clear green man signal module. • 210mm LED “pedestrian” clear red man signal module. • 210mm LED Pedestrian 3-Aspect Signal Head with Count Down Timer (CDT) <p>a) LED modules must be of a “single source” design and not a “matrix design (i.e. discreet LED dots must not be visible to the motorists) or also consist of clear lenses.</p> <p>b) LED Modules must have a minimum 5 year replacement or exchange guarantee.</p> <p>Description</p> <p>a) General</p> <ul style="list-style-type: none"> • The LED’S shall be rated for 100,000 hours continuous operation. • The modules shall be rated for a minimum useful life of sixty (60) months. All modules shall meet all parameters of this specification during this period. • The LED module shall be protected against dust and moisture intrusion as per SANS 1459:2015 requirements. • A module of each type shall have SANS 1459:2015 compliance and documents to this effect must be submitted with this tender. <p>b) Labelling</p> <p>Each lamp must be labelled with the following information:</p> <ul style="list-style-type: none"> • Manufacturer Name and/or Logo. <ul style="list-style-type: none"> i) Batch code, serial number, or other marking to identify the month and year of manufacture. ii) Where the manufacturer produces more than one module or version of a particular type of LED traffic light, a catalogue number or other marking to distinguish it from any other model of that particular type. iii) On the LED printed circuit boards or aspects, clear and permanent identification when de-energized as to the colour when illuminated. Acceptable means include labelling or colour coding. iv) The rated voltage rating of the electrical supply on which the LED is designed to operate and the maximum power rating of the LED. v) Identification of supply conductors and connection terminals or leads. vi) Any additional markings necessary for the correct installation of all the parts in the appropriate location and orientation for the LED to meet all applicable performance requirements. vii) Model Name/Number. <p>c) Orientation Marks</p>	Conductor:	Multi-strand Copper Wire.	Armour	Galvanised Steel	Diameter:	1,5mm	Number of cores:	37 core	Conductor Insulation:	PVC Nitrile (flame retardant grade). The insulation material shall withstand a temperature of up to 70°C continuously and be resistant to oils, greases, acids, alkalis and most commercial chemicals.	Sheath Colour:	Black	Voltage Rating:	600 V – 1000 V
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Voltage Rating:	600 V – 1000 V														

	<p>If the lamp is orientation sensitive on installation, the orientation must be clearly marked with either the words "UP" or an arrow.</p> <p>d) Pedestrian 3-Aspect Signal Head with Count Down Timer (CDT)</p> <ul style="list-style-type: none"> (i) The housing shall be of the standard 200mm 3-Aspect type as currently used in Stellenbosch. (ii) The upper aspect is to display the remaining seconds of the GREEN MAN followed by the remaining seconds of the FLASHING RED MAN. (iii) The middle and the lower aspects are to display the RED MAN and the GREEN MAN, respectively. (iv) Once the timings of the FLASHING RED MAN and the GREEN MAN have been learned from the ON periods of the 220v inputs to those signals, the CDT will automatically display the GREEN MAN timing and commence the count down to zero. (v) This will be followed by the display of the FLASHING RED MAN timing and again commence the count down to zero. Should the Pedestrian timing change, the CDT will automatically adapt to the new timings. (vi) The CDT display must be in 1 second decrements and be fully compatible with the installed traffic controllers in Stellenbosch. <p>Electrical</p> <ul style="list-style-type: none"> a) Operating voltage shall be 230V_{AC}, ±20%. b) Modules shall operate from a 50Hz line over a voltage ranging from 184V_{AC} to 276V_{AC}. The fluctuation in this line voltage shall have no visible effect on the luminous of the indications. c) The LED module shall have a power factor of 0, 90 or greater and the power consumption may not exceed 7VA. d) When driven at a supply voltage of less than 140 V_{AC} the luminous intensity from a LED module shall be zero. (Cut - off voltage.) e) Each module shall be able to be dimmed when requested to do so by the controller. The dimming voltage shall be 160 Volts. f) The persistence shall be in the order of 100ms. (Time taken for display to be extinguished after the supply is removed. g) When supply is connected to the module illumination shall be within 100ms. h) Maximum power consumption is not to exceed 10 Watt, measured at the primary supply input terminals and at a 220 V_{AC} primary supply and operating at a 100% duty cycle. i) The LED modules will be required to operate with the MX Controller traffic signal controllers and must have a built in circuit to illuminate "residual voltage "built up" in the cable. j) All LED modules must include active loading as part of the power supply. The purpose of this active load is to clamp unwanted residual voltage on cable cores. k) The active load may not consume power or dissipate heat when the LED module is switched on. A passive resistive clamp is unacceptable. l) The modules must be able to be retro fitted into existing traffic light housings without any modifications. The LED module must also have a pluggable electrical connection (2 way pigtail connector - MOLEX MiniFit™ compatible). m) LED modules shall be of a robust, sealed beam design. All internal circuitry must be protected from dust, moisture and physical damage by a secondary housing manufactured from a heat resistant, high impact polymer. n) The design must be such that if a single LED fails, no more than 2% of the total light output is lost. o) Units must have a minimum of a 5-year replacement/exchange guarantee, physical damage excluded. p) All units must be date stamped with date of manufacture, manufacturer's name and product model, maximum power consumption, input voltage range and a serial number. q) This item include the cost of the material, transport and labour (and any related costs) applicable to the installation, repair and maintenance of the above item.
<p>3.1 to 3.9</p>	<p>TYPICAL INSTALLATION OF LANTERNS</p>
	<p>Assemble lantern and fit backing board using extension brackets, setscrews, washers and PVC Flaps.</p>

	<p>Inverse and use the plate used to attach the individual parts of the lantern head to support backing board.</p> <p>Perform this task on a flat surface to prevent the backing board from warping and then fit the hoods.</p> <p>Fit lantern to pole using lantern brackets kit supplied and install the lamps.</p> <p>Ensure that lantern is secured and aligned properly. (horizontally and vertically)</p> <p>Lanterns to be mounted with the pole in the centre of the backing board unless otherwise agreed on site.</p> <p>Centre of green aspect to be at least 2.3m above the road surface. (not to exceed 3m)</p> <p>Fix lantern hoses to pole top and terminate wires onto the correct cores in the pole cap.</p> <p>Lantern hoses to be routed through bracket slots and secured to pole by means of cable ties.</p> <p>Lenses and backing board to be cleaned on completion and signals to be masked by means of black bags.</p>
<p>3.12</p>	<p>INSTALL PEDESTRIAN ACCESS BUTTONS AND ASSOCIATED DEVICES</p>
	<p>TYPICAL PEDESTRIAN PUSH BUTTON TO POLE</p>
	<p>Mark, drill and tap holes 6mm set crews at 1.1m (button height) above ground level if there are no holes.</p> <p>Drop 2-core flex down from pole top and pull through hole.</p> <p>Connect flex to push button and to the correct cores in the pole cap.</p> <p>Secure push button assembly to pole using 6mm bolts or set screws.</p> <p>Test and secure correct operation of the push button.</p> <p>Buzzer can be installed either in the pole top or the lantern.</p> <p>Cut a 25mm hole in the bottom of the pole top or green aspect of the lantern.</p> <p>Buzzer to be fitted in the hole and connected in parallel with the globe.</p> <p><u>PEDESTRIAN SWITCH PAD</u></p> <p>Installation surface must be clean and smooth, surface mount mat with accessories to interface to a pedestrian card in a traffic controller.</p> <p><u>Standard pedestrian push-buttons. Refer to drawing SPPB 1.</u></p> <p>a) The pedestrian push-button assemblies must be manufactured from die cast aluminium. The external corners and edges shall be rounded.</p> <p>b) The pedestrian push-button must be golden yellow in colour. The legend must be self-explanatory, permanent sign type and in black.</p> <p>c) Assemblies shall be suitable for pole mounting on a pole of 115mm diameter, must be waterproof and the push-button must be robust and shielded from accidental contact. Push-button plungers shall be so designed as to minimize the risk of jamming by foreign objects, moisture or the products of corrosion.</p> <p>d) The replacement of the push-button itself must be possible without the removal of the complete unit from the pole.</p> <p><u>Audio Tactile pedestrian push-button (APPB)</u></p> <p>Unit to consist of two parts: push button assembly and driver unit assembly.</p> <p>a) Push-button assembly specification</p> <ul style="list-style-type: none"> • Transducers to be fitted inside of the push-button housing. • To be fitted with embossed vibrato tactile directional arrow. • Directional arrow must be visually bold and adjustable only from the inside of the push-button housing. • Actuating push button diameter of 55mm/stainless steel.

	<ul style="list-style-type: none"> • Push-button to be robust, rust proof, weather proof and ergonomically acceptable. • Push Buttons must be compatible with control unit. • Mounting brackets must be galvanized and complete with stainless steel nuts, bolts and washers. • Housing manufactured in a manner that will minimize vandalism. • No sharp protrusions. • Preferred colour to be black. • The directional arrow to be silver on blue circular background – 100mm diameter. • Cable entry hole: Diameter 26mm. • Two fixing holes: M10, 100mm apart. • Dimensions of housing: 220mm (high), 120mm (wide) and 55mm (depth). • Push-button cover to be fitted with a wire rope assembly for hanging of face plate. • Transducer: 8 Ohm, 15 Watt. • Switch rating: 250V ac, 5A. • Screws, washers, nuts and bolts to be provided. <p>b) Driver unit assembly specification</p> <ul style="list-style-type: none"> • Operating voltage: 160-240 Vac. • Dimensions of driver unit housing: 250mm X 142mm X 110mm. • Traffic signal pole mountable. • Automatic gain control. • Ambient noise sampling at 0,2 second intervals. • Microprocessor controlled. • Demand indicator facility. • Higher volume demand: 12 dB louder than the locating tone and activated at minimum of three seconds. • Lamp voltage monitoring. • Fail safe mode when lamp voltage falls below selective levels, eg 160V. • Operating temperature: -15 C to +65 C. • Weather and rust proof. • Lid of housing to slide up/down for easy access. • Pole mounting brackets (115 mm pole). • Audible tones. <ul style="list-style-type: none"> – The locating tone: 1000Hz +/-50Hz with repetition rate of 0.55Hz +/- 0.05 Hz. – The transition tone: starts with a burst at 3500Hz +/- 500Hz and decreases exponentially to 700 Hz +/- 100 Hz. – The crossing tone: 500 Hz +/- 25 Hz and a repetition rate of 8.5Hz +/- 0.05Hz. • Wiring loom with following standard to be fitted and water tight. <ul style="list-style-type: none"> – Minimum length to be 2.5m. – Mains voltage: Brown (L), Blue (N) and Green/Yellow (Earth). – Walk phase: Orange. – Transducer: White, White/Black. <p>Technical / Operational requirements for APPB</p> <ol style="list-style-type: none"> I. Audible traffic signal should be switched on and be operational 24 hours a day. It must have the facility to turn off the sound e.g. for maintenance. Where intersections are within 50 meters of houses, the device should have the facility where the sound can be turned down. II. The device generating the audible signal need not be an integral part of the pedestrian push button assembly. III. The characteristics of the audible signal should take the following into account: <ul style="list-style-type: none"> • Adverse environmental effects, e.g. noise pollution. It is therefore required that the device should have the facility to automatically adjust its volume levels to suit the ambient noise. The device must also have a switch to manually select at least three levels of output dB i.e. high, medium and low. • Provisions must be made for the generation of three types of audible signals, namely: <ul style="list-style-type: none"> – The locating tone. (Don't walk). – Transition tone. (Walk). – Crossing tone.
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	<ul style="list-style-type: none"> The peak sound pressure level of the audible signal shall not exceed 85dB. The device must have a facility for adjustment of the sound pressure level up to a setting which ensures compliance within specified maximum. The device must automatically switch to fail safe mode when the operating voltage level is out of specification or in the event of any fault or vandalism. In the event of the system fault, damage by accident or similar the unit shall not reset self but remain in the do not walk made.
3.13	INSTALL SIGNS AND LANE LIGHTS AS PER SARTSM
	<p>All signs to be installed as per project manager's specifications.</p> <p>ST signs to be vertically and horizontally aligned and also symmetrical with/or the lantern aspect.</p> <p>Lane light installation should be in accordance to specifications as will be presented to contractor for individual projects. Also a generic specification will be presented during the briefing session.</p>
4	INSTALLATION OF CABLES
	<p>Tender rates to include; 1) collection or return of cable (or pipe) from or to store (unless otherwise indicated), 2) ensuring trench depth is correct and that trench floor is free of stones; if necessary installing bedding sand where applicable, 3) installing cable neatly in trench (without crossovers), 4) excavation and backfill of cable entrance at street furniture, 5) termination of cables in street furniture, 6) connection of cores to correct terminals. Excluding; 1) excavation of trenching, 2) any re-instatement, 3) duct opening.</p>
4.1	INSTALLATION OF CABLES IN TRENCHES
	<p>All cables to be permanently labelled and cores marked.</p> <p>The cables must be installed in a professional manner with as few cross-overs as possible.</p> <p>Cables shall be installed in accordance with the manufacturer's instructions by hand or winch only (and NOT with the aid of a vehicle)</p> <p>Under NO circumstance shall the minimum bending radii of the cables be exceeded while manoeuvring the cables during the installation process. Minimum bending radii are specified as 10x outer diameter of LV cables (i.e. the size of the belly of the cable drum from which the cable is removed).</p> <p>No cable shall be left exposed after installation. Backfilling up to orange identification tape level shall be completed before leaving site.</p> <p>PVC pipes to be installed a cross roads, frequently used driveways and pedestrian access ways along the proposed cable route are supplied in 4 or 6 meter lengths. PVC/HDPE pipe installations shall be completed within one day.</p> <p>The pipes shall be installed in straight lines with minimum number of couplings. Adequate space for filling with compacted soil should be left between pipes to prevent a weak structure.</p> <p>The price quoted by the tenderer shall cover the cost of delivery to site, cutting to size, joining and positioning of PVC pipes per 4 or 6m length. Separate tendered rates for excavation and reinstatement will also apply.</p>
	<p>Only cable marked each linear meter for length are allowed. All cores inside controllers must be individually numbered by yellow core markers.</p> <p>The controller as well as the traffic light poles shall be bonded to a 1.2m earth spike with a 16mm² stranded bare copper conductor. A 4mm² stranded bare copper conductor to run in parallel with the signal cable.</p> <p>The earth wire shall be terminated with crimp-on lugs. All cable armouring shall be earthed at the controller as 1.1Ω as per SANS 10142 Wiring Code</p> <p>A flexible cable must be used to facilitate functions for heads mounted at standard height on all cantilever / totem poles.</p>

	<p>Nickel-plated brass cable glands must be used on all cable terminations.</p> <p>Concrete cable markers to be used every 10 meter on supply trenches only. The top of the cable marker to be pigmented yellow.</p> <p>This item includes the cost of the material, transport and labour (and any related costs) applicable to the installation, repair and maintenance of the above item.</p>														
4.2	INSTALLATION OF CABLES THROUGH DUCTS														
	<p>Power cables running in ducts must have BCEW individually strapped to each cable.</p> <p>Cables should be installed with a 40% allowance in the sleeves.</p>														
4.3	INSTALLATION OF CABLES INTO BASE MOUNT CONTROLLER														
	<p>This includes putting glands on cables and installing.</p> <p>The main power supply cable from the power source to the controller shall be 3-core with a cross-sectional area of each conductor of not less than 6 mm².</p> <table> <tr> <td>Conductor:</td> <td>Multi-strand Copper Wire.</td> </tr> <tr> <td>Armour</td> <td>Galvanised Steel</td> </tr> <tr> <td>Diameter:</td> <td>1,5mm</td> </tr> <tr> <td>Number of cores:</td> <td>3 core</td> </tr> <tr> <td>Conductor Insulation:</td> <td>PVC Nitrile (flame retardant grade). The insulation material shall withstand a temperature of up to 70°C continuously and be resistant to oils, greases, acids, alkalis and most commercial chemicals.</td> </tr> <tr> <td>Sheath Colour:</td> <td>Black</td> </tr> <tr> <td>Voltage Rating:</td> <td>600 V – 1000 V</td> </tr> </table> <p>All cables shall conform to the SANS 1507.</p> <p>Cables to be marked each linear metre for the length of cable.</p> <p>Cable cores must be individually numbered.</p> <p>All cables to be properly identified, permanently labelled and records to be submitted to the project manager.</p>	Conductor:	Multi-strand Copper Wire.	Armour	Galvanised Steel	Diameter:	1,5mm	Number of cores:	3 core	Conductor Insulation:	PVC Nitrile (flame retardant grade). The insulation material shall withstand a temperature of up to 70°C continuously and be resistant to oils, greases, acids, alkalis and most commercial chemicals.	Sheath Colour:	Black	Voltage Rating:	600 V – 1000 V
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Sheath Colour:	Black														
Voltage Rating:	600 V – 1000 V														
4.4	INSTALLATION OF CABLES INTO POLE MOUNTED CONTROLLER														
	<p>This includes putting glands on cables and installing.</p> <p>The main power supply cable from the power source to the controller shall be 3-core with a cross-sectional area of each conductor of not less than 6 mm².</p> <table> <tr> <td>Conductor:</td> <td>Multi-strand Copper Wire.</td> </tr> <tr> <td>Armour</td> <td>Galvanised Steel</td> </tr> <tr> <td>Diameter:</td> <td>1,5mm</td> </tr> <tr> <td>Number of cores:</td> <td>3 core</td> </tr> <tr> <td>Conductor Insulation:</td> <td>PVC Nitrile (flame retardant grade). The insulation material shall withstand a temperature of up to 70°C continuously and be resistant to oils, greases, acids, alkalis and most commercial chemicals.</td> </tr> <tr> <td>Sheath Colour:</td> <td>Black</td> </tr> <tr> <td>Voltage Rating:</td> <td>600 V – 1000 V</td> </tr> </table> <p>All cables shall conform to the SANS 1507.</p> <p>Cables to be marked each linear metre for the length of cable.</p> <p>Cable cores must be individually numbered.</p> <p>All cables to be properly identified, permanently labelled and records to be submitted to the project manager.</p>	Conductor:	Multi-strand Copper Wire.	Armour	Galvanised Steel	Diameter:	1,5mm	Number of cores:	3 core	Conductor Insulation:	PVC Nitrile (flame retardant grade). The insulation material shall withstand a temperature of up to 70°C continuously and be resistant to oils, greases, acids, alkalis and most commercial chemicals.	Sheath Colour:	Black	Voltage Rating:	600 V – 1000 V
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Sheath Colour:	Black														
Voltage Rating:	600 V – 1000 V														
4.5	INSTALLATION OF CABLES INTO CONNECTION PILLAR (STUBBY)														
	<p>Refer to drawing CP_1 for connection pillar box.</p> <p>Secure power cables (37-core, 19-core etc. and earth wire (minimum 10mm) to rail in connection pillar using appropriate K-clamps.</p>														

	<p>Secure loop/demand cables (8-pair I/O screened APL cable or equivalent and up to 5 x 2core cables) to the connection pillar rail using appropriate K-clamps.</p> <p>Terminate and connect all cables to connector strip in numbering order and ensure sound earth continuity.</p> <p>Terminate cores of the traffic signal cables onto connector strips and onto correct cores for traffic signals.</p> <p>Terminate pairs of screen cables onto connector strips and onto correct loop/demand cables.</p> <p>All cables to be permanently labelled and cores marked.</p>
4.6	INSTALLATION OF CABLES INTO POLES
	<p>Cables to be properly secured into pole tops and pole hatches by aid of metal arming on the cables. Terminate and connect all cables to connector strips in numbering order and ensure sound earth continuity.</p> <p>Earth cables to be secure with on the pole and linked to the designated earth core.</p>
4.7	INSTALLATION OF CABLES INTO CABLE ENTRY BOXES
	<p>Terminate and connect all cables to connector strips in numbering order and ensure sound earth continuity.</p> <p>Terminate cores of the traffic signal cables onto connector strips and onto correct cores for traffic signals.</p> <p>Terminate pairs of screen cables onto connector strips and onto correct loop/demand cables.</p> <p>All cables to be permanently labelled and cores marked.</p>
4.8	CABLE JOINTS
	<p>Tender rates should include the supply of MT2 splicing kit.</p> <p>All joints must be inspected by project manager before it is sealed.</p> <p>Joints should be neatly done and must match the different cable colours and numbering.</p> <p>Cable must be tested for sound insulation before connection at termination point.</p>
4.9	INSTALLATION OF EARTH SPIKE
	<p>Tender rates should include the relevant tests as will be recorded on the Compliance Certificate.</p> <p>Drive an earth spike of appropriate length into the ground as close as possible to the controller.</p> <p>Test the spike as specified in SANS 10142.</p> <p>The test result must have an earth reading of less than 20 ohms.</p> <p>If the reading exceeds 20 ohms, extend the spike until the correct reading is obtained or multiple earth spikes should be installed and connected in parallel.</p> <p>Connect spike to earth terminal of the controller using a spike clamp and at least 10mm² Copper wires.</p>
5	PAINTING OF STREET FURNITURE, ROAD MARKINGS, SIGNS AND SOLAR POWERED LED ROAD STUDS
	Tender rates should include the supply of all paints and consumable.

5.1	PAINT NEW POLES														
	<p>Standard Poles</p> <ul style="list-style-type: none"> a) To be supplied as per attached drawing TSP_1. b) Total length of pole 4m. c) Overall dimensions, inside diameter 105mm, thickness 4 mm – d) 5 mm. e) A 305mm x 90mm cable entry slot shall be provided 600mm from the bottom and of the pole to the bottom of the slot. The edges of the slot shall be ground round to remove all burrs and sharp edges. f) A 4mm hole shall be provided 20mm from the top of the pole. g) Manufactured to SABS 62. h) Hot dipped galvanized to SANS 121 (ISO1461) – 2000-1. i) Additional items for traffic signal poles - traffic signal head mounting brackets as per drawings TSP_3a and TSP_3b. <p>Extended Poles</p> <ul style="list-style-type: none"> j) To be supplied as per attached drawing TSP_2. k) As per requirements detailed in the above section clause c) to h). l) Total length of pole 6m. m) Base plate to be fixed to pole and hot dipped galvanized after fabrication. <p>Overhead outreach Poles</p> <ul style="list-style-type: none"> a) To be supplied as per drawings OHP_1 & OHP_2. Base anchor bolt cage not included. Additional items for overhead poles - traffic signal head mounting brackets as per drawings OHP_3 and TSP_3b. <p>POLE CAPS</p> <ul style="list-style-type: none"> a) The pole cap shall be manufactured from carbon fibre strengthened fiberglass, glass-reinforced plastic or approved UV-resistant plastic and be yellow or black in colour. b) The pole cap should consist of a base and a cover. No tools shall be required to remove and replace the pole cap. c) There shall be sufficient space inside the assembly for connecting the incoming cable to the head wiring. The assembly shall be so designed as to avoid the possibility of a live core making contact with the external covering as far as possible. d) The pole cap shall be provided with a means of firmly securing it to a 115mm pole. e) The pole cap shall be weather proof and must be of such form as to resist deterioration due to the effects of sunlight and sea air. f) The base of the pole cap must contain a gland plate with a central 20mm hole. g) The base of the pole cap shall contain a minimum of six 20mm knockout holes for feeding cables from the gland plate to the heads. h) The base of the pole cap shall be provided with a suitable earth terminal. <p>POLE NUMBERING AND LOGOS</p> <ul style="list-style-type: none"> i) Pole numbers and logos to be heavy duty vinyl, UV resistant and self-adhesive. j) Numbers must be black on reflective white background. k) Size of pole numbers is as follows: <table border="0" style="margin-left: 20px;"> <tr> <td>Background</td> <td>:</td> <td>Height = 103mm</td> <td>Width = 83mm</td> </tr> <tr> <td>Number:</td> <td></td> <td>Height = 85mm</td> <td>Width = 55mm</td> </tr> </table> l) Size of logo numbers is as follows: <table border="0" style="margin-left: 20px;"> <tr> <td>Background</td> <td>:</td> <td>Height = 103mm</td> </tr> <tr> <td>Number:</td> <td></td> <td>Height = 85mm</td> </tr> </table> 	Background	:	Height = 103mm	Width = 83mm	Number:		Height = 85mm	Width = 55mm	Background	:	Height = 103mm	Number:		Height = 85mm
Background	:	Height = 103mm	Width = 83mm												
Number:		Height = 85mm	Width = 55mm												
Background	:	Height = 103mm													
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	<p>Contractor to provide and use drop sheets to prevent messing on sidewalks.</p> <p>Preparation and galvanize wash to be done as per manufacturer's specification.</p> <p>Etch primer to be applied as per manufacturer's specification.</p> <p>Two final coats of alkyd enamel (Golden yellow) to be applied from the bottom lantern bracket downwards.</p>														

	<p>For cantilever poles, the area between the top and bottom bracket of the lantern must be painted black.</p> <p>Top section of the pole, from bottom bracket upwards, to be painted black.</p> <p>All brackets and strappings must be painted to match the colour of the poles.</p> <p>Ensure that the areas around the poles are clean before leaving the site.</p> <p>Apply 2 x vinyl numbers to the pole 250mm below the backing board, with at least on the direction of travel.</p>
5.2	PAINTING OF EXISTING POLES ETC.
	<p>Strip and clean all the old paint off the pole.</p> <p>Paint the pole as specified above in point 5.1.</p> <p>Paint to be of 2 coats of red oxide primer and 3 coats golden yellow</p>
5.3	PAINTING OF CABINETS
	Cabinets to be cleaned dry before any painting is done with the approved paint type for the area.
5.4	TRAFFIC SIGNAL POLE RETRO-REFLECTIVITY
5.5	ROAD MARKINGS AND -SIGNS
	<p>MATERIALS</p> <p>“Where the properties of materials (before and after application/installation) are required to comply with specified specifications published by a standards authority, the contractor shall produce, when called upon to do so and at his/her own cost, certificates from the supplier/manufacturer confirming that the materials or product shall comply with an SANS specification, it means that the product shall have been tested and evaluated in accordance with the requirements of the relevant SANS specification. Where a SANS mark is specified, a certificate will be required.”</p> <p>Paint</p> <p>Roadmarking paint</p> <p>“Road-marking paint shall comply with requirements of SANS 731-1:2006 (single-pack solvent-borne paints) and SANS 731-2:2006 (single-pack water-borne paints) as follows;</p> <p>Type 1: road-marking paint for machine spray application: quick-drying paint, only for machine spray application to concrete or bituminous (or both) road surfaces; or</p> <p>Type 2: road-marking paint for general (or hand) application: paint for general application (by hand) to concrete or bituminous (or both) road surfaces.</p> <p>Each container, or a label securely fixed to the container, shall be clearly, legibly and indelibly marked with the following information:</p> <ol style="list-style-type: none"> The manufacturer’s name or the brand name of the product, or both; The words “roadmarking paint” and, where applicable, the word “retro-reflective” or the words “skid resistant” ; Where applicable, the word “for bituminous surfaces only” or “for concrete and bituminous surfaces”; Word “type”, followed by the number of the type (see first paragraph); The colour; Where applicable, the words “suitable for drop-on beads application”; The word “viscosity” followed by the numerical value of the viscosity (in Krebs units) and the letters “KU”; The drying-time classification, for example “Class 1”;

- i) The batch identification; and
- j) The directions for use, which should include all hazard warnings required in terms of current legislation.

5.5.1 Retro-reflective road-marking paint

“Retro-reflective road marking paint shall comply with the requirements of sub clause 5702(a)(i) and glass beads used to improve the paint’s retro-reflectivity shall comply with the requirements of SANS 51423:1997.

Re-reflective road-marking paint shall meet the following photometric requirements:

		Luminance Factor	Coefficient of Retro-reflection (mcd/lx/m ²)
New materials	White	0,6	150
	Yellow	0,4	100
	Red	0,08	30
Used materials (at end of 12 month maintenance period)	White	0,45	100
	Yellow	0,3	70
	Red	0,06	20

Determination of conformance with the specification will be done in accordance with SANS 6261:1998.

SURFACE PREPARATION

“The surface where road-marking paint is to be applied shall, where the extent and degree of surface contamination warrants this, be properly cleaned by means of a combination of high pressure water and an approved degreasing agent”

“The onus is on the contractor to ensure that the surface on which the road markings are to be applied is sufficiently clean and dry to ensure that the quality of the road markings will not be adversely affected. The contractor is also responsible for protecting road studs from being painted over, and the subsequent cleaning thereof if such over-painting did occur.”

MECHANICAL EQUIPMENT FOR PAINTING

Any mechanical equipment to be used for this period tender shall adhere to each specific paints application rate, to ensure the required dry film thickness for each paint specified in this tender document. Clear visible road signage and amber warning lights shall be attached to the equipment whilst work is in progress, and sufficient measured shall be placed to accommodate traffic. Mechanical equipment can be a self-propelled machine and a walk-behind machine, which require any form of petroleum agent or electricity to function.

APPLYING THE PAINT

Ordinary road-marking paint shall be applied to a minimum dry film thickness (DFT) of 200microns and hot-melt plastic road marking material shall be applied to a minimum thickness of 1.25 millimeters. Retro-reflective cementitious road-marking compound shall be applied to a minimum thickness of 2 millimeters. Cold-plastic road marking compound shall be applied to a minimum thickness of 3 millimeters.

“The Contractor’s establishment on site and general obligation shall be deemed to fully include the establishment of the road-marking team, irrespective of the number of times the road-marking team is required to be on site or is required to move within the site.

“Solvent borne road marking paint shall be applied at a nominal rate of 0.42 l/m² or as directed by the Engineer. Thermoplastic road marking shall be applied at a nominal rate of 2.5 kg/m² to achieve a minimum thickness of 1.25mm to 1.5mm or as directed by the Engineer. The two-component road marking material shall be applied by hand by means of a trowel. The desired symbol or line shall be marked with a tape or a template on the road surface. Thereafter apply the required volume of material and spread uniformly over the entire area. When dry/set, remove the tape or template. A spreading rate of 4.5kg/m² is estimated to achieve a 2.0mm material thickness.

In order to ensure proper coverage on all types of surfaces the Engineer may order an increase in the above nominal application rates.

A daily log-sheet, provided by the Employer, shall be completed and signed by the Contractor and the Engineer’s representative, recording the quantities of paint and glass beads used on that day and shall be available for inspection at all times. The completed and signed log-sheet for the period covered by a payment certificate shall be attached to the payment certificate.”

“Solvent-based road marking as specified by the Engineer shall be carried out within 14 days of opening the road full width to traffic after the completion of the surfacing.

If in the in the opinion of the Engineer, conditions are unsafe, the centre-line shall be painted immediately after 2.0 km of continuous road has received a new asphalt layer, or 4.0 km of continuous road has received a new seal surfacing.”

“The machine shall always operate in the direction of the traffic when undertaking the lane marking.

5.5.2 APPLYING THE RETRO-REFLECTIVE BEADS AND ANTISKID AGGREGATES

The rate of application of the beads shall be such so as to meet the photometric and skid resistance requirements specified in SANS standards.

MEASUREMENT

The unit of measurement for item shall be as specified in the price schedule, and shall be the actual area applied to the surface.

Retro-reflective beads

Retro-reflective glass beads shall be applied to the wet road-marking paint, thermoplastic and cold plastic road-marking materials.

“The thermoplastic road marking material and two-component road marking material shall contain in situ glass beads of minimum content of 25% in order to obtain night visibility (reflectivity). The contractor shall immediately apply additional glass beads at 400g/m² to obtain immediate reflectivity. The beads shall be sprayed onto the road marking layer by means of a pressure sprayer. Where letter, symbol, traverse line and island road marking is undertaken by hand, the glass beads may be applied by hand if approved by the Engineer. Prior to any hand application work, the contractor shall first request approval from the Engineer.”

The beads shall comply with Class A beads in accordance with EN 1424: 1998, with the following requirements or as approved by the Engineer:

- colour : crystal clear
- roundness : > 80%
- size range of : 14 – 200 US Mesh (75 – 1400 Microns)
- refractive index : > 1.5
- specific gravity : ± 2.5
- granulometry : Refer Table below

GRANULOMETRY OF BEADS

Sieve size	Cumulative retained (mass)	
	Minimum	Maximum
1700	0	2
1400	0	10
1180	5	30
850	40	80
600	70	100
425	80	100
355	90	100
212	95	100
PAN	100	100

The beads shall be delivered to the site in sealed bags, marked with the name of the manufacturer, the batch number and an inspection seal of SANS, confirming that the beads form part of a lot tested by SANS and comply with the requirements of EN 1424: 1998. Alternatively, the Contractor shall at all times have a SANS certificate on the site, identifying the batches to which the inspection seals apply and certifying that they have been tested by SANS, and comply with the requirement of EN 1424: 1998.”

5.5.3 THERMO-PLASTIC ROAD MARKINGS

Thermoplastic road marking material shall comply with the requirements of EN 1436, and EN 1423: 1998 for drop-on glass beads for road marking and anti-skid aggregates and mixtures thereof. Blending of thermoplastic road marking material and glass beads shall comply with EN 1424: 1998.

The binder shall be an elasticized synthetic resin and the material shall be reflectorized by mixing in 25% by mass Class A glass beads in accordance with EN 1424: 1998. An additional topping of glass beads shall be applied to the hot surface of the material for instant retro-reflectivity.

The road marking material shall contain 6% by mass minimum titanium dioxide content and shall have a skid resistance of 45 S.R.T. – units or higher. SABS Method 1248: 1995 shall be used for determination of traffic wear index; indication of durability.

The following minimum lamination values are required for the completed product:

- 250 mcd/m².lux & 120 mcd/m².lux for white & yellow lines respectively, at 30 days after application.
- 200 mcd/m².lux & 100 mcd/m².lux for white & yellow lines respectively, at 6 months after application.

Determination of coefficient of retro-reflected luminance by means of portable retro-reflectometer shall be carried out using SANS 6261: 2008. Application of the permanent roadmarking will thus have to be performed within the first 6 months of the 12 month defects liability period to allow for the second measurement to fall within the contract dates. Should the application of the permanent road-marking fall outside the first half of the defects liability period for whatever reason, the settlement of the retention money will be delayed until the second measurement of luminance can be performed at the stipulated time and the required adjustment can be made to the tendered rate (if required).

Two-component cold plastic road marking material shall be used for symbols, arrows and letters (hand painted markings) unless otherwise instructed by the Engineer.”

Cold plastic road-marking material

	<p>"The Contractor shall provide temporary traffic control facilities in accordance with Section 1500 of the COLTO's standard specifications for road and bridge works to ensure traffic safety where work is being executed.</p> <p>Property and/or road signs damaged by the Contractor, his personnel, his agents or sub-contractors shall be repaired or restored to their condition prior to the damage at his own cost."</p> <p>"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 retro-reflective road marking paint, and/or temporary road studs, as directed by the engineer.</p> <p>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.</p> <p>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:</p> <ul style="list-style-type: none"> (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." <p>FAULTY WORKMANSHIP OR MATERIAL</p> <p>"The Contractor shall rectify in an acceptable manner and at his own costs; all marking that do not comply with the specified requirements.</p> <p>While work is in progress, tests shall be carried out on materials and/or the quality of work to ensure compliance with the specified requirements. The sampling methods are specified in SANS 731-1. The sampling methods described in TMH5 shall be followed where applicable."</p> <p>PROTECTION</p> <p>" Traffic cones shall not be smaller than 750mm in height and shall be placed on the road not further than 48m apart. Cones shall not be removed before the paint on the road has hardened to such an extent that it will not be damaged by traffic and the adhesive of the road studs has hardened to such an extent that the studs will not turn or become loose. All marks on the road caused by traffic driving over wet paint shall be removed by the Contractor at his own cost."</p>
5.7	<p>SUPPLY AND INSTALLATION OF SOLAR POWERED LED ROAD STUDS</p> <p>Studs are to be supplied to various roads in order warn motorists of proximities of road conditions. Studs shall be solar powered and back-up by batteries at night.</p> <p>Studs must have a round design with a good appearance while relieving the impact from traffic load and indicating hazardous areas and traffic circles. Road Studs shall be fitted with epoxy glue inside its shell that will make it easy, simple and steady to install like a normal road stud.</p>
5.7.1	<p>Technical Specification of Solar Powered LED Road Studs</p> <p>The dimensions of the Stud shall be approximately;</p> <ul style="list-style-type: none"> a. Diameter 110mm (+/- 10 mm) b. Height 20mm (not more than 22mm) <p>Studs shall charge up sufficiently by day and shine or flash very brightly throughout the night and during periods of dark fog.</p>

	<p>The power storage can be done through either a battery or capacitor backup. Solar sources and power storage shall be sufficiently sized to provide 72 hours of LED light from 8 hours of charging from sunlight.</p> <p>The illuminations levels produced by a single light source (combination of LEDs per source unit) shall be more than 35 milli candela</p> <p>It must be possible to be used on roads/highways, foggy areas, non-street light area, on- and –off ramps, curves or some dangerous roads but also on loading vehicles, trailers and other similar structures as a safety precaution.</p> <p>Studs are to be supplied with two different types:</p> <ul style="list-style-type: none"> a. Static b. Flashing <p>The frequency of the flashing facility shall be primarily 4Hz but must not deviate by more than +/- 25%</p> <p>Studs shall withstand compression of 15 tons and will be fitted with three LED lights to make it visible from up to 700m away.</p> <p>Road studs shall provide excellent visible traffic guidance in all-weather condition.</p> <p>Any electronics and optics must be fitted inside a waterproof and highly damage resistant unit.</p> <p>The unit shall be suitably reinforced such that it is suitably compression resistant.</p> <p>The material used for the body of the stud shall be highly weather and UV resistant and the unit shall be guaranteed to last at least 3 years under the conditions specified above as well as weather conditions for Stellenbosch Municipality</p> <p>The number of LED light units within each stud may vary from a single light, double light and three lights on one halve or on both halves as required</p> <p>Studs LED options must be available in:</p> <ul style="list-style-type: none"> a. Red, b. Amber and c. White <p>It shall be possible to switch LED lights into flashing or non-flashing modes.</p> <p>Studs illumination shall be activated by the ambient illumination level and shall automatically switch on at dusk and switch off at dawn</p> <p>The unit shall work satisfactorily and be able to withstand temperatures between -20 Deg. C up to +70 Deg. C</p> <p>The unit shall still be easily visible from 500m.</p>
<p>5.7.2</p>	<p>Installation of Metal Solar powered Road Studs with Epoxy</p> <ul style="list-style-type: none"> a) Fixing materials (ABE Epidermix 372) Creamy Yellow and 75 x 8 mm electroplated anchor nails – These items to be purchased by the successful bidder. b) Anchor nails heads must be sealed with Sikaflex 11 FC - To be purchased by the successful bidder. c) The contractor must proof to the Management staff that the correct adhesive materials has been used. d) Successful bidder will be informed by the Superintendent of the correct positioning of the Road Studs.

	<ul style="list-style-type: none"> e) Adhesive to be applied to dry & clean road surface and Road Stud - double application f) 10.0 mm plug holes to be drilled for anchor nails – nails should be dipped in Epidermix before put into the drilled holes. g) Anchor nails heads should be sealed with Sikaflex – to prevent water penetration. h) Allow 1.5 hour setting time for adhesive before traffic can move over Road Studs. i) Pedestrians, cyclist & motorist should be warned at all times while construction is in progress. j) Damage / faulty Road Studs to be handed in at Traffic Eng. workshop k) Successful bidder will be responsible for traffic accommodation e.g. temporary road signs, cones , functional flagmen and the use of proper PPE for workers (Safety Jackets to be worn by all staff) l) Flagmen / women to be in position at all times. m) Successful bidder responsible for his own electrical equipment eg. Generator, Masonry drill & transport of his staff to the different sites 								
5.7.3	<p>Installation of Plastic Road Studs with Epoxy Method of fixing - Epidermix 372 Creamy Yellow (ABE Product) Adhesive material to be purchased by the successful bidder.</p> <ul style="list-style-type: none"> a) The contractor must proof to the Management staff that the correct adhesive materials has been used. b) Final positions of road studs will be identified by end user department. c) Holes for Cat Eyes to be drilled 60 mm. deep with a 24 mm. diameter cleaned thoroughly and filled halfway with Epidermix 372 d) Dip the point of the road stud in the Epidermix before placed in the hole e) Adhesive to be applied to road surface and Road Stud double application f) Road surface to be clean & dry. g) Allow 1.5 hour setting time for adhesive before traffic can move over Road Studs. h) Pedestrians, cyclist & motorist should be warned at all times while construction is in progress. i) Successful bidder will be responsible for traffic accommodation eg. temporary road signs, cones, functional flagmen and the use of proper PPE for workers (Safety Jackets to be worn by all staff) j) Flagmen / women to be in position at all times. k) Successful bidder responsible for his own electrical equipment eg. Generator, Masonry drill & transport of his staff to the different sites 								
6	INSTALLATION OF DETECTION EQUIPMENTS								
6.1	LOOP DETECTION								
	Tender rates to include the supply of all materials required to install loops.								
6.1.1	<p>TESTING EXISTING VEHICLE LOOPS Excavate and expose loop joint and cut out loop joint. Loop feeder cable to be isolated or disconnected at relevant points i.e. other joints before testing. Test the continuity of the loop(s) and the feeder cable separately. Loop conductors to be connected to 2-core armoured cable using connector blocks of ferrules. Loop cable(s) and loop conductors to be joined by means of resin compound joint. Joint to be buried at least 500mm underground. Operation of loop to be verified in conjunction with the Engineering Services Department.</p>								
6.1.2	TYPICAL CUT AND INSTALL INDUCTIVE LOOPS								
	<ul style="list-style-type: none"> a) Detector Lead in cable installed in road surface: Loop windings and tails shall constitute a single un-joined length of insulated multi-strand tinned copper conductor. The conductor shall be of the type: Heluloop /H991C150LOOP or equivalent and have the following specifications: <table style="margin-left: 40px;"> <tr> <td>Conductor:</td> <td>Multi-strand Tinned Copper Fine Wire.</td> </tr> <tr> <td>Diameter:</td> <td>1,5mm</td> </tr> <tr> <td>Number of cores:</td> <td>One</td> </tr> <tr> <td>PVC Nominal Overall Diameter:</td> <td>2.7mm</td> </tr> </table> 	Conductor:	Multi-strand Tinned Copper Fine Wire.	Diameter:	1,5mm	Number of cores:	One	PVC Nominal Overall Diameter:	2.7mm
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	<p>Conductor Insulation: PVC Nitrile (flame retardant grade). The insulation material shall withstand a temperature of up to 70°C continuously and be resistant to oils, greases, acids, alkalis and most commercial chemicals.</p> <p>Sheath Colour: Black</p> <p>Voltage Rating: 500 V</p> <p>Special test requirements: Cable tested at 3000 volts DC under water @ 20°C for 24 hours.</p> <p>b) Detector cable installed in ducting: Feeder shall constitute a single un-joined length of insulated multi-strand tinned copper conductor. The conductor shall be of the type: Helukabel 1.5mm X 2core OAM – BLACK (H112C100-BK) or equivalent and have the following specifications:</p> <p>Conductor: Multi-strand Tinned Copper Fine Wire.</p> <p>Diameter: 1,5mm</p> <p>Number of cores: Two</p> <p>Colour cores: Red (1) & Black (2)</p> <p>PVC Nominal Overall Diameter: ± 7mm</p> <p>Conductor Insulation: PVC</p> <p>Sheath Colour: Black</p> <p>Voltage Rating: 300/500 V</p> <p>Overall screen: Overall Aluminium Mylar + Drain wire.</p>
	<p>Tender rates to include supply of all consumables. Loop measurements are in meters.</p> <p>All loops shall be installed to the satisfaction of the project manager or his authorized representative.</p> <p>All loop positions will be determined and marked by the Traffic Engineering Services Department.</p> <p>All loop slot shall be cut at least 6mm wide and between 35mm and 50mm deep.</p> <p>Each loop shall be wired with a continuous length of 3 coils of 2.5mm² –stranded wire with no joints in loop slot.</p> <p>The wire must be inserted in the slot and the backfilling be done on the same day that the slot is cut.</p> <p>Loops shall be backfilled with a proper mixture of Abecote 356 epoxy and No.1 sand to the satisfaction of the Traffic Engineer or his representative.</p> <p>Loop slot shall be sealed after backfilling using BRP Crack seal Rubber or equivalent to prevent the ingress of water resulting in the road surface breaking up causing potholes.</p> <p>Any backfilling breaking up within one (1) year shall be repaired by the Contractor at his own cost.</p> <p>All loops shall be cut to and connected to an armoured feeder cable, behind the kerbs unless specified otherwise by project manager.</p> <p>The contractor must do Loop joints provided that the loop cables are installed.</p> <p>Cement kerbs and sidewalks shall be reinstated to the satisfaction of the Roads Engineer.</p> <p>All excavated areas shall be levelled and all rubble removed from site on completion.</p> <p>Loops shall be tested for correct operation in conjunction with the Traffic Engineering Department and any defective loop shall be re-cut at the Contractor's cost.</p> <p>Loops and the backfilling thereof shall be guaranteed for a period of one (1) year from date of invoice.</p> <p>Loops shall be measured after cutting and correct operation is verified.</p>

	<p>Magnetometers, which depend upon the change in a magnetic field produced by the metal of a vehicle. Wireless Vehicle Detection System detectors must be installed below the road surface by means of core drilling and using of an approved epoxy.</p> <p>Wireless Vehicle Detection System to use pavement-mounted magnetic sensors to detect the presence and movement of vehicles.</p> <p>The magneto-resistive sensors must be wireless, transmitting their detection data in real time via low power radio technology to a nearby networks access point that then relays the data to one or more local or remote traffic management controllers and systems.</p> <p>In cases where one or more wireless sensors are out of range of the nearest access point, one or more repeaters must be used to provide a two-way relay between the out-of-range sensors and the access point</p> <p>This item includes the cost of the material, transport and labour (and any related costs) applicable to the installation, repair and maintenance of the above item.</p>
<p>6.1.3</p>	<p>REFILLING AND SEALING OF EXISTING LOOPS</p>
	<p>When required, the contractor shall be appointed to seal existing loops that have been exposed on the road and this measured in meters. Tender rates shall include supply of all materials.</p>
	<p>Loops shall be backfilled with proper mixture of Abecote 356 epoxy and No.1 sand to the satisfaction of the Traffic Engineer or his representative.</p> <p>Loop slots shall be sealed after backfilling using BRP crack seal rubber or equivalent to prevent the ingress of water resulting in the road surface breaking up causing potholes.</p>
<p>6.4</p>	<p>INSTALLATION OF VIDEO DETECTION EQUIPMENTS</p>
	<p>Tender rates shall be for the supply of labour and expertise where necessary.</p> <p>Where installation requires cables run, rates should include trenching and laying of such cables. Tender rates to excluded cherry picker as this will be measured separately.</p> <p>GENERAL</p> <ol style="list-style-type: none"> The vehicle presence detection system is non-intrusive (i.e. above ground) and consists of a camera and a video detection module, mounting bracket and video detection software. The camera and video detection module are integrated in one housing. In one or more predefined detection zones (“virtual loops”), the video detection software detects both moving and stationary vehicles on multiple lanes (when module is well-positioned). The system generates detection outputs to the traffic light controller. <p>TRAFICAM SYSTEM ITEMS</p> <p>The Traficam system has the following items:</p> <ul style="list-style-type: none"> • Traficam sensor • Interface module • Traficam software • Connection cables • Tools • Traficam brackets for mounting • Retaining straps • Traficam pole <p>SPECIFICATION</p> <p>Traficam sensor</p> <ol style="list-style-type: none"> The housing is compact, esthetical, and UV-resistant and waterproof to IP67. It has an integrated rain/sun shield and is made of polycarbonate and fibre reinforced polyamide. The camera is a black & white or colour 1/3” CMOS with a resolution of minimum 480x640 pixels.

LENS TYPE	Wide Angle	Narrow Angle
Focal Distance	3.0mm	8.0mm
Field of view- horizontal	95°	32°
Field of view - vertical	65°	22°
Field of view diagonal	103°	39°

c) The **video detection module** has a version for detection at close range (0-25m) and one for medium range (15-60m).

d) A red detection LED is clearly visible from the ground and allows both the vehicle drivers and maintenance personnel to see the video detection module status (detection, no detection, safe status). The LED can be switched off.

e) The video detection module operates at 12-26VAC/DC and between -34°C and +80°C.

f) Its power consumption does not exceed 1.5W (or 65mA at 24V) during regular operations.

Interface module

g) A **DIN-rail clickable interface** connects a portable PC with 1 or up to 4 video detection modules.

h) The interface is used for system configuration, detection verification and provides 4-16 (i.e. 4 per video detection module) optically isolated open-collector outputs to a traffic signal controller, intelligent signs or other devices (U_{max} = 48VDC, I_{max} = 50mA).

Traficam software

i) The interface has a USB, an RS485 or an Ethernet connection to communicate with a portable PC.

Connection cables

j) **Cabling** connection from the sensor to the interface to be shielded twisted pair cable, UV resistant, 4 wires plus shielding, dia. 5 -10m.

k) **Cable** from Interface to PC is USB cable type.

Tools

Hex keys and cable tags.

Traficam brackets

The **bracket** allows horizontal and vertical mounting and is made of fibre reinforced polyamide with an aluminium tube.

Retaining straps

Used to attach the video detection module on existing or new infrastructure, 2 stainless steel bands are used.

Traficam pole

The video detection module should be mounted on a stable pole, an ideal height of 8m high. The mean time between failure and lifetime expectancy of the video detection module, mounting bracket and interface is a minimum 100 hours.

Thermal Camera Detection

Description

An integrated thermal camera and detector for vehicle, bike presence detection and counting at signalized intersections. It detects vehicles and bicycles at and nearby the stop bar. The intelligent sensor will transmit its detection information over contact closures or over IP to the traffic light controller and will thus allow a more dynamic control of traffic lights.

It makes use of thermal video images to analyse the traffic scene to distinguish between vehicles and bikes.

The thermal energy emitted from vehicles and bicyclists to make a distinction between both. The intelligent sensor can provide the traffic light controller with specific information on vehicle and bike presence, which allows traffic managers to make more intelligent decisions and adapt green times according to the specific road user type (bike or other vehicle).

Guaranteed detection, day and night

	<p>Ability to detect vehicles and bikes in the darkest of nights over a long range and across different lanes (typically up to 4). 24-hour detection of motorized vehicles and cyclists regardless of the amount of light available.</p> <p>Detection in difficult weather conditions - It offers reliable vehicle and bike presence detection in various conditions that are tough for traditional, visual cameras, such as sun glare, wet road surfaces, car headlights, shadows, snow or fog detection</p> <p>Detection functionalities - Vehicle and bike presence, counting - Detection zones: 16 vehicle presence zones - 4 bike presence regions</p> <p>Camera - Resolution CIF (320x240) - Frame rate 30 FPS - Lens types Wide angle Medium angle Narrow angle - Focal distance 7.5 mm 9 mm 13 mm - Detection distance 0 - 20m (short range) 15 - 60m (medium range) 30 - 90m (long range) - Horizontal field of view 63° or 90° 35° 25° - Mounting height Side fire position: 3.5 – 12 m - Overhead position: 5 – 12 m - Camera type Long wave Infrared (7 – 14µm) - Compression H.264, MPEG-4, MJPEG (dual stream)</p> <p>Housing - Mounting Material Aluminium - Dimensions (including mounting bracket) Vertically mounted 45 cm x 16 cm x 12 cm, - Horizontally mounted 41 cm x 18 cm x 12 cm</p> <p>Sunshield Optional - Power, outputs, communications - Power in 24VAC/DC via interface - Consumption 5 W - IP address Yes - Communication between PC and Camera Via interface - Outputs 16, via interface (Pmax=300m, Imax=50mA, Umax=48VDC) - PC tool for set-up</p> <p>Regulatory - EU Directives EMC 2004/108/EC - RoHS 2011/65/EU - Environmental - Operating temperature NEMA TS2 : -34°C to +74°C - Mechanical integrity EN60529 : IP67 Ingress protection - EN50556 : Ax2 Vibration protection - Thermal camera BPL wide angle - Thermal camera BPL medium angle - Thermal camera BPL narrow angle</p> <p>Pedestrian/Bicycle Detector Imaging Specifications Functionalities - Kerbside and on-crossing pedestrian and bicycle presence detection - Stopbar and advance vehicle and bicycle presence detection (optional license) - Wi-Fi monitoring (optional license) - Visual HD streaming video (optional license) - detection zones 8 vehicle presence zones</p>
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	<ul style="list-style-type: none"> - 8 pedestrian presence zones - Configuration Web page via secure Wi-Fi or Ethernet <p>Thermal Sensor</p> <ul style="list-style-type: none"> - Resolution 160 x 120 - Frame rate 9 FPS - Detector type Focal Plane Array (FPA) uncooled VOx microbolometer LWIR sensor, - 8 to 14 µm wavelength - Streaming Video RTSP - Compression H.264, MPEG-4, MJPEG <p>Visual Sensor</p> <ul style="list-style-type: none"> - Resolution 1080 x 1920 HD colour CMOS - Frame rate 30 fps - Lens HFOV 95° - Streaming Video RTSP - Compression H.264, MPEG-4, MJPEG <p>Product types</p> <ul style="list-style-type: none"> - Wide Angle Pedestrian Sensor, Narrow Angle Pedestrian Sensor - HFOV 95° 56° - Detection distance - (depending on installation height) - vehicle & bicycle presence: 0 - 20m - pedestrian & bicycle presence: 0 - 12m - vehicle & bicycle presence: 20 - 40m - pedestrian & bicycle presence: 10 - 25m - Installation height 3.5 - 6m 5.5 - 8m <p>Housing</p> <ul style="list-style-type: none"> - Material Aluminium housing with PC GF10 sunshield - Bracket mounting clamps and aluminium tube <p>Power, outputs, communication</p> <p>Input power 12 – 42 V AC/DC</p> <p>Power consumption 3 Watt</p> <p>Outputs 1 N/O and 1 N/C dry contacts direct</p> <p>16 N/C dry contacts via TI BPL2 interface</p> <p>Ethernet 10/100 Mbps</p> <p>PoE PoE A and PoE B</p> <p>Powerline Communication Up to 2 Mbps via TI BPL2 interface</p> <p>Wi-Fi IEEE 802.11</p> <p>Environmental</p> <ul style="list-style-type: none"> - Shock & Vibration NEMA TS2 specs - Materials All weatherproof UV-resistant - IP Rating IP67 - Temperature range -40°C to +55°C - FCC part 15 class A - Regulatory - EU Directives EMC 2004/108/EC, RoHS 2011/65/EU
6.5	The Magnetometer system components

Magnetometer Detector Control unit

Description:

It is a compact module that controls the components of the Magnetometer wireless Vehicle Detection System. It maintains two-way wireless links to the sensors and repeaters, establishes overall time synchronization, transmits configuration commands and message acknowledgements, and receives and processes data from the sensors. It then relays the sensor detection data to a roadside traffic controller or remote server traffic management system. It provides equivalent functionality to normal contact closure cards used by the Stellenbosch Municipality.

It uses an ARM-based Linux computer to provide layers of processing and networking. Processing includes analytics for traffic data, traffic signal control, specialized control applications and system performance and diagnostic reports. Networking includes complete lower power functionality, security and proxying, as well as Linux-based IP, VPN, secure access (ssh), and secure web server (https) capabilities. Custom add-ons can be developed by qualified customers for their own remote applications.

It consists of dual Radio ports (SPP-0 and SPP-1) and an expansion (EX) port. The EX port connects to the existing Contact closure cards. Module to relay detection events to a traffic controller. It has two USB 2.0 full speed host ports, one 10/100Base-T Ethernet port, and one USB device port. It is powered by a 9-28 VDC source via a barrel connector or a pluggable terminal block connector. It includes a bracket mount kit for installation in a traffic cabinet. The module is configured by the configuration tool over the Ethernet port.

Functions / Features:

- Processing of sensor data
- Per-lane or per-vehicle data
- Data binning over selectable time intervals
- Data filtering (e.g., adaptive holdover)
- Platform for remote applications

Storage of sensor data:

- Data buffering (event caching) 500 K
- Data storage (processed data) 1 M

Master time-based for all supported wireless sensors

- Common clock for sensor timestamps

Low power radio communications

- To/from Radio modules

Relay of sensor data:

- Via EX card to traffic controller
- Via IP connectivity (wired or wireless) to traffic management systems and upstream servers.

Diagnostics and Supervisory:

- Daily diagnostic report
- Intrusion detection and packet authentication
- Sensor health monitor (RSSI, battery, downtime)

Firmware upgrades:

- Upgraded via IP connectivity
- Delivers upgrades to all Magnetometer System Networks devices

Simple installation:

- Mounts in traffic cabinet with bracket mount. Mounting kit supplied with module.

Specifications: interfaces

RS-422 full duplex to Radio(s) via RJ45 connector
 USB 2.0 full speed host ports

	<p>IP connectivity</p> <p>per-lane data processing</p> <p>per-vehicle data processing</p> <p>processor</p> <p>over-the-air protocol</p> <p>Power, Physical, & Environmental:</p> <p>input voltage</p> <p>power consumption</p> <p>dimensions</p> <p>weight</p> <p>operating temp</p> <p>mounting</p>	<p>RS-485 full duplex to EX cards via RJ45 connector</p> <p>10/100Base-T Ethernet port via RJ45 connector</p> <p>USB device port</p> <p>HTTP, HTTPS, Open VPN, PPP, PPTP, SSH, optional encryption over tunnel</p> <p>counts (volume)</p> <p>occupancy</p> <p>average and median speeds</p> <p>binned speeds and vehicle lengths over selectable time intervals</p> <p>initial vehicle detect time</p> <p>gap</p> <p>speed</p> <p>length</p> <p>output formats and CSV</p> <p>Minimum 400 MHz ARM9 processor</p> <p>Minimum Linux 3.14 operating system</p> <p>Minimum 256 MB Flash</p> <p>Minimum 128 MB SDRAM</p> <p>TDMA-based secure protocol</p> <p>9-28 VDC: pluggable terminal block and socket (3 pos 5 mm) for 24-12 gauge wire</p> <p>less than 1 W</p> <p>109 mm x 88 mm x 30 mm without mount</p> <p>240.9 g without mount</p> <p>industrial -40°C to 85°C</p> <p>bracket mount</p>
	<p>Magnetometer Isolator</p> <p>Description:</p> <p>The Magnetometer Isolation Unit module provides both safety and length extension for the Magnetometer Detector Control Unit to Radio wired interface. The Magnetometer Isolation Unit provides two independent isolator ports, one for each Radio connection.</p> <p>A typical Magnetometer System consists of Magnetometer Detector Control Unit and two Radios with one Magnetometer Isolation Unit. The system can also consist of a Magnetometer Isolation Unit and a Radio.</p> <p>It isolates and protects signals from the Magnetometer Detector Control Unit to the Radio and provides up to 610 meters of 24 AWG CAT5 cable communication for the Magnetometer Detector Control Unit to and from the Radio using RS-422 drivers.</p> <p>The Magnetometer Isolation Unit serves three purposes:</p> <ul style="list-style-type: none"> • Equipment protection from electrical surges. • Surge protection prevents unwanted electrical surge currents, for example from lightning, to enter the controller cabinet and destroy electronic circuitry. Protection from electrical shock. • Ground isolation prevents dangerous voltages in a cable from shorting onto the ground or power supply in the cabinet. <p>Length extension:</p> <p>The power supply voltage on the CAT5 between the Magnetometer Detector Control Unit and the Radio is normally 5 V which allows only limited connection length. To increase the connection length, the Magnetometer Isolation Unit boosts this voltage to 15 V. Applicable also to the Access Point Controller Card.</p> <p>Functions / Features:</p> <p>- Safety Assurance</p>	

	<ul style="list-style-type: none"> - Provides surge protection up to 12 A - Provides electrical isolation up to 2,500 Vrms <p>Increases connection length between Magnetometer Detector Control Unit and Radio Power and Activity indicators for both Local (i.e. Magnetometer Detector Control Unit) and Remote (i.e. Radio) connections.</p> <p>Two types of ground terminations:</p> <ul style="list-style-type: none"> - Mounts in traffic cabinet with DIN mount or bracket mount <p>Power, Physical, & Environmental output</p> <table border="0"> <tr> <td>voltage</td> <td>15 VDC unregulated 2 W</td> </tr> <tr> <td>power consumption</td> <td>600 mW per Radio</td> </tr> <tr> <td>dimensions</td> <td>109 mm x 88 mm x 30 mm without mount</td> </tr> <tr> <td>weight</td> <td>221.5 g without mount</td> </tr> <tr> <td>operating temp</td> <td>industrial -40°C to 85°C</td> </tr> <tr> <td>surge protection</td> <td>IEC 61000-4-2 (ESD) ±15 kV (air), ±8 kV (contact)</td> </tr> <tr> <td></td> <td>IEC 61000-4-4 (EFT) 40 A (5/50 ns)</td> </tr> <tr> <td></td> <td>IEC 61000-4-5 (Lightning) 12 A (8/20 µs)</td> </tr> <tr> <td>electrical isolation</td> <td>2500 Vrms</td> </tr> <tr> <td>connection length extension</td> <td>Up to 610 m</td> </tr> <tr> <td>mounting</td> <td>bracket mount</td> </tr> </table>	voltage	15 VDC unregulated 2 W	power consumption	600 mW per Radio	dimensions	109 mm x 88 mm x 30 mm without mount	weight	221.5 g without mount	operating temp	industrial -40°C to 85°C	surge protection	IEC 61000-4-2 (ESD) ±15 kV (air), ±8 kV (contact)		IEC 61000-4-4 (EFT) 40 A (5/50 ns)		IEC 61000-4-5 (Lightning) 12 A (8/20 µs)	electrical isolation	2500 Vrms	connection length extension	Up to 610 m	mounting	bracket mount
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	<p>Digital Radio Antenna</p> <p>Description: Digital Radio Antenna is a Serial Port Protocol Radio is a low powered radio that maintains two-way wireless links to an installation's sensors and repeaters. The Radio establishes overall time synchronization, transmits configuration commands and message acknowledgements, and receives data from the sensors. The Radio then relays the sensor detection data to the Magnetometer Detector Control Unit† over a CAT5 cable.</p> <p>A typical Magnetometer Detector Control Unit system consists of one Magnetometer Detector Control Unit and one or two Radios with one Magnetometer Isolation Unit.</p> <p>Functions / Features</p> <p>Magnetometer System Networks radio communications:</p> <ul style="list-style-type: none"> - To/from Magnetometer System Networks sensors - To/from Magnetometer System Networks repeaters <p>Radio signal quality measurements:</p> <ul style="list-style-type: none"> - Receive Signal Strength Indicator (RSSI, in dBm) - Link Quality Index (LQI, figure of merit) <p>Simple installation:</p> <ul style="list-style-type: none"> - Any roadside location that provides adequate signal coverage to sensors/repeaters - No special requirements regarding setback, relative angle of the sun, or mounting stability - Mounted on pole using a Magnetometer System Networks mounting kit <p>Low power consumption:</p> <ul style="list-style-type: none"> - Receives power through the Magnetometer Detector Control Unit in the traffic cabinet <p>No calibration or adjustment required</p> <table border="0"> <tr> <td>Functional interfaces</td> <td>Specifications</td> <td>RS-422 full duplex to Magnetometer Detector Control Unit via RJ45 connector</td> </tr> <tr> <td>over-the-air protocol</td> <td></td> <td>TDMA based secure protocol</td> </tr> <tr> <td>physical layer protocol</td> <td></td> <td>IEEE 802.15.4 PHY</td> </tr> <tr> <td>modulation</td> <td></td> <td>Direct Sequence Spread Spectrum Offset Quadrature Phase-Shift Keying (DSSS O-QPSK)</td> </tr> </table>	Functional interfaces	Specifications	RS-422 full duplex to Magnetometer Detector Control Unit via RJ45 connector	over-the-air protocol		TDMA based secure protocol	physical layer protocol		IEEE 802.15.4 PHY	modulation		Direct Sequence Spread Spectrum Offset Quadrature Phase-Shift Keying (DSSS O-QPSK)										
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	<p>Magnetometer Repeater + Standard Antenna and/or Long-Range Antenna</p> <p>Description The Magnetometer Networks Repeaters are used in cases where the installed Magnetometer System Networks wireless sensors are out of range of the nearest access point, one or more Magnetometer System Networks repeaters can be used to provide a two-way relay between the out of range sensors and the access point. A repeater is pole mounted by the roadside and is positioned so that both the sensors and the tandem repeater or access point are within view and within range.</p> <p>Repeater Types The Magnetometer System Solar Repeater is a single pole-mounted unit with a 10+ year life that eliminates any battery replacement for the effective life of the wireless sensor networking system thereby lowering ongoing maintenance costs. It is housed in a new robust enclosure that provides excellent protection against heat and humidity. The solar panels are mounted on two sides of the enclosure cover to allow increased exposure to sunlight during the sun's trajectory over the course of a day seasonally. It has a connector for an external antenna to provide for greater flexibility in providing a two-way relay between long range sensors and the access point. It should be mounted in such a way to receive maximum amount of sunlight. Stainless steel pole mount brackets to be supplied with the unit. Best practice to avoid areas that are in shade for the majority of the day.</p> <p>It has three different power sources: (i) the solar panels used when the sun is shining, (ii) a rechargeable battery that is charged by the solar panels and used when the sun is not shining, (iii) Lithium battery as backup where there might be extended periods of low sunlight.</p> <p>The multiple power sources provide a reliable mechanism to provide power for the repeater for at least 10 years.</p> <p>Antenna options. The External Antenna connects to the Solar Repeater via a coaxial cable. The antenna allows the repeater to be aimed in two directions simultaneously utilizing a pole located between the sensor and access point. Two types of External Antenna are supported: (i) Standard with the same RF coverage as the internal antenna and (ii) Long Range RF coverage. The Solar Repeater can also operate without an external antenna</p> <p>Features and Functions Relay of radio communications</p>																																		

	<ul style="list-style-type: none"> - To/from wireless sensors (downlink) - To/from access point (uplink) - To/from another repeater (uplink or downlink) <p>Extension of range and coverage of the access point</p> <ul style="list-style-type: none"> - Can be operated in tandem – one repeater and its supported sensors can communicate with another repeater and then to the access point - Maximum single-hop range of 610 meters from supporting access point or repeater - Maximum single-hop range of 91 meters from sensors with Long Range External Antenna <p>Fully wireless operation – no cable connections</p> <p>Radio signal quality measurements (of each link to wireless sensor or tandem repeater)</p> <ul style="list-style-type: none"> - Receive Signal Strength Indicator (RSSI, in dBm) - Link Quality Index (LQI, figure of merit 40-99) - Firmware upgrades over-the-air from access point <p>New enclosure</p> <ul style="list-style-type: none"> - Robust protection against moisture inside enclosure - More compact <p>Simple installation</p> <ul style="list-style-type: none"> - Any roadside location that provides adequate signal coverage to sensors and the access point or repeater - No special requirements regarding setback, relative angle of the sun or mounting stability - No calibration or adjustment required <p>Functional Specifications</p> <p>Interfaces</p> <ul style="list-style-type: none"> - to/from sensors via 802.15.4 PHY radio - to/from repeaters via 802.15.4 PHY radio - to/from access point via 802.15.4 PHY radio <p>Over-the-air protocol</p> <p>TDMA based secure protocol</p> <p>physical layer</p> <p>protocol IEEE 802.15.4 PHY</p> <p>Modulation</p> <ul style="list-style-type: none"> - Direct Sequence Spread Spectrum Offset - Quadrature Phase-Shift Keying (DSSS OQPSK) <p>Transmit/receive bit rate 250 kbps</p> <p>Frequency band 2400 to 2483.5 MHz (ISM unlicensed band)</p> <p>Frequency channels 16</p> <p>Channel bandwidth 2 MHz</p> <p>Antenna type microstrip patch antenna behind front face panel)</p> <p>Antenna field of view $\pm 60^\circ$ (azimuth & elevation)</p> <p>Nominal output power 3 dBm</p> <p>Spurious emissions:</p> <ul style="list-style-type: none"> - 30 - 1000 MHz: < -36 dBm - 1 - 12.75 GHz: < -30 dBm - 1.8 - 1.9 GHz: < -44 dBm - 5.3 GHz: < -47 dBm <p>Typical receive sensitivity -101 dBm (PER \leq 1%)</p> <p>Saturation (max input level) \geq 10 dBm</p> <p>Power, Physical, & Environmental</p> <p>power supply:</p> <ul style="list-style-type: none"> - Solar panel: 200 mm x 35 mm solar panels
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	<ul style="list-style-type: none"> - Rechargeable battery: Panasonic lithium ion 18650 with protection - Backup battery: Li-SOCI2 3.6v battery pack, nominal capacity 57 Ah - Recommended system replacement every 10 years <p>Dimensions:</p> <ul style="list-style-type: none"> - Solar Repeater 22.8 cm x 12.1 cm) - Standard Antenna 14.4 cm x 9 cm x 12.2 cm) - Long range Antenna 24.10 cm x 24.10 cm x 11.10 cm) <p>Weight:</p> <ul style="list-style-type: none"> - Solar Repeater 1 kg - Standard Antenna: 0.43 kg - Long range Antenna 1 kg <p>Environmental • designed for weatherproof, outdoor operation Operating temp -40°C to +80°C Product Description</p>																																																
	<p>Solar Repeater</p> <p>FLEX Standard External Antenna FLEX Long Range External Antenna Cabinet Radio and Omni Repeater</p> <p>The Cabinet mount Radio It is a module mounted inside the traffic cabinet with an external omni directional antenna mounted on top of the cabinet. This method of installation allows the Cabinet mount radio to communicate with repeaters without the need for running cables through external conduits. The Cabinet mount radio is a low powered radio that maintains two-way wireless links to an installation's repeaters. The Cabinet mount radio establishes overall time synchronization, transmits configuration commands and message acknowledgements, and receives data from the sensors and repeaters. The Cabinet mount radio then relays the data to the Wireless detection control unit over a CAT5 cable.</p> <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top; width: 30%;">Functional interfaces</td> <td style="vertical-align: top; width: 30%;">Specifications</td> <td style="vertical-align: top;">RS-422 full duplex to Magnetometer Detector Control Unit via RJ45 connector</td> </tr> <tr> <td style="vertical-align: top;">over-the-air protocol</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">TDMA based secure protocol</td> </tr> <tr> <td style="vertical-align: top;">physical layer protocol modulation</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">IEEE 802.15.4 PHY Direct Sequence Spread Spectrum Offset Quadrature Phase-Shift Keying (DSSS O-QPSK)</td> </tr> <tr> <td style="vertical-align: top;">transmit/receive bit rate</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">250 kbps</td> </tr> <tr> <td style="vertical-align: top;">frequency band</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">2405 to 2483.5 MHz (ISM unlicensed band)</td> </tr> <tr> <td style="vertical-align: top;">frequency channels</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">16</td> </tr> <tr> <td style="vertical-align: top;">channel bandwidth</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">2.8 MHz (20 dB)</td> </tr> <tr> <td style="vertical-align: top;">antenna type</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">ceramic patch antenna (+5 dBi)</td> </tr> <tr> <td style="vertical-align: top;">antenna field of view</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">±60° (azimuth & elevation)</td> </tr> <tr> <td style="vertical-align: top;">nominal output power</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">+3 dBm</td> </tr> <tr> <td style="vertical-align: top;">spurious emissions</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">30 - 1000 MHz: < -36 dBm 1 - 12.75 GHz: < -30 dBm 1.8 - 1.9 GHz: < -44 dBm 5.15 - 5.3 GHz: < -47 dBm</td> </tr> <tr> <td style="vertical-align: top;">typical receive sensitivity</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">-101 dBm (PER ≤ 1%)</td> </tr> <tr> <td style="vertical-align: top;">saturation (max input level)</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">≥ 10 dBm</td> </tr> <tr> <td style="vertical-align: top;">Power, Environmental consumption</td> <td style="vertical-align: top;">Physical, & power</td> <td style="vertical-align: top;">less than 150 mW</td> </tr> <tr> <td style="vertical-align: top;">input voltage</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">4.5 V up to 28 V</td> </tr> <tr> <td style="vertical-align: top;">dimensions</td> <td style="vertical-align: top;"></td> <td style="vertical-align: top;">109 mm x 88 mm x 30 mm</td> </tr> </table>	Functional interfaces	Specifications	RS-422 full duplex to Magnetometer Detector Control Unit via RJ45 connector	over-the-air protocol		TDMA based secure protocol	physical layer protocol modulation		IEEE 802.15.4 PHY Direct Sequence Spread Spectrum Offset Quadrature Phase-Shift Keying (DSSS O-QPSK)	transmit/receive bit rate		250 kbps	frequency band		2405 to 2483.5 MHz (ISM unlicensed band)	frequency channels		16	channel bandwidth		2.8 MHz (20 dB)	antenna type		ceramic patch antenna (+5 dBi)	antenna field of view		±60° (azimuth & elevation)	nominal output power		+3 dBm	spurious emissions		30 - 1000 MHz: < -36 dBm 1 - 12.75 GHz: < -30 dBm 1.8 - 1.9 GHz: < -44 dBm 5.15 - 5.3 GHz: < -47 dBm	typical receive sensitivity		-101 dBm (PER ≤ 1%)	saturation (max input level)		≥ 10 dBm	Power, Environmental consumption	Physical, & power	less than 150 mW	input voltage		4.5 V up to 28 V	dimensions		109 mm x 88 mm x 30 mm
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	<p>Omni Repeater</p> <p>The Omni Line Powered Repeater is a single pole-mounted unit. The Line Powered Repeater includes no battery and is powered by a continuous 12-24 VDC power source. The Line Powered Repeater is housed in a robust enclosure that provides IP 67 protection. The Line Powered Repeater includes two antennas. The internal antenna communicates with the sensors in the ground and should be pointed towards the sensors. The external Omni directional antenna communicates with the cabinet mount digital radio.</p> <p>48.2.1 Functional Specifications</p> <table border="0"> <tr> <td>interfaces</td> <td>to/from sensors via 802.15.4 PHY radio to/from access point via 802.15.4 PHY radio</td> </tr> <tr> <td>over-the-air protocol</td> <td>TDMA Based secure protocol</td> </tr> <tr> <td>physical layer protocol</td> <td>IEEE 802.15.4 PHY</td> </tr> <tr> <td>modulation</td> <td>Direct Sequence Spread Spectrum Offset Quadrature Phase Shift Keying (DSSS O-QPSK)</td> </tr> <tr> <td>transmit/receive bit rate</td> <td>250 kbps</td> </tr> <tr> <td>frequency band</td> <td>2400 to 2483.5 MHz (ISM unlicensed band)</td> </tr> <tr> <td>frequency channels</td> <td>16</td> </tr> <tr> <td>channel bandwidth</td> <td>2 MHz</td> </tr> <tr> <td>antenna type</td> <td>internal ceramic patch antenna (behind front face panel) external circularly polarized omni antenna</td> </tr> <tr> <td>antenna field of view</td> <td>internal: ±60° (azimuth & elevation) external: azimuth: ±360° elevation: ±60°</td> </tr> <tr> <td>nominal output power</td> <td>+3 dBm</td> </tr> <tr> <td>spurious emissions</td> <td>30 - 1000 MHz: < -36 dBm 1 - 12.75 GHz: < -30 dBm 1.8 - 1.9 GHz: < -47 dBm 5.15 - 5.3 GHz: < -47 dBm</td> </tr> <tr> <td>typical receive sensitivity</td> <td>-101 dBm (PER ≤ 1%)</td> </tr> <tr> <td>saturation (max input level)</td> <td>≥ 10 dBm</td> </tr> <tr> <td>Power, Physical, & Environmental</td> <td></td> </tr> <tr> <td>power input</td> <td>9- 24 VDC line powered (wire 24-12 stranded/solid AWG, maximum length 610 m)</td> </tr> <tr> <td>power consumption</td> <td>< 50 mW</td> </tr> <tr> <td>dimensions</td> <td>367 mm x 141.9 mm x 109.7 mm</td> </tr> <tr> <td>weight</td> <td>0.56 kg</td> </tr> <tr> <td>environmental</td> <td>designed for weatherproof, outdoor operation IP67 ingress protection</td> </tr> <tr> <td>operating temp</td> <td>-40°C to +80°C</td> </tr> </table>	interfaces	to/from sensors via 802.15.4 PHY radio to/from access point via 802.15.4 PHY radio	over-the-air protocol	TDMA Based secure protocol	physical layer protocol	IEEE 802.15.4 PHY	modulation	Direct Sequence Spread Spectrum Offset Quadrature Phase Shift Keying (DSSS O-QPSK)	transmit/receive bit rate	250 kbps	frequency band	2400 to 2483.5 MHz (ISM unlicensed band)	frequency channels	16	channel bandwidth	2 MHz	antenna type	internal ceramic patch antenna (behind front face panel) external circularly polarized omni antenna	antenna field of view	internal: ±60° (azimuth & elevation) external: azimuth: ±360° elevation: ±60°	nominal output power	+3 dBm	spurious emissions	30 - 1000 MHz: < -36 dBm 1 - 12.75 GHz: < -30 dBm 1.8 - 1.9 GHz: < -47 dBm 5.15 - 5.3 GHz: < -47 dBm	typical receive sensitivity	-101 dBm (PER ≤ 1%)	saturation (max input level)	≥ 10 dBm	Power, Physical, & Environmental		power input	9- 24 VDC line powered (wire 24-12 stranded/solid AWG, maximum length 610 m)	power consumption	< 50 mW	dimensions	367 mm x 141.9 mm x 109.7 mm	weight	0.56 kg	environmental	designed for weatherproof, outdoor operation IP67 ingress protection	operating temp	-40°C to +80°C
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	<p>Wireless Magnetometer Grind Resistant</p> <p>Description The Magnetometer System Networks Wireless Vehicle Detection System uses wireless magneto-resistive sensors to detect the presence and movement of vehicles. The sensors – installed in holes</p>																																										

	<p>cored in the roadway and covered with epoxy – transmit detection data in real-time via low-power radio technology to a nearby Magnetometer System Networks access point. Vehicle detections are further relayed to a traffic signal controller, remote traffic management centre, or other system. It utilizes the next generation of RF chipsets and circuitry. The sensors are installed flush with the roadway surface in plastic shells. The plastic shells enable the removal and replacement of sensors during roadway milling operations. The GR sensors are installed at depth of up to 7 inches below the top of the roadway surface without plastic shells. Sensors installed at these depths do not have to be removed and replaced during most roadway milling operations.</p> <p>In typical traffic management applications, a sensor is placed in the middle of a traffic lane to detect the presence and passage of vehicles. Vehicle speeds and length are measured by two sensors installed in the same lane with the exact distance between them configured in software. The recommended distance between sensors depends on the range of expected speeds to be measured: for typical freeway applications, a separation of 6.1 to 7.3 meters is recommended; for typical arterial applications, a separation of 3.1 to 3.7 meters is preferred.</p> <p>Advanced Magnetometer-Based Vehicle Detection. The state-of-the-art magneto-resistive sensing devices in each wireless sensor measure the x-, y-, and z-axis components of the Earth’s magnetic field at a 128 Hz sampling rate. As vehicles come within range, changes in the x, y, or z axes of the measured magnetic field become apparent. When no vehicles are present, sensors continually measure the background magnetic field to estimate a reference. Each sensor automatically self-calibrates to the local environment, and to any long-term variations of the local magnetic field, by allowing this reference value to change over time.</p> <p>Functions / Features Lower power consumption 3-axis magnetometer for vehicle detection 128 Hz sampling rate Count and presence detection modes Modes for bicycle and motorcycle detection</p> <p>Flush mount or up to 178mm depth in-pavement installation with no wires or lead-in cabling Fast and simple installation Installs in less than 10 minutes in small hole using a hammer or core drill 102 mm diameter; a maximum of 178 mm deep Covered with fast-drying epoxy</p> <p>Minimal lane closure time No saw cuts</p> <p>Expected 10-year battery life</p> <p>Rugged mechanical design Auto-calibration</p> <p>Reliable 2-way radio communications with access point</p> <p>Uniquely addressable and configurable Firmware can be upgraded over-the-air Readily deployed where other systems cannot be used</p> <p>Split roadways High water tables Damaged pavement</p>
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Functional Specifications.

detection technique	3-axis magnetic field sensing
sampling rate	128 Hz
programmable vehicle detection parameters (mode B only)	Z-axis detect threshold (mG)
	Z-axis undetect threshold (mG) X-axis undetect threshold (mG) onset filter (ms) holdover (ms) auto-recalibration timeout (secs)
over-the-air protocol	TDMA based secure protocol protocol (TDMA)
physical layer protocol	EEE 802.15.4 PHY
modulation	Direct Sequence Spread Spectrum Offset Quadrature Phase-Shift Keying (DSSS O-QPSK)
transmit/receive bit rate	250 kbps
frequency band	2400 to 2483.5 MHz (ISM unlicensed band)
frequency channels	16
channel bandwidth	2 MHz
antenna type	microstrip patch antenna (mounted below top surface of sensor)
antenna field of view	±60° (azimuth & elevation)
nominal output power	+3 dBm
spurious emissions	30 - 1000 MHz: < -36 dBm 1 - 12.75 GHz: < -30 dBm 1.8 - 1.9 GHz: < -44 dBm 5.15 - 5.3 GHz: < -47dBm
typical receive sensitivity	-101 dBm (PER = 1%)
saturation (max input level)	≥ 10 dBm

<p>Sensor Modes</p> <table border="1"> <thead> <tr> <th>mode</th> <th>application</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>B (event)</td> <td>count stations; advance detection</td> <td>sends timestamped ON and OFF detection events using configurable detection parameters not supported by traffic signal only sensor</td> </tr> <tr> <td>E (idle)</td> <td>status reporting</td> <td>disables magnetometer and sends sensor hardware and software version information</td> </tr> <tr> <td>STOPBAR-# (presence detection)</td> <td>stop bar detection; ramp management</td> <td>Sends timestamped <i>ON</i> and <i>OFF</i> detection events using pre-configured detection parameters</td> </tr> <tr> <td colspan="3">16 different stop bar detection modes can be selected recommended stop bar detection modes for specific applications:</td> </tr> <tr> <td>STOPBAR-0</td> <td>bicycles/scooters</td> <td></td> </tr> <tr> <td>STOPBAR-2</td> <td>motorcycles</td> <td></td> </tr> <tr> <td>STOPBAR-5</td> <td>passenger vehicles (normal recalibration)</td> <td></td> </tr> <tr> <td>STOPBAR-7</td> <td>passenger vehicles (fast recalibration)</td> <td></td> </tr> </tbody> </table>			mode	application	description	B (event)	count stations; advance detection	sends timestamped ON and OFF detection events using configurable detection parameters not supported by traffic signal only sensor	E (idle)	status reporting	disables magnetometer and sends sensor hardware and software version information	STOPBAR-# (presence detection)	stop bar detection; ramp management	Sends timestamped <i>ON</i> and <i>OFF</i> detection events using pre-configured detection parameters	16 different stop bar detection modes can be selected recommended stop bar detection modes for specific applications:			STOPBAR-0	bicycles/scooters		STOPBAR-2	motorcycles		STOPBAR-5	passenger vehicles (normal recalibration)		STOPBAR-7	passenger vehicles (fast recalibration)	
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<p>Wireless Radar Sensor</p> <p>Description</p> <p>Wireless Radar Sensor incorporates an extremely low power, wide-band radar with a TDMA based secure protocol. The compact in-ground sensor works using the same principle as any other radar. High frequency RF pulses are transmitted, bounced off a target object, and the return pulses are measured by a time-gated RF mixer. RF reflections are analysed to produce presence, distance, and motion measurements.</p> <p>Wireless Radar Sensor sensors are installed very close to the roadway surface and are capable of detecting trains, cars, trucks, and bicycles. Wireless Radar Sensor sensors are also capable of detecting and distinguishing objects in motion from objects that are stationary, as well as large objects from small objects. Wireless Radar Sensor sensors have a programmable detection range between 1.2 m and 3 m. The width of a detection zone is approximately 90 degrees and the default range are 2 m.</p> <p>Advanced Wireless Radar Sensor-Based In-Road and Parking Detection</p>																													

Wireless Radar Sensor sensors can detect bicycles that are stopped at a stop bar and differentiate between a vehicle and a bicycle. The basic method to differentiate bicycles from vehicles is based on measuring the breadth of the returned RF signal. Bicycles yield relatively small breadth values while vehicles generate both small and large values depending on the location of the vehicle. Wireless Radar Sensor sensors can also detect vehicles parked on the street or in a parking lot. Since there is always the possibility of a person or a vehicle moving in or near the detection zone, a filter is applied during detection to eliminate the effects of nearby moving objects. The filter removes any short-term variations so that detection is performed only on that part of the return signal that is long term stationary.

Functions/Features

Fully wireless operation – no cable connections

- Battery powered
- Eight-year battery life
- Low power consumption

Enhancement to wireless sensor

- Wireless Radar Sensor sensors can be used in conjunction with magnetometer sensors, and can be used in both dedicated and shared lanes
- Installs seamlessly as a supplement to an existing primary detection system

In-road and parking detection

- In-road detection capable of detecting bicycles and vehicles
- Modes for in-road and parking detection
- Detection modes differentiate between vehicles, bicycles, and other objects
- Detects long term stationary, stopped, and slow-moving vehicles

Detection area

- User programmable detection area
- 1 Hz sampling rate for in-road and parking detection
- Selectable sampling rate of 1/2, 1, 2, 4, and 8Hz

Simple installation

- Installs in less than 10 minutes using a hammer or core drill
- Installed flush to the road surface (no more than ¼" (.6 cm) below the road surface)
- Covered with fast-drying epoxy
- Minimal lane closure time

Functional Specifications

over-the-air protocol	TDMA based secure protocol
physical layer protocol	IEEE 802.15.4 PHY
modulation	Direct Sequence Spread Spectrum Offset Quadrature Phase-Shift Keying (DSSS O-QPSK)
transmit/receive bit rate	250 kbps
frequency band	2400 to 2483.5 MHz (ISM unlicensed band)
frequency channels	16
channel bandwidth	2 MHz
antenna type	ceramic patch antenna (mounted below top surface of sensor)
antenna field of view	±60° (azimuth & elevation)
nominal output power	+3 dBm
spurious emissions	<ul style="list-style-type: none"> • 30 - 1000 MHz: < -56 dBm • 1 - 12.75 GHz: < -44 dBm • 1.8 - 1.9 GHz: < -56 dBm • 5.15 - 5.3 GHz: < -51 dBm
typical receive sensitivity	-101 dBm

Radio Specifications

	<table border="1"> <tr> <td>frequency</td> <td>6.3 GHz</td> </tr> <tr> <td>bandwidth</td> <td>>500 MHz</td> </tr> <tr> <td>radiated power</td> <td>within FCC class B limits</td> </tr> <tr> <td>maximum range</td> <td>1.2 m to 3 m (selectable)</td> </tr> <tr> <td>calibration</td> <td>self calibrating</td> </tr> <tr> <td>sample rate</td> <td>1/2, 1, 2, 4, and 8Hz (selectable)</td> </tr> </table> <p>Power, Physical and Environmental</p> <table border="1"> <tr> <td>power supply</td> <td>non-replaceable primary Li-SOCI2 3.6V battery pack 7.2 Ah (nominal capacity)</td> </tr> <tr> <td>dimensions</td> <td>7.4 cm x 7.4 cm x 5.8 cm</td> </tr> <tr> <td>weight</td> <td>0.6 pounds / 0.3 kg</td> </tr> <tr> <td>environment</td> <td>designed for in-pavement mounting performance diminishes in standing water and in slushy conditions NEMA Type 6P enclosure IP67 ingress protection</td> </tr> <tr> <td>operating temp</td> <td>-40°C to +85°C</td> </tr> </table> <p>Interface Protocol for Detection over IP. Available preinstalled on 586 CPU Allows the Traffic controller to connect to the magnetometer system without the use of contact closure cards 20m UV Resistant Direct Burial cable with RJ45 connectors fitted All pole mount brackets and fittings to be supplied with the various units. Material to be stainless steel</p>	frequency	6.3 GHz	bandwidth	>500 MHz	radiated power	within FCC class B limits	maximum range	1.2 m to 3 m (selectable)	calibration	self calibrating	sample rate	1/2, 1, 2, 4, and 8Hz (selectable)	power supply	non-replaceable primary Li-SOCI2 3.6V battery pack 7.2 Ah (nominal capacity)	dimensions	7.4 cm x 7.4 cm x 5.8 cm	weight	0.6 pounds / 0.3 kg	environment	designed for in-pavement mounting performance diminishes in standing water and in slushy conditions NEMA Type 6P enclosure IP67 ingress protection	operating temp	-40°C to +85°C
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	<p>Streaming BPL Video Detection Sensor Kit</p> <p>Description The Streaming BPL Video Detection Camera is an Integrated Camera and detector board housing which connects to a BPL Camera interface unit with a twisted pair shielded UV resistant cable (Minimum 2 core twisted pair cable). The camera allows 16 Virtual loops per detection camera. When connected to a BPL four camera interface unit 16 outputs are available per camera to the Traffic controller. The system can be upgraded with a BPL expansion cards to 8 Video camera detectors and 32outputs. A second BPL expansion card can be used to provide a total of 48 outputs. The system shall allow remote set-up and configuration. The BPL Camera interface will have an Ethernet connection on board. The PC camera connection tool uses the USB connection for local access to the Video detection system and the Ethernet connection for ether local or remote access/configuration. Zone properties functions be configurable. Live detection viewing local and remotely. The system contains a webserver. Cables between interface and cameras are BPL Power + Communication.</p> <p>Components Streaming BPL Camera with pole mount brackets The Streaming BPL Video Detection Camera is an integrated colour camera and detector offering vehicle presence detection and traffic data collection with video compression up to H.264.</p> <p>Vehicle presence detection and monitoring of moving and stationary vehicles at signalized intersections. Via detection outputs or via IP protocol, vehicle presence information is transmitted to the traffic controller so that signal timing can be adjusted dynamically. This results in reduced waiting time, improved traffic flow and less pollution.</p> <p>Traffic data collection, queue detection and traffic flow monitoring on highways and inter-urban roads. It can be used for temporary or permanent applications.</p> <p>It is an IP-addressable video detection sensor. Streaming video at full frame rate is available for system and traffic monitoring. You can configure, view and control the system both onsite and remotely. The set-up software: connect to all BPL camera devices on the network and provides ability to position your virtual detection zones onsite and remotely.</p> <p>FUNCTIONALITIES</p> <ul style="list-style-type: none"> - Vehicle Presence Detection at Intersections - Stop Bar and Advance Detection 																						

- Data Collection
- Flow Monitoring
- Queue Detection
- All-In-One Sensor (Camera + Detector)
- Above-Ground Installation
- Up to H.264 Image Compression
- Ip-Addressability
- Real-Time Verification and Monitoring
- Easy Installation and Quick Configuration
- Low Power Consumption
- Up To 16 Presence And 4 Data Detection Zones
- Reliable Detection 24/7
- Field-Proven Traficon Detection Algorithms
- Aesthetical Design, Using Durable Materials

Camera to be available in two types Wide and Narrow angle

Type	Focal Range	Detection Area
Wide Angle	2.1mm	0 to 20m
Narrow Angle	6mm	15m to 75m

Zone functions

- Presence: presence detection of moving and stationary vehicles (= default)
- Stop: presence detection of stationary vehicles
- Loop: vehicle counting and zone occupancy

Zone Properties

- 24 Presence zones per camera
- Direction sensitivity to ignore opposite traveling traffic
- Delay and extend time on zones with ability to enable and disable at different times of day
- The pulse width and period shall be configurable if loop mode is used for vehicle counting

Imaging Specifications

System Overview

- Detection Functionalities Vehicle presence + data
- Detection Zones 24 presence zones 4 data zones
- Detection Outputs: 16 for BPL versions via BPL interface

CAMERA

- Resolution 640x480 pixels (VGA)
- Frame rate 25 FPS
- Lens Types
- Focal Distance
- Detection Distance
- Wide Angle
- 2.1mm
- 0-25m
- Mounting Height 3,5-12m
- CMOS type 1/4" colour
- Compression MJPEG, MPEG-4,
- H.264 (dual stream)

Housing

- Material Aluminium
- Dimensions
- Vertically mounted
- 45 cm x 16 cm x 12 cm,
- Horizontally mounted
- 41 cm x 18 cm x 12 cm

	<p>Sunshield Optional</p> <ul style="list-style-type: none"> - Power, outputs, communication - Operating voltage 12-32VAC, 12-42VDC - IP Address Yes - Communication PC - Sensor Via interface or direct (ETH) - Interface(s) for BPL sensors <p>Outputs</p> <ul style="list-style-type: none"> - (Pmax=300m>, Imax=50mA, - Umax=48VDC) - 16 for BPL interface - PC Tool for Setup - Regulatory, environmental - Electromagnetic Compatibility - 2004/108/EG - FCC Part 15 Class A - Temperature Range -34°C to +80°C - Materials Weatherproof (UV-resistant) - Protection grade Housing = IP68, connectors = IP67 <p>Pole mount bracket</p> <p>It can be mounted on Traffic signal infrastructure like extension poles or traffic signal poles. A flexible bracket allows horizontal and vertical mounting.</p> <p>Configuration of the sensor is done on site or remotely via portable PC with pre-installed user-friendly software. Using camera images (JPEG snapshot), virtual detection zones can be positioned accurately. Verification and viewing of the detection are possible via streaming video.</p> <p>WEB INTERFACE</p> <ul style="list-style-type: none"> - A web interface allows users to manage their video sources online. <p>RELIABLE DETECTION 24/7</p> <p>Based on field-proven video detection technology, detection performance is highly reliable for any road surface, day and night. Advanced filters in combination with smart detection algorithms allow it to be used for vehicle detection at night (detection on headlights or taillights when no/poor public illumination) and to suppress unwanted detections that can be caused by e.g. vehicle shadows or headlight reflections. A fail-safe mode is integrated into the firmware just in case accurate detection is not possible due to power failure, dense fog or when the lens is covered by snow or dirt.</p> <p>BPL Camera Interface Din Rail Mount</p> <ul style="list-style-type: none"> - Provides 16 outputs to the traffic controller and allows 4 BPL cameras to be connected to the system <p>BPL Camera/Output Expansion unit</p> <ul style="list-style-type: none"> - Allows outputs to be increased from 17 to 32 outputs. Allows to add an additional 4 cameras <p>Direct Burial cable 2 core to 8 core twisted pair UV resistant cable</p>
<p>8</p>	<p>UNINTERRUPTED POWER SUPPLY SYSTEMS</p>
	<p>The UPS shall connect either directly to the Stellenbosch Municipality RMS JSENT system or via the traffic controller.</p> <p>The UPS shall report the following: Input Voltage; Output Voltage; Battery Voltage; Load percent; temperature; UPS Mode (Shutdown Active; UPS on Standby; Boost/Buck; Test in progress); Battery status.</p> <p>Electrical: Peak Voltage Amperes (VA): 3000 with computer type load minimum continuous power Watts (W): 1000</p>

	<p>Input: AC input voltage: 230 V single phase AC input voltage window: 190 - 250 VAC, nominal mains (battery mode outside of nominal mains)</p> <p>Battery backup mode: below 190VAC Battery backup mode: above 250VAC</p> <p>Minimum start-up AC voltage: 184V (at any load) Input frequency: 50/60 Hz Input frequency range: nominal ± 5 Hz Typical no-load power consumed: <10 W Max. AC input current (A): 6.0 AC input fuse / Breaker (A): 10 Solar panel input: Sockets: IEC type C14 socket</p> <p>Output: AC output voltage: 230 V nominal AC output voltage tolerance: 190 - 250 VAC V (230V $\pm 2\%$ when operating on battery) Output frequency: 50 Hz Output frequency stability: < ± 0.1 Hz (battery operation) Output waveform: pure sine wave Crest factor handling: up to 6:1 Power factor: 1 Transfer time: < 5 ms. Sockets: IEC type C13 socket</p> <p>Efficiency: (battery fully charged)</p> <p>On mains: typical 98% On battery: typical 94%</p> <p>Dimensions: Length x Width x Height: 540 x 180 x 220</p> <p>Environment: Inverter operating temperature: -20 to 60°C Battery charging temperature: -20 to 60°C Temperature Compensation: 2.5 - 4.0 mV per °C per cell Audible noise at 1 meter: less than 35 dB(A) (virtually inaudible) Max. relative humidity: 95% (non-condensing)</p> <p>Backup Runtimes: (ratings given for 25°C) 10 Hours at 550W Batteries:</p> <p>Nominal voltage (V): 36 Batteries (number x Ah): 3 or 6 x 100 Type: AGM maintenance free or Deep Cycle Lead Acid Service life: up to 12 years (depending on operating conditions) Average battery recharge current: 12 A (from 30% to full)</p> <p>Communications: 1 x RS232 isolated interface Open communications protocol</p> <p>Logging and Reporting: Mains Event Logging, recording and reporting Power, current and voltage recording facilities Mains failure logging and reporting</p>
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	<p>Battery failure logging and reporting UPS Bypassed via remote switch</p> <p>Display: Parameters should be visible via display</p>
	<p>Industrial 4 Port Router</p> <p>Industrial 4 Port cellular router, secure and high-speed wireless connectivity with VPN supported. Programmable industrial mobile router with high performance and harden casing design for remote management, telemetry, condition monitoring, CCTV, ATMs, vending machine and other M2M applications.</p> <p>Basic Features</p> <ul style="list-style-type: none"> - Industrial robust design and compact metal housing - 3G, 2.5G backward compatible - Strong electromagnetic interference Resistance, heat endurance and radiation ability - Ultra security, VPN: PPTP, L2TP, GRE, IPSec VPN optional - Built-in watch dog, Multi-link detection - 802.11b/g/n Wi-Fi support, 150Mbps data rate - 5xLAN or 4xLAN, 1xWAN - WAN port support PPPoE, static IP, DHCP client. - Always online, reboot automatically if disconnected to ensure continual connection - Support APN and VPDN wireless private network access in - LCP/ICMP/flow/heartbeat check, ensure network usability - Web/CLI/SSH/Management platform support, easy configure - SNMP network management, NTP support - Local & remote management (configuration, status, upgrade firmware) - Supports DHCP Server - Supports DNS proxy and Dynamic DNS (DDNS) - Supports timing operation - Supports LED status indication - Shock and vibration resistant

Specification.

Optional Supports Mobile Network	FDD-LTE / TDD-LTE DC-HSPA+/HSPA+/HSPA/HSDPA/WCDMA/UMTS EDGE/GPRS CDMA2000 EVDO/CDMA 1X
Ethernet Standard	IEEE 802.3 IEEE 802.3u
Interface	5× 10/100Mb LAN (4xLAN, 1xWAN configurable) 1× RS-232 console port(RJ45) 3× SMA-K antenna interface (4 & 5 optional) 1× Standard SIM/R-UIM Slot (Daul SIM optional) 1× power connector
LED instruction	NET WLAN WAN LAN (LAN1~LAN4)
Route protocol	Static route RIPv2/OSPF dynamic route
Power supply	7.5 - 32VDC
Device Management	Local or remote web browser (IE v8 or above) CLI/Telnet command M2M management platform (optional) SSH configure (optional)
WiFi	Standard: IEEE 802.11b/g/n WEP, WPA and WPA2 encryption Standard 150Mbps, 300Mbps optional AP, Client, station, bridge mode support
Firewall & Filter	IP packet/Domain/MAC filter NAT DMZ
VPN	IPSec PPTP/L2TP client GRE/IPIP
Power Consumption	Idle: 180mA@+12VDC Single Module Communications: 210mA@+12VDC Dual Module Communications: 600mA@+12VDC
Other	Dimension: 176mm x 105mm x 25mm (not including antenna) Weight: 350g Operation temperature: -30~+70 degree Store temperature: -40~+85 degree Related humidity: <95% (non-condensing) Guarantee: one year
Approval	CE FCC RoHS CCC
Standard	EN 300 328 v 2.1.1 (2016-11) EN 301 489-52, EN 301 489-17, EN 301 489-1 EN 301 908-1, EN 301 908-2, EN 301 908-13, EN 55023:2015 EN 60950-1, EN 55024:2010 EN 61000-3-2: 2014 EN 61000-3-3:2013 EN 62311:2008

9	ENERGY STORAGE MODULES DEVICES																																																																						
	<p>48V 5kW Lithium Ion Battery</p> <table border="1" data-bbox="316 407 1449 1223"> <tr> <td>Nominal Energy</td> <td>5KWH</td> <td>7.5KWH</td> <td>10KWH</td> </tr> <tr> <td>Nominal Voltage</td> <td>51.2V</td> <td>51.2V</td> <td>51.2V</td> </tr> <tr> <td>Nominal Capacity</td> <td>100Ah</td> <td>150Ah</td> <td>200Ah</td> </tr> <tr> <td>Cell Type</td> <td>LFP</td> <td>LFP</td> <td>LFP</td> </tr> <tr> <td>Standard Charge Voltage</td> <td>56V</td> <td>56V</td> <td>56V</td> </tr> <tr> <td>Max Discharge Current</td> <td>100A</td> <td>150A</td> <td>150A</td> </tr> <tr> <td>Discharge Cut-Off Voltage</td> <td>44.8V</td> <td>44.8V</td> <td>44.8V</td> </tr> <tr> <td>Parallels Function</td> <td colspan="3">Support 8 Units In Parallels</td> </tr> <tr> <td>Communication Interface</td> <td colspan="3">RS485、RS232、CAN (Optional)</td> </tr> <tr> <td>Cycle Life *</td> <td colspan="3">≥6000 Cycles (80%DOD)</td> </tr> <tr> <td>Charge temperature range</td> <td colspan="3">0~65°C</td> </tr> <tr> <td>Discharge temperature range</td> <td colspan="3">-20~65°C</td> </tr> <tr> <td>Certification</td> <td colspan="3">MSDS / UN38.3</td> </tr> <tr> <td>Dimensions</td> <td>480*600*150mm</td> <td>480*650*180mm</td> <td>480*650*225mm</td> </tr> <tr> <td>Weight</td> <td>58Kg</td> <td>85Kg</td> <td>93Kg</td> </tr> <tr> <td>Installation method</td> <td colspan="3">Wall Mounted/Floor Standing</td> </tr> <tr> <td>Warranty</td> <td colspan="3">5 Years</td> </tr> </table>			Nominal Energy	5KWH	7.5KWH	10KWH	Nominal Voltage	51.2V	51.2V	51.2V	Nominal Capacity	100Ah	150Ah	200Ah	Cell Type	LFP	LFP	LFP	Standard Charge Voltage	56V	56V	56V	Max Discharge Current	100A	150A	150A	Discharge Cut-Off Voltage	44.8V	44.8V	44.8V	Parallels Function	Support 8 Units In Parallels			Communication Interface	RS485、RS232、CAN (Optional)			Cycle Life *	≥6000 Cycles (80%DOD)			Charge temperature range	0~65°C			Discharge temperature range	-20~65°C			Certification	MSDS / UN38.3			Dimensions	480*600*150mm	480*650*180mm	480*650*225mm	Weight	58Kg	85Kg	93Kg	Installation method	Wall Mounted/Floor Standing			Warranty	5 Years		
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	<p><u>MultiPlus Inverter/Charger 500VA - 2000VA 12 / 24 / 48V</u></p> <p>Multifunctional, with intelligent power management The MultiPlus is a powerful true sine wave inverter, a sophisticated battery charger that features adaptive charge technology, and a highspeed. AC transfer switch in a single compact enclosure. Next to these primary functions, the MultiPlus has several advanced features, as outlined below.</p> <p>Parallel operation and three phase capability Up to six Multis can operate in parallel to achieve higher power output. In addition to parallel connection, three units can be configured for three-phase output.</p> <p>PowerControl - Dealing with limited generator, shore side or grid power With the Multi Control Panel a maximum generator or shore current can be set. The MultiPlus will then take account of other AC loads and use whatever is extra for charging, thus preventing the generator or shore supply from being overloaded.</p> <p>PowerAssist - Boosting the capacity of shore or generator power This feature takes the principle of PowerControl to a further dimension. It allows the MultiPlus to supplement the capacity of the alternative source. Where peak power is so often required only for a limited period, the MultiPlus will make sure that insufficient shore or generator power is immediately compensated for by power from the battery. When the load reduces, the spare power is used to recharge the battery.</p>																																																																						

Four stage adaptive charger and dual bank battery charging

The main output provides a powerful charge to the battery system by means of advanced 'adaptive charge' software. The software finetunes the three-stage automatic process to suit the condition of the battery, and adds a fourth stage for long periods of float charging.

The adaptive charge process is described in more detail on the Phoenix Charger datasheet and on our website, under Technical Information. In addition to this, the MultiPlus will charge a second battery using an independent trickle charge output intended for a main engine or generator starter battery.

High start-up power

Needed to start high inrush loads such as power converters for LED lamps, halogen lamps or electric tools.

Search Mode

When Search Mode is 'on', the power consumption of the inverter in no-load operation is decreased by approx. 70%. In this mode the Multi, when operating in inverter mode, is switched off in case of no load or very low load, and switches on every two seconds for a short period. If the output current exceeds a set level, the inverter will continue to operate. If not, the inverter will shut down again.

Programmable relay

By default, the programmable relay is set as an alarm relay, i.e. the relay will de-energise in the event of an alarm or a pre-alarm (inverter almost too hot, ripple on the input almost too high, battery voltage almost too low).

Remote on / off / charger on

Three pole connectors.

On-site system configuring, monitoring and control

After installation, the MultiPlus is ready to go. Some settings can be changed with DIP switches. 500/800/1200VA models: remote switch / battery charge voltage / inverter frequency / search mode. 1600/2000VA models: battery charge voltage / search mode. For more settings use VE-Config or the VE.Bus Smart dongle.

Remote configuring and monitoring

Install a Cerbo GX or other GX product to connect to the internet. Operational data can be stored and displayed on our VRM (Victron Remote Management) website, free of charge. When connected to the internet, systems can be accessed remotely, and settings can be changed.

12 Volt 24 Volt 48 Volt	MultiPlus 12/500/20 MultiPlus 24/500/10 MultiPlus 48/500/6	MultiPlus 12/800/35 MultiPlus 24/800/16 MultiPlus 48/800/9	MultiPlus 12/1200/50 MultiPlus 24/1200/25 MultiPlus 48/1200/13	MultiPlus 12/1600/70 MultiPlus 24/1600/40 MultiPlus 48/1600/20	MultiPlus 12/2 MultiPlus 24/2 MultiPlus 48/2
PowerControl / PowerAssist	No	Yes	Yes	Yes	Yes
Three Phase and parallel operation	Yes	Yes	Yes	Yes	Yes
Transfer switch	16 A	16 A	16 A	16 A	35 A
INVERTER					
Input voltage range	9,5 – 17 V 19 – 33 V 38 – 66 V				
Output	Output voltage: 230VAC ± 2% Frequency: 50Hz ± 0,1% (1)				
Cont. output power at 25°C (3)	500 VA	800 VA	1200 VA	1600 VA	2000 VA
Cont. output power at 25°C	430 W	700 W	1000 W	1300 W	1600 W
Cont. output power at 40°C	400 W	650 W	900 W	1100 W	1400 W
Cont. output power at 65°C	300 W	400 W	600 W	800 W	1000 W
Peak power	900 W	1600 W	2400 W	2800 W	3500 W
Maximum efficiency	90 / 91 / 92%	92 / 93 / 94%	93 / 94 / 95%	93 / 94 / 95%	93 / 94 / 9
Zero-load power	6 / 6 / 7 W	7 / 7 / 8 W	10 / 9 / 10 W	10 / 9 / 10 W	10 / 9 / 10
Zero-load power in search mode	2 / 2 / 3 W	2 / 2 / 3 W	3 / 3 / 3 W	3 / 3 / 3 W	3 / 3 / 3
CHARGER					
AC Input	Input voltage range: 187-265 VAC Input frequency: 45 – 65 Hz				
Charge voltage 'absorption'	14,4 / 28,8 / 57,6 V				
Charge voltage 'float'	13,8 / 27,6 / 55,2 V				
Storage mode	13,2 / 26,4 / 52,8 V				
Charge current house battery (4)	20 / 10 / 6 A	35 / 16 / 9 A	50 / 25 / 13 A	70 / 40 / 20 A	80 / 50 / 2
Charge current starter battery	1A (12 V and 24 V models only)				
Battery temperature sensor	Yes				
GENERAL					
Programmable relay (5)	Yes				
Protection (2)	a – g				
VE.Bus communication port	For parallel and three phase operation, remote monitoring and system integration (RJ45-splitter ASS030065510 needed for 500 / 800 / 1200 VA models)				
Remote on-off	On/off/charger only			On/off	
DIP switches	Yes (6)	Yes (6)	Yes (6)	Yes (7)	Yes (7)
Internal DC fuse	125 / 60 / 30 A	150 / 80 / 40 A	200 / 100 / 50 A	200 / 125 / 60 A	no
Common Characteristics	Operating temp. range: -40 to +65°C (fan assisted cooling) Humidity (non-condensing): max 95%				
ENCLOSURE					
Common Characteristics	Material & Colour: Steel/ABS (blue RAL 5012)		Protection category: IP 21		Steel (RAL 501
Battery-connection	16 / 10 / 10 mm ²	25 / 16 / 10 mm ²	35 / 25 / 10 mm ²	50 / 35 / 16 mm ²	M8 bolt
230V AC-connection	G-ST18i connector				
Weight	4,4 kg	6,4 kg	8,2 kg	10,2 kg	15,5 kg
Dimensions (h x w x d)	311 x 182 x 100 mm	360 x 240 x 100 mm	406 x 250 x 100 mm	470 x 265 x 120 mm	506 x 236 x 1
STANDARDS					
Safety	EN-IEC 60335-1, EN-IEC 60335-2-29, EN 62109-1				
Emission Immunity	EN 55014-1, EN 55014-2, EN-IEC 61000-3-2, EN-IEC 61000-3-3, IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3				
Automotive Directive	ECE R10-5				
1) Can be adjusted to 60Hz and to 240V 2) Protection: a. Output short circuit b. Overload c. Battery voltage too high d. Battery voltage too low e. Temperature too high f. 230VAC on inverter output g. Input voltage ripple too high 3) Non-linear load, crest factor 3:1 4) Up to 25°C ambient 5) Programmable relay which can be set for: general alarm, DC under voltage or generator start/stop signal function AC rating: 230V/4A DC rating: 4A up to 35VDC, 1A up to 60VDC 6) Remote / battery charge voltage / inverter frequency / search mode 7) Battery charge voltage / search mode					

Cerbo GX, Cerbo-S GX and GX Touch

Cerbo GX: communication-centre

This communication-centre allows you to always have perfect control over your system from wherever you are and to maximise its performance. Simply access your system via our Victron Remote Management (VRM) portal, or access it directly, using the optional GX Touch screen, a Multi-Functional Display (MFD) or our Victron Connect app thanks to its Bluetooth capability.

GX Touch: display accessory

The GX Touch 50 and GX Touch 70 are display accessories for the Cerbo GX. The five inch and seven-inch touch screen displays give an instant overview of your system and allows you to adjust settings. Simply connect the display to the Cerbo GX with just one cable. Both GX Touch displays have a waterproof design, a top-mountable setup and are simple to install. The supplied (from serial number HQ2242) protection cover prevents damage from UV light during prolonged exposure to the sun.

Remote Console on VRM

Monitor, control and configure the Cerbo GX remotely, over the internet. Just like if you were standing in front of the device, using Remote Console. The same functionality is also available on the local network LAN, or using the Wi-Fi Access Point of the Cerbo GX.

Perfect monitoring & control

Instantly monitor the battery state of charge, power consumption, power harvest from PV, generator, and mains, or check tank levels and temperature measurements. Easily control the shore power input current limit, (auto)start/stop generator(s) or change any setting to optimise the system. Follow up on alerts, perform diagnostic checks and resolve complications remotely.

Simple mounting and configuration

The Cerbo GX is easily mountable and can also be mounted on a DIN-Rail using the DIN35 adapter small, (not included). Its separate touchscreen can be bolted on a dashboard, eliminating the need to create perfect cut-outs (like with the Color Control GX). Connection is easy via just one cable, taking away the hassle of having to bring many wires to the dashboard. The Bluetooth feature enables a quick connection and configuration.

	Cerbo GX	Cerbo-S GX
Supply voltage	8 – 70V DC	
Mounting	Wall or DIN rail (35mm) ²⁾	
Communication ports		
VE.Direct ports (always isolated)	3 ⁽³⁾	
VE.Bus (always isolated)	2 paralleled RJ45 sockets	
VE.Can	yes - non isolated	
BMS-Can port	yes	No
IO		
Resistive tank level inputs	4	0
Temperature sense inputs	4	0
Digital Inputs	4	4
Other		
Outer dimensions (h x w x d)	78 x 154 x 48 mm	
Operating temperature range	-20 to +50°C	
Standards		
Safety	IEC 62368-1	
EMC	EN 301489-1, EN 301489-17	
Automotive	ECE R10-6	
GX Touch 50 / GX Touch 70		
Mounting	With included mounting accessories	
Protection cover	Included with every GX Touch from serial number HQ2242 Can also be purchased individually: Part number BPP900462050: GX Touch 50 protection cover Part number BPP900462070: GX Touch 70 protection cover	
Display Resolution	GX Touch 50: 800 x 480 GX Touch 70: 1024 x 600	
Other		
Outer dimensions (h x w x d)	GX Touch 50: 87 x 128 x 12.4 mm GX Touch 70: 113 x 176 x 13.5 mm	
Cable length	2 meter	

EasySolar-II 3kVA MPPT 250/70 GX, 5kVA MPPT 250/100 GX

(The all-in-one solar power solution)

The EasySolar-II GX integrates the following elements:

- A MultiPlus-II inverter/charger
- A SmartSolar MPPT -Tr solar charge controller
- A GX device with a 2 x 16-character display.

These elements come prewired together inside a single unit. This greatly simplifies most installations, saving time and money.

Display and Wi-Fi

The display reads battery, inverter and solar charge controller parameters. The same parameters can be accessed with a smartphone or other Wi-Fi enabled device. In addition, Wi-Fi can be used to set up the system and to change settings.

Solar charge controller

The DC output of the SmartSolar MPPT is parallel wired with the DC connection of the MultiPlus-II inverter/charger.

The on/off mechanism of the MultiPlus-II also controls the SmartSolar MPPT.

GX device

The integrated GX device includes:

- A BMS-Can interface. This can be used to connect to a compatible CAN-bus managed battery. Note that this not a VE.Can compatible port.
- A USB ports
- An Ethernet ports
- A VE.Direct port

The GX device controls the MultiPlus-II and the SmartSolar MPPT with respectively a VE.Bus and a VE.Direct connection.

EasySolar-II	24/3000/70-32 MPPT 250/70 GX	48/3000/35-32 MPPT 250/70 GX	48/5000/70-50 MPPT 250/100 GX
INVERTER/CHARGER			
PowerControl & PowerAssist	Yes		
Transfer switch	32 A		50 A
Maximum AC input current	32 A		50 A
Auxiliary output	32 A		50 A
INVERTER			
Input voltage range	19 – 33 V	38 – 66 V	38 – 66 V
Output	Output voltage: 230 VAC ± 2 % Frequency: 50 Hz ± 0,1 % (1)		
Cont. output power at 25 °C (3)	3000 VA / 2400 W	3000 VA / 2400 W	5000 VA / 4000 W
Cont. output power at 40 °C / 55 °C	2200 W / 1700 W	2200 W / 1700 W	3700 W / 3000 W
Maximum apparent feed-in power	2470W / 3000 VA	2470W / 3000 VA	4400 W / 5000 VA
Peak power	5500 W	5500 W	9000 W
Maximum efficiency	94 %	95 %	96%
Zero load power	13 W	11 W	18 W
Zero load power in AES mode	9 W	7 W	12 W
Zero load power in Search mode	3 W	2 W	2 W
CHARGER			
AC Input	Input voltage range: 187-265 VAC Input frequency: 45 – 65 Hz		
Charge voltage 'absorption'	28.8 V		57,6 V
Charge voltage 'float'	27.6 V		55,2 V
Storage mode	26.4 V		52,8 V
Maximum battery charge current	70 A	35 A	70 A
Battery temperature sensor		Yes	
Programmable relay (5)		Yes	
Protection (2)		a - g	
VE.Bus communication port	For parallel and three phase operation, remote monitoring and system integration		
General purpose com. port	Yes, 2x		

SMARTSOLAR CHARGE CONTROLLER			
Model	MPPT 250/70-Tr		MPPT 250/100-Tr
Maximum output current	70 A		100 A
Maximum PV power	2000 W	4000 W	5800 W
Maximum PV open circuit voltage	250 V		
Maximum efficiency	99%		
Self-consumption	20 mA		
Charge voltage 'absorption', default	57,6 V		
Charge voltage 'float', default	55,2 V		
Protection (2)	a – e		
GENERAL			
Interfaces	BMS-Can, USB, Ethernet, VE.Direct, Wi-Fi		
Remote on-off	Yes		
Operating temp. range	-20 to +45 °C (fan assisted cooling) Max. altitude 2000 m		
Humidity (non-condensing):	max 95 %		
ENCLOSURE			
Material & Colour	aluminium (blue RAL 5012)		
Protection category	IP21		
Battery-connection	M8 bolts		
PV connection	M6 bolts		
230 VAC-connection	Screw terminals 16 mm ² (6 AWG)		
Weight	26 kg	26 kg	38.6 kg
Dimensions (h x w x d) mm	499 x 268 x 237		604 x 323 x 253
STANDARDS			
Safety	EN-IEC 60335-1, EN-IEC 60335-2-29, EN-IEC 62109-1, EN-IEC 62109-2		
Emission / Immunity	EN 55014-1, EN 55014-2, EN-IEC 61000-3-2, EN-IEC 61000-3-3 IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3		

MultiPlus-II GX Inverter/Charger
MultiPlus-II 24/3000/70-32 GX, 48/3000/35-32 GX & 48/5000/70-50 GX

A MultiPlus-II with LCD and GX functionality
The MultiPlus-II GX integrates a MultiPlus-II inverter/charger and a GX device with a 2 x 16 character display.

Display and Wi-Fi
The display reads battery, inverter and solar charge controller parameters.
The same parameters can be accessed with a smartphone or other Wi-Fi enabled device.

GX device
The integrated GX device includes:

- A BMS-Can interface. This can be used to connect to a compatible CAN-bus managed battery. Note that this not a VE.Can compatible port.
- A USB port.
- A Ethernet port.
- A VE.Direct port.

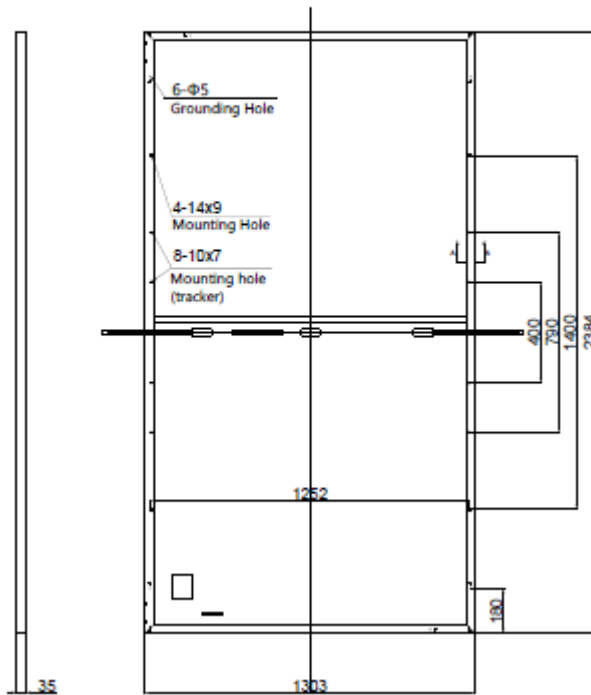
Applications
The MultiPlus-II GX is intended for applications where additional interfacing with other products and/or remote monitoring is required, such as on-grid or off-grid energy storage systems and certain mobile applications.

Parallel and three phase operation
Only one GX unit is needed in case of Parallel and three phase operation.

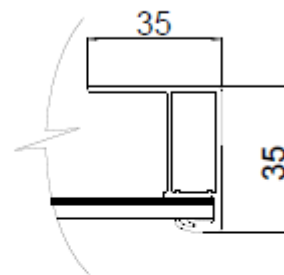
	<table border="1"> <tr> <th>MultiPlus-II GX</th> <th>24/3000/70-32</th> <th>48/3000/35-32</th> <th>48/5000/70-50</th> </tr> <tr> <td>PowerControl & PowerAssist</td> <td colspan="3">Yes</td> </tr> <tr> <td>Transfer switch</td> <td>32 A</td> <td></td> <td>50 A</td> </tr> <tr> <td>Maximum AC input current</td> <td>32 A</td> <td></td> <td>50 A</td> </tr> <tr> <td>Auxiliary output</td> <td colspan="3">Yes (32 A)</td> </tr> <tr> <th colspan="4">INVERTER</th> </tr> <tr> <td>DC Input voltage range</td> <td>19 – 33 V</td> <td colspan="2">38 – 66 V</td> </tr> <tr> <td>Output</td> <td colspan="3">Output voltage: 230 VAC ± 2 % Frequency: 50 Hz ± 0,1 % (1)</td> </tr> <tr> <td>Cont. output power at 25 °C (3)</td> <td>3000 VA</td> <td></td> <td>5000 VA</td> </tr> <tr> <td>Cont. output power at 25 °C</td> <td>2400 W</td> <td></td> <td>4000 W</td> </tr> <tr> <td>Cont. output power at 40 °C</td> <td>2200 W</td> <td></td> <td>3700 W</td> </tr> <tr> <td>Cont. output power at 65 °C</td> <td>1700 W</td> 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current	32 A		50 A	Auxiliary output	Yes (32 A)			INVERTER				DC Input voltage range	19 – 33 V	38 – 66 V		Output	Output voltage: 230 VAC ± 2 % Frequency: 50 Hz ± 0,1 % (1)			Cont. output power at 25 °C (3)	3000 VA		5000 VA	Cont. output power at 25 °C	2400 W		4000 W	Cont. output power at 40 °C	2200 W		3700 W	Cont. output power at 65 °C	1700 W		3000 W	Maximum apparent feed-in power	3000 VA		5000 VA	Peak power	5500 W		9000 W	Maximum efficiency	94 %	95 %	96 %	Zero load power	13 W	11 W	18 W	Zero load power in AES mode	9 W	7 W	12 W	Zero load power in Search mode	3 W	2 W	2 W	CHARGER				AC Input	Input voltage range: 187-265 VAC Input frequency: 45 – 65 Hz			Charge voltage 'absorption'	28,8 V		57,6 V	Charge voltage 'float'	27,6 V		55,2 V	Storage mode	26,4 V		52,8 V	Maximum battery charge current (4)	70 A	35 A	70 A	Battery temperature sensor	Yes			GENERAL				Interfaces	BMS-Can, USB, Ethernet, VE.Direct, Wi-Fi			External AC current sensor (optional)	50 A		100 A	Programmable relay (5)	Yes			Protection (2)	a – g			VE.Bus communication port	For parallel and three phase operation, remote monitoring and system integration			General purpose com. port	Yes, 2x			Remote on-off	Yes			Operating temperature range	-40 to +65 °C (fan assisted cooling)			Humidity (non-condensing)	max 95 %			ENCLOSURE				Material & Colour	Steel, blue RAL 5012			Protection category	IP22			Battery-connection	M8 bolts			230 V AC-connection	Screw terminals 13 mm ² (6 AWG)			Weight	20 kg		31 kg	Dimensions (hwxwd) mm	506 x 275 x 147		565 x 323 x 148	STANDARDS				Safety	EN-IEC 60335-1, EN-IEC 60335-2-29, EN-IEC 62109-1, EN-IEC 62109-2			Emission, Immunity	EN 55014-1, EN 55014-2 EN-IEC 61000-3-2, EN-IEC 61000-3-3 IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3			Uninterruptible power supply	IEC 62040-1		
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ENGINEERING DRAWING (mm)

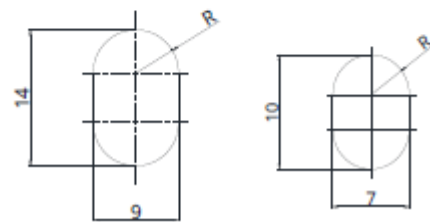
Rear View



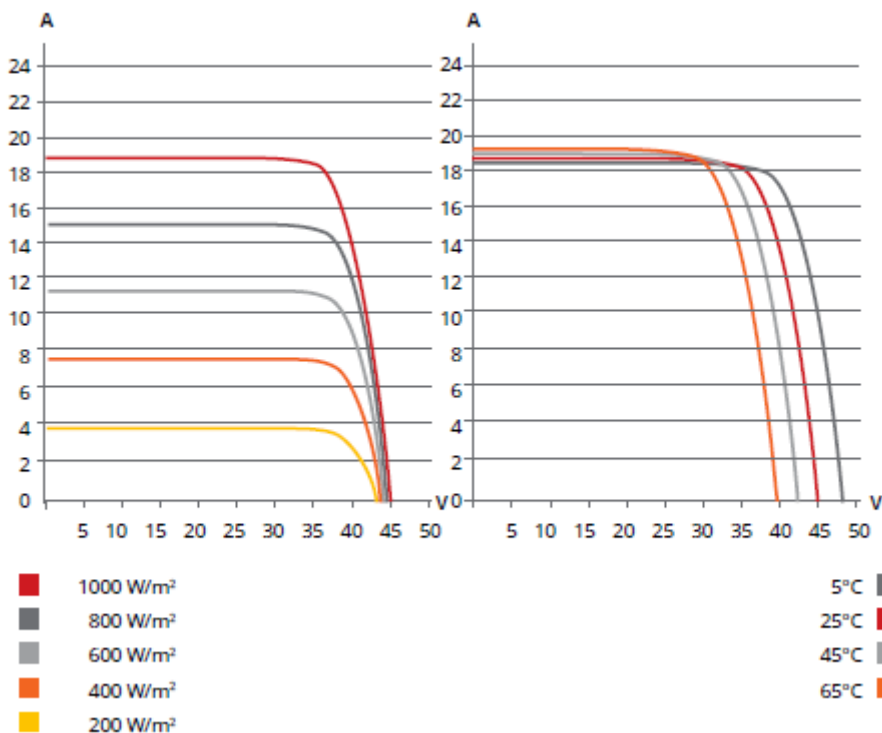
Frame Cross Section A-A



Mounting Hole



CS7N-650MS / I-V CURVES



ELECTRICAL DATA STC*							
CS7N	640MS	645MS	650MS	655MS	660MS	665MS	670MS
Nominal Max. Power (Pmax)	640 W	645 W	650 W	655 W	660 W	665 W	670 W
Opt. Operating Voltage (Vmp)	37.5 V	37.7 V	37.9 V	38.1 V	38.3 V	38.5 V	38.7 V
Opt. Operating Current (Imp)	17.07 A	17.11 A	17.16 A	17.20 A	17.24 A	17.28 A	17.32 A
Open Circuit Voltage (Voc)	44.6 V	44.8 V	45.0 V	45.2 V	45.4 V	45.6 V	45.8 V
Short Circuit Current (Isc)	18.31 A	18.35 A	18.39 A	18.43 A	18.47 A	18.51 A	18.55 A
Module Efficiency	20.6%	20.8%	20.9%	21.1%	21.2%	21.4%	21.6%
Operating Temperature	-40°C ~ +85°C						
Max. System Voltage	1500V (IEC/UL) or 1000V (IEC/UL)						
Module Fire Performance	TYPE 1 (UL 61730 1500V) or TYPE 2 (UL 61730 1000V) or CLASS C (IEC 61730)						
Max. Series Fuse Rating	30 A						
Application Classification	Class A						
Power Tolerance	0 ~ + 10 W						
* Under Standard Test Conditions (STC) of irradiance of 1000 W/m ² , spectrum AM 1.5 and cell temperature of 25°C.							
ELECTRICAL DATA NMOT*							
CS7N	640MS	645MS	650MS	655MS	660MS	665MS	670MS
Nominal Max. Power (Pmax)	480 W	484 W	487 W	491 W	495 W	499 W	502 W
Opt. Operating Voltage (Vmp)	35.2 V	35.3 V	35.5 V	35.7 V	35.9 V	36.1 V	36.3 V
Opt. Operating Current (Imp)	13.64 A	13.72 A	13.74 A	13.76 A	13.79 A	13.83 A	13.85 A
Open Circuit Voltage (Voc)	42.2 V	42.3 V	42.5 V	42.7 V	42.9 V	43.1 V	43.3 V
Short Circuit Current (Isc)	14.77 A	14.80 A	14.83 A	14.86 A	14.89 A	14.93 A	14.96 A
* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m ² spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.							
TEMPERATURE CHARACTERISTICS							
Specification	Data						
Temperature Coefficient (Pmax)	-0.34 % / °C						
Temperature Coefficient (Voc)	-0.26 % / °C						
Temperature Coefficient (Isc)	0.05 % / °C						
Nominal Module Operating Temperature	41 ± 3°C						

	<p>MECHANICAL DATA</p> <table border="1"> <thead> <tr> <th>Specification</th> <th>Data</th> </tr> </thead> <tbody> <tr> <td>Cell Type</td> <td>Mono-crystalline</td> </tr> <tr> <td>Cell Arrangement</td> <td>132 [2 x (11 x 6)]</td> </tr> <tr> <td>Dimensions</td> <td>2384 x 1303 x 35 mm (93.9 x 51.3 x 1.38 in)</td> </tr> <tr> <td>Weight</td> <td>34.4 kg (75.8 lbs)</td> </tr> <tr> <td>Front Cover</td> <td>3.2 mm tempered glass with anti-ref-lective coating</td> </tr> <tr> <td>Frame</td> <td>Anodized aluminium alloy, crossbar enhanced</td> </tr> <tr> <td>J-Box</td> <td>IP68, 3 bypass diodes</td> </tr> <tr> <td>Cable</td> <td>4 mm² (IEC), 12 AWG (UL)</td> </tr> <tr> <td>Cable Length (Including Connector)</td> <td>460 mm (18.1 in) (+) / 340 mm (13.4 in) (-) (supply additional jumper cable: 2 lines / Pallet) or customized length*</td> </tr> <tr> <td>Connector</td> <td>T4 series or MC4-EVO2</td> </tr> <tr> <td>Per Pallet</td> <td>31 pieces</td> </tr> <tr> <td>Per Container (40' HQ)</td> <td>527 pieces</td> </tr> </tbody> </table>	Specification	Data	Cell Type	Mono-crystalline	Cell Arrangement	132 [2 x (11 x 6)]	Dimensions	2384 x 1303 x 35 mm (93.9 x 51.3 x 1.38 in)	Weight	34.4 kg (75.8 lbs)	Front Cover	3.2 mm tempered glass with anti-ref-lective coating	Frame	Anodized aluminium alloy, crossbar enhanced	J-Box	IP68, 3 bypass diodes	Cable	4 mm ² (IEC), 12 AWG (UL)	Cable Length (Including Connector)	460 mm (18.1 in) (+) / 340 mm (13.4 in) (-) (supply additional jumper cable: 2 lines / Pallet) or customized length*	Connector	T4 series or MC4-EVO2	Per Pallet	31 pieces	Per Container (40' HQ)	527 pieces
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J-Box	IP68, 3 bypass diodes																										
Cable	4 mm ² (IEC), 12 AWG (UL)																										
Cable Length (Including Connector)	460 mm (18.1 in) (+) / 340 mm (13.4 in) (-) (supply additional jumper cable: 2 lines / Pallet) or customized length*																										
Connector	T4 series or MC4-EVO2																										
Per Pallet	31 pieces																										
Per Container (40' HQ)	527 pieces																										
12	<p>DAY WORKS</p>																										
	<p>This will be for work required to be done but not detailed elsewhere in this schedule. This item will only be used with prior written approval of the project manager.</p> <p>SCOPE This section covers day works ordered by the Engineer and covers the listing of day work items in accordance with Clause 6.5 of the General Conditions of Contract for the use in determining payment for work which cannot be quantified in specific units in the Bill of quantities, or work ordered by the Engineer during the construction period which was not foreseen at tender stage and for which no applicable rate exists in the Bill of quantities.</p> <p>ORDERING OF DAYWORK No day works shall be undertaken unless written authorization has been obtained from the Engineer.</p> <p>MEASUREMENT AND PAYMENT Only work ordered by the Engineer to be carried out under day works shall be measured and paid for at the rates given in the day works schedule.</p> <p>The day works rates submitted for labour shall cover overhead charges and profit, site supervision and administration staff, use of small hand tools and appliances, non-mechanical plant and equipment, consumable stores and site supervisors transport.</p> <p>The day works rates for vehicles, plant and equipment shall be all-inclusive hire charge for the use of the vehicle and driver or plant/equipment and operator and shall apply only to vehicles, plant and equipment nominated in writing by the Engineer</p> <p>Materials:</p>																										

	<p>(a) Procurement of materials prime cost (PC) sum (b) Contractor's handling costs, profit and all other charges as per section (a) ...percentage (%)</p> <p>The unit of measurement for items personnel during normal working hours, personnel outside normal working hours and plant shall be the hour for the item of plant or personnel. Non-working hours for transport breakdown, lack of operator of any other reason shall not be measured. The time shall be taken from the time that the personnel and/or equipment depart until return.</p> <p>Measurement shall only be for work instructed as directed by the Engineer, where the Engineer considers no other appropriate rate is available in the bill of quantities. Prior to the commencement of any work by the labourers described under items B18.01 and B18.02, the Contractor must obtain written consent from the Engineer regarding the classification of all labour in terms of "unskilled", "semi-skilled" and "skilled" labour.</p> <p>The tendered rates for labour for items a and b shall include full compensation to cover charges and profit, leave pay, bonuses, subsistence, allowances, Employer's contributions, additional payment for overtime where applicable, insurances, housing, site supervision, use of small hand tools and appliances, non-mechanical plant and equipment and consumables, for all administrative, supervisory, operative and contingent costs, relating to the supply of personnel.</p> <p>Local labour provided from the local community, must be utilised for all unskilled Labour requirements. A database of unskilled labourers will be made available to all contractors on the panel. Contractors are to utilise unskilled labour for work package that have unskilled labour components such as trenching.</p> <p>The tendered rates for plant shall be an all-inclusive hire charge for the use of the vehicle and driver or plant/equipment and operator and shall apply only to vehicles plant and equipment nominated in writing by the Engineer, for all administrative, supervisory operative and contingent cost, and profit relating to the running of the plant.</p> <p>The unit of measurement for plant shall be the amounts actually paid for the procurement of materials to be purchased and shall be made in accordance with the provision of the general conditions of contract. Only the actual quantities of materials used, as verified by the Engineer, shall be paid for."</p> <p>The percentage tendered for materials shall be the percentage of the amounts actually paid for the procurement of materials as ordered under materials and shall be in full and final compensation in respect of the Contractor's handling costs, profit and all other charges in connection with the procurement and supply of the materials to the point of usage.</p> <p>The abovementioned tendered rates shall be full compensation for the various items as specified and no further profit shall be paid.</p>
<p>12.1</p>	<p>Normal Time: 07h30 – 16h30 personnel during normal working hours Electrician (Artisan) – this will be number of qualified artisan's onsite, proof of documentations to be provided to the project manager. Labourers (unskilled and skilled) – number of general workers onsite for specific job. Security guard – security log book to be provided to the project manager.</p>
<p>12.2</p>	<p>After Hours: 16h30 – 07h30 personnel outside normal working hours Electrician (Artisan) – this will be number of qualified artisan's onsite, proof of documentations to be provided to the project manager. Labourers (unskilled and skilled) – number of general workers onsite for specific job. Security guard – security log book to be provided to the project manager.</p>
<p>12.3</p>	<p>Sunday and Public Holiday Time - personnel outside normal working hours Electrician (Artisan) – this will be number of qualified artisan's onsite, proof of documentations to be provided to the project manager. Labourers (unskilled and skilled) – number of general workers onsite for specific job. Security guard – security log book to be provided to the project manager.</p>

13	Extra Vehicle and Plant Cost (for use by the contractor only) – these items are only for use by agreement with the project manager as normally tendered rates for items described in this schedule must include for any vehicle or plant costs.
15	INSPECTION AND REPORT
	Tender rates should include transportation cost, PPE and costing is per site inspected. Inspections will be scheduled by the respective depot superintendent or technician as and when required.
	Contractor must have the staff and resources to complete the inspections and compile a report indicating faulty sites and equipment within the specified time. Contractor must report to the traffic signal technician or engineer on a daily basis. All defects whether it was repaired or not must be recorded and reported to traffic engineering department. All items on the inspection forms must be completed. Critical or dangerous defects must be reported to the traffic engineering department immediately. Contractor will have to observe and adhere to all safety regulations at all times.
16	CONTROLLERS
16.1	FAULTS – CALLOUT AND REPAIR
	Tender rates to include; 1) travel distance, 2) contractor must maintain adequate supply of spares to repair any fault. Fault response time is 2 hours from time of call, 3) a comprehensive report of fault must be submitted to traffic engineer after fault has been attended to. Normal Time (07h30 – 16h30) After hours (16h30 – 07h30) and Saturdays – rate to be 1,5 times normal hours Sundays and public holidays – rates to be doubled normal hours SCM upgrade, installation and removal will be per SCM removed or installed.
17	REMOVAL OF STREET FURNITURE OR DAMAGED EQUIPMENT
	Tender rates to include: 1) excavations to remove equipment, 2) disconnection of cables, 3) removal of equipment, 4) backfilling, 5) transportation to depot, 6) measuring of cable lengths, 7) inventory of all removed items. Excludes: 1) re-instatement, 2) supply of cherry picker for work on cantilever poles.
17.1	REMOVAL OF CABINETS
	Cabinets should be removed and returned to respective depot. All cables to be disconnected and marked for reference purpose in case of reconnection. In case of non-replacement of cabinet, excavated hole should be filled up and area reinstated to match surrounding surfaces.
17.2	REMOVAL OF POLES AND POLE TOPS
	All cables to poles to be neatly disconnected and labelled for reference. Reinstatement to be neatly done to match the surrounding surfaces.
17.3 to 17.8	All lantern must be disconnected, brackets removed and all returned to the depot. Signs to be removed and returned to depot.
18	REMOVAL OF CABLES FROM TRENCHES, DUCTS AND STREET FURNITURE
18.1 to 18.7	Tender rates to include: 1) removing glands of cables where necessary, 2) disconnect of cables, 3) measurement of removed cable length from trenches and ducts, 4) transportation of cables to depot.
19	REMOVAL OF DETECTION EQUIPMENT
19.2	REMOVAL OF VIDEO DETECTION EQUIPMENTS: Removal of video detection equipment shall include disconnection of cables, removal of attached brackets where necessary and transportation to depot. Where removal involves parts of cantilever boom, a cherry picker truck will be costed separately as indicated on the bill of quantities.

	<p>REPAIRS TO ITS EQUIPMENT (Section 2 of “Bill of Quantities”)</p>
	<p>Test Procedure: Inspect item(s) for any physical damage or irregularities. Test item on supplier test lists and perform supplier’s factory acceptance tests as per standard procedures. Inform customer if the item needs to be upgraded, repaired or is beyond economical repair (BER). Inform customer of item status and issue customer with certificate of conformance (COC)</p> <p>Upgrade: Inspect items for any physical damage or irregularities. Test item on supplier test lists and perform supplier’s factory acceptance tests as per standard procedures. Inform customer if the item needs to be upgraded, repaired or is beyond economical repair (BER). Upgrade item to the latest supplier’s revision. Test item on supplier test lists and perform supplier’s factory acceptance tests (Final QA release). Inform customer of item status and issue customer with certificate of conformance (COC).</p> <p>Repair: Inspect items for any physical damage or irregularities. Test item on supplier test lists and perform supplier’s factory acceptance tests as per standard procedures. Inform customer if the item needs to be upgraded, repaired or is beyond economical repair (BER). Repair item and upgrade to the latest supplier’s revision if required. Test item on supplier test lists and perform supplier’s factory acceptance tests (Final QA release). Inform customer of item status and issue customer with certificate of conformance (COC).</p>
<p>24</p>	<p>ROAD SIGNAGE</p>
	<p>SCOPE</p> <p><i>Replace “... South African Road Traffic Signs Manual ...” with “... SADC Road Traffic Signs Manual ...” in the second paragraph</i></p> <p>MANUFACTURING OF ROAD SIGN BOARDS AND SUPPORTS</p> <p>(a) Road Sign Boards</p> <p><i>Add the following:</i></p> <p>“The contractor shall make every effort to ensure that signboards are correct in all respects and shall provide the engineer with a 100mm x 150mm colour photograph of each sign face for approval of the correctness of the legend before dispatching the boards from the manufacturer’s factory. Such approval will not imply final acceptance of the board. If the contractor is in any doubt as to the correctness of the sign detail, the sign designer shall be contacted for verification.”</p> <p>(ii) Steel profile road sign boards</p> <p><i>Add the following:</i></p> <p>Where the letter of legends cross the horizontal joints of the sign panels, the letter shall be cut on the joint and both ends folded around the radius.</p> <p>Retro-reflective material to adjoining Chromadek panels on a sign shall be practical visual match of the specified colour.”</p> <p>ROAD SIGN FACES AND PAINTING</p> <p><i>Add the following sub-clause:</i></p> <p>“(e) Application of retro-reflective material</p> <p>“Where applied to Chromadek sections, retro-reflective material shall be applied as specified for aluminum section as South African Road Traffic Signs Manual (SARTSM).”</p>

STORAGE AND HANDLING

Add the following:

“The following shall not be allowed on the sign face:

- (i) Drilling of holes, except for the fastening of overlays;
- (ii) Application of any form of adhesive;
- (iii) Cleaning with any chemicals that are not specifically approved by the manufacturer of the retro-reflective material; and
- (iv) Covering the sign face with an impermeable material that does not allow free circulation of air.”

ERECTING ROAD SIGNS

(e)Erection

Add the following:

“After erection the signboard shall be thoroughly cleaned with a cleaning agent approved by the retro-reflective material’s manufacturer.

All vegetation obstructing the new or replaced sign board shall be removed and disposed of as instructed by the engineer.”

MEASUREMENT AND PAYMENT

Item

Unit

Road sign boards with painted or colour semi-matt background. Symbols, lettering, and borders in semi-matt black or in Class I retro-reflective material, where the sign board is constructed from:

Amend the last two lines of the second paragraph to read:

“..... completion, delivery, installation of the road sign board complete as specified, as well as the removal and disposal of all vegetation obstructing the motorists’ view of the new or replaced sign board.”

Add the following item:

“Item

Unit

Provision and erection of danger plates at culverts/structures:

- (a) Dismantle, store and re-erect existing danger plates number (No)
- (b) Erect new danger plates (specify type and size) number (No)

The unit of measurement shall be the number of danger plates provided and erected in accordance with the drawings.

The tendered rate shall include full compensation for all labour and material, painting, treated timber posts, excavation, backfilling with soil or concrete, etc., as may be necessary for completing the work in accordance with the details shown on the drawings.”

VARIATIONS TO STANDARDIZED SPECIFICATIONS AND ADDITIONAL CLAUSES

SECTION 1200: GENERAL REQUIREMENTS AND PROVISIONS

All excavations of trenches and installation of sleeves shall comply with the relevant clauses of SANS 1200.

- Selected granular material and selected fill material as per SANS 1200LB, if relevant shall apply.
- Bedding materials for ducts shall comply with clause 3.2.1 of SANS 1200LC.
- Backfill materials and materials for the reinstatement of roads and paved areas as per SANS 1200 DB clause 3.5 & 3.6 shall apply.
- Selection of materials as per clause 3.7 of SANS 1200 DB shall apply where relevant.
- Control of water clause 4.2 of SANS 1200 DB and 4.2 SANS 1200LC shall apply.
- Compaction equipment clause 4.3 SANS 1200 DB and 4.2 SANS 1200LC shall apply.
- Construction precautions: Contractor’s attention is drawn to the provisions of Section D16 of chapter V of the regulations gazette under factories, machinery and building works Act 1941 (Act 22 of 1941), as amended, which lays down the statutory precautions to be taken in all trench excavations.
- Storm water, seepage and dewatering of excavations: The Contractor shall properly and adequately protect the works from flooding, damage by storm water, flow from springs and seepage and shall comply with the conditions of SANS 1200A sub clause 5.5.
- Accommodation of traffic and access to properties: Clause 5.1.3 of SANS 1200 CB shall apply.
- Existing services that intersect or adjoin trenches: The requirements of sub clause 5.4 of SANS 1200 A shall apply.
- Trench widths and depths: the minimum trench dimensions for ducts shall be as specified in clause 5.1.1 of SANS 1200LC.
- Cables that are not laid in ducts shall have a minimum of 500mm cover over 500V cables or less, and 900mm cover for cables more than 500V. Minimum trench width shall be 250mm or the total width of the group of cables plus 100mm on either side.
- Bedding and compaction of bedding as per SANS 1200 LB – 1983 shall apply.
- Ducts as per clause 5.2 of SANS 1200 LC shall apply.
- Backfilling and compaction as per relevant clause 5.6 and 5.7 of SANS 1200 CB shall apply.
- Minimum distances between electrical cables and detector lead-in cables / auxiliary cables to be at least 300 mm where possible.
- Reinstatement of surfaces as per sub clause 5.9 and 5.10 of SANS 1200 DB.
- Tolerances required as per clause 6 of SANS 1200 LC shall apply to cable and duct trenches.
- Testing in accordance to clause 6 of SANS 1200 LC shall apply.

SABS CEMENT SPECIFICATIONS

- *Add the following:*
 “All cement used during construction shall comply with SANS 50197-1 for common cements and SANS 50413-1:2004 for masonry cement. Any reference to SABS 471 in the standard specifications shall be replaced with the new specification SANS 50197-1: Cement compositions, specifications and conformity criteria: Part 1: Common cements.

Where the old SABS 471 product nomenclature has been used in the standard specifications, the contractor shall supply and use the relevant new product, in compliance with SANS 50197-1.”

- *The following new clauses shall be added after clause 1229 of the specifications:*

SITE SECURITY

The contractor shall carefully assess the security measures of whatever nature that may be required at the location of the site offices and the site of the works. No direct payment for security measures shall be made and the contractor shall make adequate provision in his tendered rates for all measures, including insurances, deemed necessary by him to safeguard his staff and that of the Engineer, his

plant, materials and equipment, the offices of the Engineer complete with furniture, equipment and personal belongings, and to prevent disruption of the works by criminals. No claims in this regard will be entertained.

22 CONTRACTORS ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS

The successful tenderer(s) will be required to work in road reserve, within the boundaries of the Stellenbosch municipal area. The construction areas will be pointed out by the authorized Municipal Official as and when required.

Access to the site of the works will be given to the Contractor on the Commencement Date of a Work Package. The site of the works is on public open space and public roads, which will remain in use during the course of the work. No road may be closed and traffic shall be accommodated as shown on the drawings.

GENERAL REQUIREMENTS

(a) Camps, constructional plant and testing facilities

The Municipal will identify an area that can be used as a camp site. For minor works a campsite shall be fenced off and comprise of a sheltered area and mobile toilet. For all other works a campsite shall be fenced off and comprise of a container (contractors office), ablution facilities, a sheltered area for workers and an area to stockpile materials.

(c) Legal and contractual requirements and responsibilities to the public

1.1.1.1.1 *Add the following as a second paragraph*

“There has been recent legislation promulgated by Government that 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:

(i) Part C of C3.4 Construction 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. Separate payment items are included in these provisions. However, non-compliance with these provisions may lead to the imposition of penalties.

(ii) Part D of C3.4 Construction of the Scope of Works contains provisions that regulate the contractor’s construction methods for compliance with Government’s initiatives towards the use of local labour in construction, black economic empowerment and the use of targeted enterprises and labour (local resources). Separate pay items for labour obligations and training are included in these provisions. However, non-compliance with these provisions may lead to the imposition of penalties.

(iii) Section G of C3.4 Construction of the Scope of Works contains the specification that regulates the contractor’s construction methods so far as to ensure health and safety of his employees and of the public. Separate new pay item(s) are included in these provisions to allow the contractor to make separate provision for the cost of health and safety measures during the construction process.”

WATER FOR CONSTRUCTION PURPOSES

The Contractor must make adequate provision in his tender for all negotiations and procurement of water for construction activities and all related costs will be deemed to be included in his tendered rates.

WAYLEAVES AND PERMITS

The Contractor shall be responsible for ensuring that he obtains all wayleaves and permits from the relevant service authorities for working over, under or near services. In order to facilitate such approval the Employer will provide all available details, plans and drawings of the services on the site to the Contractor. The Employer will assist the Contractor to obtain necessary wayleaves, however this will not limit the Contractors obligations in terms of the Contract, to comply with the provisions or by-laws of any local statutory body.

EXISTING SERVICES

Before the Contractor commences operations, he must discuss with and have the approval of the Employer, authority or owner concerned regarding the method he proposes to use for relocating or safe-guarding any services and existing works he may encounter during construction.

Any details of existing services shown on drawings may not be accurate therefore, where required, the Contractor shall arrange with authority concerned to point out services on site.

The Contractor shall locate all known services and safeguard any existing services or works he locates or may encounter during construction. The Contractor shall obtain clearance from the authority concerned before commencement of work in the proximity of the existing services.

The Contractor shall be responsible for any damage to such existing services or existing works in the execution of this contract and shall reimburse the Employer, authority or the owner concerned for any repairs required or damages incurred.

The Contractor shall be responsible for immediately notifying the Employer and the authorities concerned regarding and damage caused to public services and existing works. Any alteration to public services shall be carried out by the Authority concerned unless the Contractor is instructed otherwise.

The Contractor shall provide the necessary assistance during any operations necessary in connection with the removal, alteration or safeguarding of any public service.

The Contractor is not permitted to cut off and roots from protected vegetation or tree roots which may cause the trees to become unstable, before consulting the local Green Services authority.

The Contractor shall assume full responsibility where any person in his service either directly or indirectly causes and damage to known services. The Contractor shall bear the cost of repair of any such damage.

23 ACCOMMODATION OF TRAFFIC

Work, including the erection and removal of traffic control facilities, shall be executed, where possible, between sunrise and sunset on Mondays to Saturday, inclusive. Occupation of existing traffic lanes will only be allowed during daylight hours on normal working days, which are defined as Monday to Saturday, inclusive. The existing number of lanes for each traffic movement affected by construction shall not be reduced without the written authorization of the Employer.

The traveling public has 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 public roads.

Failure to maintain road signs, warning signs or flicker lights, ect, in good condition shall constitute ample reason for the Employer to bring the works to a stop until the road signs, etc, has been repaired to his/her satisfaction.

The Contractor may not commence constructional activities before adequate provision has been made to accommodate traffic in accordance with the requirements of these specifications and Chapter 13 of Volume 2 of the South African Road Traffic Signs Manual (SARTSM).

The Contractor shall submit proposals in connection with all signs and accommodation of traffic to the Employer for approval.

The traffic shall be accommodated on the existing surfaced carriageway and shoulders. No bypasses or temporary deviations shall be constructed. Accommodation of traffic will generally be carried out by closing off one lane of traffic at a time and accommodating the traffic on the other lane(s). During non-working days and the period from the 21th December to 4th January, the contractor will be required to shut down normal construction activities and ensure that the total surfaced width is available to public traffic. Only emergency work will be allowed. Where necessary, the traffic safety officer will be required to patrol during these non-working periods and ensure that all temporary traffic-control facilities are in place and functional. The accommodation of traffic team will be required to be on standby.

The penalty, for each incident or event that deviates from the approved Traffic Accommodation Plans, shall be R10 000.00.

MEASUREMENT AND PAYMENT

1.1.1.1.2 In the 17th paragraph (the fourth last paragraph) under item 13.01 replace the second sentence with the following:

“The tendered rate will be paid monthly, pro rata for parts of a month from the commencement date of the contract in terms of clause 5.2 of the general conditions of contract, until the due completion date as defined in clause 1.1.1.14 of the general conditions of contract, provided that – “

Replace with the following payment items:

Item	Unit
(a) Fixed obligations	Per Site
(c) Time-related obligations	Per Day
(d) Fixed obligations for Minor Works <R400 000	Per Site
(e) Time-related obligations for Minor Works <R400 000	Per Day

The tendered rates shall be the rates per site and rates per day, of the various categories of work as described above, and shall include full compensation for all the contractor’s charges in respect of the following items, collectively termed the “contractor’s general obligations”.

- *Add the following item:*

Contract	Unit
Signboards.....	number(No.)

The unit of measurement shall be the number of contract signboards provided in accordance with the drawings and erected at the locations as instructed by the Engineer.

The tendered rate shall include full compensation for procuring and furnishing all materials, and for the manufacturing of the contract signboards complete as specified on the drawings. It shall also include for the delivery and erection of the signs complete as specified at the locations instructed by the Engineer, and for their removal on completion of the contract.”

OCCUPATIONAL HEALTH AND SAFETY SPECIFICATIONS

This part of the project specifications contains comprehensive additional standardised specifications for health and safety matters not covered by nor carried out in terms of the Standard Specifications.

The following additional requirements are covered under this part of the project specifications:

25 HEALTH AND SAFETY REQUIREMENTS

DEFINITIONS

Definitions as per the Construction Regulations 2014 are applicable to this health and safety specification with the following clarifications:

- (a) Client means Employer
- (b) Principal contractor
- (c) Contractor means sub -contractor
- (d) Note-go through the definitions as clarify

SCOPE

This part of the specification has the objective to assist principal contractors entering into contracts with the Employer that they comply with the Occupational Health and Safety (OH&S) Act, No. 85 of 1993, as well as all applicable Regulations. Compliance with this document does not absolve the principal contractor from complying with minimum legal requirements and the principal contractor remains responsible for the health and safety of their employees. Principal and other contractors should insist that this part of the specification form part of any contract that he may have with other contractors and/or suppliers.

This section 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 principal contractors and other contractors 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 the Construction Regulations, regarding negotiations between the parties, related to the contents and approval of the Health and Safety Plan, must be complied with.

GENERAL OCCUPATIONAL HEALTH AND SAFETY PROVISIONS

(a) Legal Requirements

A principal contractor shall, as a minimum, comply with:

- (i) The Occupational Health and Safety Act and Regulations (Act 85 of 1993)
- (ii) The Compensation for Occupational Injuries and Diseases Act (Act 130 of 1993)

(b) Risk Assessment

Every principal contractor performing construction work shall, before the commencement of any construction work or work associated with the aforesaid construction work and during such work, cause a risk assessment to be performed by a competent person, appointed in writing, and the risk assessment shall form part of the OH&S plan and be implemented and maintained. The principal contractor shall conduct a baseline risk assessment, before work commences.

The risk assessment shall further include, where applicable, the standard working procedures and the applicable method statements. This does not imply that all possible risk assessments must be attended to before work commences, but that all relevant risk assessments receive the necessary attention as the Project progresses.

Based on the risk assessments, the principal 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.

The risk assessment shall include, as far as is reasonably practicable, at least:

- (i) the identification of the risks and hazards to which persons may be exposed
- (ii) the analysis and evaluation of the risks and hazards identified, inclusive of a residual risk rating methodology. The method used shall not be prescribed.
- (iii) a documented plan of safe work procedures, to mitigate, reduce or control those residual risks that have been identified as unacceptably high, by means of the rating system.
- (iv) a monitoring plan and
- (v) a review plan, inclusive of dates to be adhered to.

All variations to the scope of work shall similarly be subjected to a risk assessment process.

The principal contractor shall review the risk assessments and standard working procedures regularly as the contract work develops and progresses and each time changes are made to the designs, plans and construction methods and processes. The principal contractor shall provide the Employer, other contractors and all other concerned parties with copies of any changes, alterations or amendments

(c) Structure and Responsibilities

(i) Overall Supervision and Responsibility for OH&S

It is a requirement that the principal contractor, when he appoints contractors in terms of Construction Regulations, includes in his agreement with such contractors the following:

- (1) OH&S Act (85 of 1993), Section 37(2) agreement: "Agreement with Mandatory"
- (2) OH&S Act (85 of 1993), Section 16(2) appointee/s as detailed in his/her/their respective appointment forms. (Where applicable)

(ii) 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. It is a requirement that where the Construction Regulations stipulate “competence” in an appointment, the contractor shall provide a form of evidence, proving this competence. This proof of evidence will be negotiated between both parties as per the Construction Regulations.

Where the principal contractor employs more than 20 persons (including the employees of other contractors (subcontractors) he has to appoint one OH&S representatives for every 50 employees or part thereof. This is a minimum (legal) requirement in terms of section 17 of the OH&S Act. The principle contractor may at his own discretion cause more OH&S Representatives to be appointed according to site specific requirements.

In terms of section 18 of the OH&S Act, 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, trained and able to move freely at their designated area of responsibility.

The principal contractor shall ensure that the designated OH&S representatives conduct continuous monitoring and regular inspections of their respective areas of responsibility, focussing on unsafe acts and unsafe conditions and report thereon to the principal contractor. OH&S representatives shall be included in accident or incident investigations. OH&S representatives shall attend all OH&S committee meetings.

(iii) Appointment of OH&S Committee

The principal contractor shall in terms of sections 19 and 20 of the OH&S Act, establish an OH&S committee, which shall meet once a month or sooner, should circumstances require an extraordinary meeting.

(d) Administrative Controls

(i) Site specific Health and Safety Plan

In compliance with the Construction Regulations the contractor shall, after performing a risk assessment, prepare a health and safety plan for approval by the employer.

The health and safety plan shall include, but not be limited to, the following:

- (1) The safety management structure including the names of all designated persons such as the construction supervisor and any other competent persons;
- (2) Safety method statements and procedures to be adopted to ensure compliance with the OHS Act. Aspects to be dealt with shall include:
- (3) Public vehicular and pedestrian traffic accommodation measures;
- (4) Control of the movement of construction vehicles;
- (5) The storage and use of materials;
- (6) The use of tools, vehicles and plant;
- (7) Temporary support structures;
- (8) Dealing with working at height;
- (9) The use of batch plants;
- (10) Excavation work;
- (11) Demolition work;
- (12) Security, access control and the exclusion of unauthorised persons.
- (13) The provision and use of temporary services;
- (14) Compliance with wayleaves, permissions and permits;
- (15) Safety equipment, devices and clothing to be employed;
- (16) Emergency procedures;
- (17) Provision of welfare facilities;
- (18) Induction and training;
- (19) Provision and maintenance of the health and safety file and other documentation;
- (20) Arrangements for monitoring and control to ensure compliance with the safety plan.

(ii) Health and Safety Records

As required by the Construction Regulations, the principal contractor and other contractors shall each keep an OH&S file on site. The OH&S file is a term for the SHE Management System utilised on site, which may include copies of relevant documentation.

The following index is neither exhaustive nor prescriptive and shall only be used as a guide:

- Notification of construction work (Construction Regulation 3) where applicable
- Latest copy of OH&S Act (General Administrative Regulation 4)
- Proof of registration and good standing with COID Insurer (Construction Regulation 4(g))
- OH&S plan agreed with the Client including the underpinning risk assessment/s and method statements (Construction regulation 5(1))
- Copies of OH&S committee and other relevant minutes
- Designs/drawings (Construction Regulation 5(8))
- A list of contractors (subcontractors) including copies of the agreements between the parties and the type of work being done by each contractor (Construction Regulation 9)
- Appointment/designation forms as per paragraphs 2.1.1 and 2.1.2.
- Registers as follows:
 - Accident/Incident registers (Annexure 1 of the General Administrative Regulations)
 - OH&S representatives' inspection register
 - Asbestos demolition and stripping register
 - Batch 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 powered tool inspection, maintenance, issue and returns register (incl. cartridges and nails)
 - Fall protection inspection register
 - First aid box contents
 - Fire equipment inspection and maintenance
 - Formwork and support work inspections
 - Hazardous chemical substances record
 - Ladder inspections
 - Lifting equipment register
 - Materials hoist inspection register
 - Machinery safety inspection register (incl. machine guards, lock-outs etc.)
 - Scaffolding inspections
 - Stacking and storage inspection
 - 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

(iii) OHS Audits and Inspections

The employer will conduct monthly audits to comply with Construction Regulations in order to ensure that the principal contractor has implemented and is maintaining the agreed and approved OH&S plan. The employer reserves the right to conduct other ad hoc audits and inspections as deemed necessary. This will include site safety walks.

The principal contractor may conduct his own regular internal audits to verify compliance with his own OH&S management system, as well as with this specification. The principal contractor shall furthermore ensure that each contractor's health & safety plan is being implemented by conducting periodic audits at intervals mutually agreed upon between upon by the principal contractor and the contractor, but at least once per month.

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.

All the results of the abovementioned inspections and audits shall be in writing, reviewed at OH&S committee meetings, endorsed by the chairman of the meeting and placed on the OH&S File.

(iv) Accidents and Incident Investigations

The principal contractor, with the assistance of appointed Contractors if required, shall insure that the 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, take place. The results of the investigation shall be entered into an accident/incident register.

The affected contractor 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.

The principal contractor shall provide the Employer with copies of all statutory reports required in terms of the Act within 7 days of the incident occurring.

(v) Notification of Construction Work

The principal contractor shall, where the contract meets the requirements laid down in Construction Regulations, prior to commencement of the works, notify the Department of Labour of the intention to carry out construction work and use the form (Annexure A 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.

(vi) Training and Competence

The training required by the Act and Regulations shall be included in the principal contractor's OH&S plan. The principal contractor shall be responsible for ensuring that all relevant training is undertaken. Only accredited Training providers shall be used for OH&S. The principal contractor shall ensure that their and other contractors' 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 principal 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 contractors from their responsibilities as Employers. Records of all training must be kept on the OH&S file for auditing purposes.

(vii) Consultations, Communication and Liaison

OH&S liaison between the employer, principal contractor, other contractors, designer and other concerned parties will be through the OH&S committee as contemplated. In addition to this, communication may be directly to the client 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 supervisors, OH&S representatives and the OH&S committee. The principal contractor shall be responsible for the dissemination of all relevant OH&S information to the other contractors e.g. design changes agreed with the client and the designer, instructions by the client and/or his/her agent, exchange of information between contractors, the reporting of hazardous/dangerous conditions/situations etc. The principal contractors' most senior manager on site shall be required to attend all OH&S meetings.

OPERATIONAL CONTROL

(a) Operational Procedures

Each construction activity shall be assessed by the principal 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 principal contractor:

- (i) to be conversant with all relevant Regulations
- (ii) to comply with their provisions
- (ii) to include them in his OH&S plan where relevant.

(b) Emergency Procedures

In conjunction with the identification of operational procedures, the principal 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.

(c) Personal & 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 the 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 the hazardous environment.

It is a further requirement that the contractor maintain the said equipment, that he 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 principal 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.

(d) Other Regulations

Wherever in the Construction Regulations or this specification there is reference to other regulations (e.g. Construction Regulation 22: Electrical Installations and Machinery on Construction Sites) the principal contractor shall be conversant with and shall comply with these regulations.

(e) Public Health & Safety (Section 9 of the OH&S Act)

The principal contractor shall, as far as is reasonably practicable, be responsible for ensuring that non-employees 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:

- (i) Non- employees entering the site for whatever reason
- (ii) The surrounding community
- (iii) Passers-by to the site

PROJECT SPECIFIC REQUIREMENTS

The following site-specific requirements are applicable to this project.

(a) General

The temporary and permanent works required under this contract are described in the various volumes forming part of this contract. The contractor, in complying with the OHS Act and the Construction Regulations, shall consider all aspects of the works described and consider the construction methods and materials to be used.

Design information provided for safety planning purposes, such as design loads for structures, foundation conditions etc, is provided on the drawings, in the project specifications or in other volumes forming part of this contract.

Environmental conditions and requirements particular to this contract are indicated in the Project Specification.

(b) Site access, egress, deliveries and vehicular and pedestrian routes

The requirements regarding the control of access to and egress from the Site and vehicular and pedestrian routes are indicated in the Project and Standard Specifications and in particular in Section 1500.

(c) Existing Conditions

The contractor shall consider; inter alia, the following existing conditions when complying with the OHS Act:

- (i) Existing utility services;
- (ii) Existing ground and foundation conditions;
- (iii) Traffic accommodation requirements;
- (iv) Surrounding land use;
- (v) Anticipated weather conditions.

(d) Wayleaves, permissions and permits

The contractor shall be responsible for obtaining all the wayleaves, permissions or permits applicable to working near any existing services or other infrastructure on Site and shall abide by the safety conditions imposed by such wayleaves, permissions or permits.

(e) Risk Assessments

The Contractor must ensure that the risk assessment involves identifying the hazards present in a work activity on site. This is followed by an evaluation of the extent of the risk involved considering those precautions already being taken.

The following general principle should be followed when conducting a risk assessment:

- (i) All relevant risks and/or hazards should be systematically addressed;
- (ii) The risk assessment should address what actually happens in the workplace during the work activity;

- (iii) All employees and those who may be affected must be considered, including maintenance staff, security guards, visitors and subcontractors;
- (iv) The risk assessment should highlight those groups and individuals who may be required to work alone or who have disabilities;
- (v) The risk assessment process should consider the existing safety measures and controls;
- (vi) The level of detail on a risk assessment should be appropriate to the level of risk.

The following is a typical list of Risk Assessments to be performed:

- (vii) Clearing and Grubbing of the area/site
- (viii) Site establishment including:
 - (ix) Office/s
 - (x) Secure/safe storage for materials, plant and equipment
 - (xi) Ablutions
 - (xii) Sheltered eating area
 - (xiii) Maintenance workshop
 - (xiv) Vehicle access to the site
 - (xv) Dealing with existing structures
 - (xvi) Location of existing services
 - (xvii) Installation and maintenance of temporary construction electrical supply, lighting and equipment
 - (xviii) Adjacent land uses/surrounding property exposures
 - (ixx) Boundary and access control/public liability exposures (NB: the employer is also responsible for the OH&S of non-employees affected by his/her work activities.)
Health risks arising from neighbouring as well as own activities and from the environment e.g. threats by dogs, bees, snakes, lightning etc.
 - 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
 - Use of portable electrical equipment including
 - Angle grinder
 - Electrical drilling machine
 - Circular saw
 - Excavations including
 - Ground/soil conditions
 - Trenching
 - Shoring
 - Drainage of trench
 - Welding including
 - Arc welding
 - Gas welding
 - Flame cutting
 - Use of LP gas torches and appliances
 - Loading and offloading of trucks
 - Aggregate/sand and another 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
 - 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 the like.
- Layering and bedding
- Installation of pipes/sleeves in trenches
- Pressure testing of pipelines
- Backfilling of trenches
- Protection against flooding
- Use of explosives
- Protection from overhead power lines
- As discovered by the principal contractor's hazard identification exercise
- As discovered from any inspections and audits conducted by the client or by the principal contractor or any other contractor on site
- As discovered from any accident/incident investigation.

(f) Traffic Accommodation

(i) General

A traffic management plan is to be supplied by the contractor and agreed to by the Engineer.

(ii) Traffic Safety Officer

The Employer requires that a Traffic Safety Officer be appointed. The appointment 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.

(iii) Public

The protection of members of public as road users, road traffic and pedestrians must be prioritised.

(iv) Construction Materials

The following commonly used construction materials and substances potentially pose health and safety hazards:

- (1) All materials contained in pressurized containers;
- (2) Bitumen products;
- (3) Cement;
- (4) Epoxies;
- (5) Lime and other stabilizing agents;
- (6) Paints;
- (7) Tar products;
- (8) Timber preservatives.

The materials to be used to construct the works are described in the following:

- (9) The Scope of Work;
- (10) The Project Specifications;
- (11) The Standard Specifications;
- (12) The Drawings;
- (13) The Bills of Quantities;

The contractor shall take appropriate measures to manage the risks associated with the use of all the materials required to complete the works, ie not only those listed above, and shall, inter alia, implement all the precautionary measures provided by manufacturers and suppliers for the storage, use and application of materials used.

FURTHER REQUIREMENTS

Duties of Principal Contractor / Contractors in Terms of the Construction Regulations 2014

A principal contractor must-

- provide and demonstrate to the client a suitable, sufficiently documented and coherent site-specific health and safety plan, based on the client's documented health and safety specifications, *which* plan must be applied from the date of commencement of and for the duration of the construction work and which must be reviewed and updated by the principal contractor as work progresses;
- open and keep on site a health and safety file, which must include all documentation required in terms of the Act and these Regulations, which must be made available on request to an inspector, the client, the client's agent or a contractor; and
- on appointing any other contractor, in order to ensure compliance with the provisions of the Act
 - provide contractors who are tendering to perform construction work for the principal contractor, with the relevant sections of the health and safety specifications pertaining to the construction work which has to be performed;
 - ensure that potential contractors submitting tenders have made sufficient provision for health and safety measures during the construction process;
 - ensure that no contractor is appointed to perform construction work unless the principal contractor is reasonably satisfied that the contractor that he or she intends to appoint, has the necessary competencies and resources to perform the construction work safely;
 - ensure prior to work commencing on the site that every contractor is registered and in good standing with the compensation fund or with a licensed compensation insurer as contemplated in the Compensation for Occupational Injuries and Diseases Act, 1993;
 - appoint each contractor in writing for the part of the project on the construction site
 - take reasonable steps to ensure that each contractor's health and safety plan is implemented and maintained on the construction site;
 - ensure that the periodic site audits and document verification are conducted at intervals mutually agreed upon between the principal contractor and any contractor, but at least once every 30 days;
 - stop any contractor from executing construction work which is not in accordance with the client's health and safety specifications and the principal contractor's health and safety plan for the site or which poses a threat to the health and safety of persons;
- where changes are brought about to the design and construction, make available sufficient health and safety information and appropriate resources to the contractor to execute the work safely; and
- discuss and negotiate with the contractor the contents of their health and safety plan and finally approve that plan for implementation
- ensure that a copy of both the principal contractor and contractor's health and safety plan is available on request to an employee, an inspector, a contractor, the client or the client's agent;
- hand over a consolidated health and safety file to the client upon completion of the construction work, to include a record of all drawings, designs, materials used and other similar information concerning the completed structure;
- in addition to the documentation required in the health and safety file include and make available a comprehensive and updated list of all the contractors on site accountable to the principal contractor, the agreements between the parties and the type of work being done; and

- ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3.

A contractor must prior to performing any construction work-

- provide and demonstrate to the principal contractor a suitable and sufficiently documented health and safety plan, based on the relevant sections of the client's health and safety specification and provided by the principal contractor, which plan must be applied from the date of commencement of and for the duration of the construction work and which must be reviewed and updated by the contractor as work progresses;
- open and keep on site a health and safety file, which must include all documentation required in terms of the Act and these Regulations, and which must be made available on request to an inspector, the client, the client's agent or the principal contractor;
- before appointing another contractor to perform construction work be reasonably satisfied that the contractor that he or she intends to appoint has the necessary competencies and resources to perform the construction work safely;
- co-operate with the principal contractor as far as is necessary to enable each of them to comply with the provisions of the Act; and
- as far as is reasonably practicable, promptly provide the principal contractor with any information which might affect the health and safety of any person at work carrying out construction work on the site, any person who might be affected by the work of such a person at work, or which might justify a review of the health and safety plan.

Where a contractor appoints another contractor to perform construction work, the duties that apply to the principal contractor will apply to the contractor as if he or she were the principal contractor.

A principal contractor must take reasonable steps to ensure co-operation between all contractors appointed by the principal contractor to enable each of those contractors to comply with these Regulations.

No contractor may allow or permit any employee or person to enter any site, unless that employee or person has undergone health and safety induction training pertaining to the hazards prevalent on the site at the time of entry.

A contractor must ensure that all visitors to a construction site undergo health and safety induction pertaining to the hazards prevalent on the site and must ensure that such visitors have the necessary personal protective equipment.

A contractor must at all times keep on his or her construction site records of the health and safety induction training and such records must be made available on request to an inspector, the client, the client's agent or the principal contractor;

A contractor must ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3.

Management and supervision of construction work

A principal contractor must, in writing, appoint one full-time competent person as the construction manager with the duty of managing all the construction work on a single site, including the duty of ensuring occupational health and safety compliance, and in the absence of the construction manager an alternate must be appointed by the principal contractor.

A principal contractor must upon having considered the size of the project, in writing appoint one or more assistant construction managers for different sections thereof: Provided that the designation of any

such person does not relieve the construction manager of any personal accountability for failing in his or her management duties in terms of this regulation.

Where the construction manager has not appointed assistant construction managers, or, in the opinion of an inspector, a sufficient number of such assistant construction managers have not been appointed, that inspector must direct the construction manager in writing to appoint the number of assistant construction managers indicated by the inspector, and those assistant construction managers must be regarded as having been appointed.

No construction manager appointed under this sub regulation may manage any construction work on or in any construction site other than the site in respect of which he or she has been appointed.

A contractor must, after consultation with the client and having considered the size of the project, the degree of danger likely to be encountered or the accumulation of hazards or risks on the site, appoint a full-time or part-time construction health and safety officer in writing to assist in the control of all health and safety related aspects on the site: Provided that, where the question arises as to whether a construction health and safety officer is necessary, the decision of an inspector is decisive.

No contractor may appoint a construction health and safety officer to assist in the control of health and safety related aspects on the site unless he or she is reasonably satisfied that the construction health and safety officer that he or she intends to appoint is registered with a statutory body approved by the Chief Inspector and has necessary competencies and resources to assist the contractor

A construction manager must in writing appoint construction supervisors responsible for construction activities and ensuring occupational health and safety compliance on the construction site.

A contractor must, upon having considered the size of the project, in writing appoint one or more competent employees for different sections thereof to assist the construction supervisor, and every such employee has, to the extent clearly defined by the contractor in the letter of appointment, the same duties as the construction supervisor: Provided that the designation of such employee does not relieve the construction supervisor of any personal accountability for failing in his or her supervisory duties. Where the contractor has not appointed such an employee, or, in the opinion of an inspector, a sufficient number of such employees have not been appointed, that inspector must instruct the employer to appoint the number of employees indicated by the inspector.

No construction supervisor appointed may supervise any construction work on or in any construction site other than the site in respect of which he or she has been appointed: Provided that if a sufficient number of competent employees have been appropriately designated on all the relevant construction sites, the appointed construction supervisor may supervise more than one site.

Notification of Intention to Commence Construction Work

The Contractor shall notify the Provincial Director of the Department of Labour of the intention to commence construction work at least 7 days prior to the works commencing if the intended construction work will:

- Include excavation work
- Include work at height where there is a risk of falling
- Include the demolition of a structure, or
- Include the use of explosives to perform construction work.

If the construction work involves construction of a single storey dwelling for a client, and such client will be residing in such dwelling upon completion, the contractor must also notify the Provincial Director of the Department of Labour at least 7 days before the works commence.

This must be done on a form similar to an Annexure 2. A copy of the notification letter to the Provincial Director shall be forwarded to the Client for record purposes.

Construction Work Permit

It must be noted that from August 2015 all projects that meet the following criteria will require a construction work permit to be applied for at least 30 days prior to the work being carried out:

- Exceeds 180 days
- Will involve more than 1800-person days of construction work
- Works contract is of a value equal to or exceeding thirteen million rand, or Construction Industry Grading Board (CIDB) grading level 6

It is the client's responsibility to apply for this permit from the Provincial Director and construction work may not commence until the permit has been issued by the Provincial Director.

A copy of this permit will be required to be kept in the principal contractor's safety file, and the site-specific number issued by the Provincial Director must be displayed at the site entrance.

Assignment of Contractor's Responsible Persons to Manage Health & Safety on Site

The Contractor shall submit management and supervisory appointments as well as any relevant appointments in writing (as stipulated by the Construction Regulations 2014 and the Occupational Safety and Health Act 1993), prior to commencement of work (**Annexure B**)

Competency for Contractor's Responsible Persons

The Contractor's responsible persons shall be competent in health and safety and be familiar with the Occupational Health and Safety Act 1993, and applicable regulations. Valid proof of pertinent health and safety courses attended by such persons will be required to be presented to the Client.

Compensation of Occupational Injuries and Diseases Act 130 of 1993 (COIDA)

The Contractor shall submit to the Client a valid letter of good standing with the Compensation Insurer as part of their tender bid.

Occupational Health and Safety Policy

The Contractor shall submit a Health and Safety Policy with the Tender, signed by the Chief Executive Officer. The Policy must outline objectives and how they will be achieved and implemented by the Company / Contractor.

Health and Safety Organogram

The Contractor shall submit an organogram with the Tender, outlining the Health and Safety Site Team that will be assigned to the project, if successful with the tender. In cases where appointments have not been made, the organogram shall reflect the position. The organogram shall be updated, when there is a change in the site team.

Risk Assessments

Baseline Risk Assessment

The Client shall cause a baseline risk assessment to be conducted by a competent person before the design process and tender process commence, and the assessed risks shall form part of the health and safety specifications.

This baseline risk assessment will need to be comprehensive and may well lead to further, separate, more in depth risk assessment studies. The baseline risk assessment should be periodically reviewed.

The Contractor must, before commencement of any construction work, and during construction work, have risk assessments performed by a competent person appointed in writing, which risk assessments form part of the health and safety plan to be applied on the site and must include:

- The identification of the risks and hazards to which persons may be exposed to;

- An analysis and evaluation of the risks and hazards identified; based on a documented method
- A documented plan and applicable safe work procedures to mitigate, reduce or control the risks and hazards that have been identified;
- A monitoring plan; and
- A review plans

The Contractor must ensure that, as far as is reasonably practicable, ergonomic related hazards are analysed, evaluated and addressed in a risk assessment.

The Contractor must ensure that all employees under his control are informed, instructed and trained by a competent person regarding any hazard and the related work procedures and/or control measures **before any work commences** and thereafter **at the times determined in the risk assessment monitoring and review plan of the relevant site.**

The Principal Contractor must ensure that all contractors are informed regarding any hazard that is stipulated in the risk assessment **before any work commences** and thereafter **at the times determined in the risk assessment monitoring and review plan of the relevant site.**

The Contractor must consult with the health and safety committee or with a representative trade union or representative group of employees if no health and safety committee exist, on the monitoring and review of the risk assessments for the site.

The Contractor must ensure that copies of risk assessment for this site are available on sit for inspection purposes by interested parties (inspector, the client, client's agent, any contractor, any employee, a representative trade union, a health and safety representative or safety committee member.

A Contractor must review the relevant risk assessment where changes are affected to the design and/or construction that result in a change to the risk profile, or when an incident has occurred.

<p>Preventative measures must first address the elimination of the hazard or risk. Should PPE be required to reduce risk, the equipment or clothing must be used and be SABS approved</p>

In general, the Contractor must ensure that the Risk Assessment involves identifying the hazards present in a work activity on site. This is followed by an evaluation of the extent of the risk involved considering those precautions already being taken.

The following general principle should be followed when conducting a risk assessment:

- All relevant risks and/or hazards should be systematically addressed;
- The risk assessment should address what actually happens in the workplace during the work activity;
- All employees and those who may be affected must be considered, including maintenance staff, security guards, visitors and subcontractors;
- The risk assessment should highlight those groups and individuals who may be required to work alone or who have disabilities;
- The risk assessment process should consider the existing safety measures and controls.
- The level of detail on a risk assessment should be appropriate to the level of risk.

Health and Safety Representative(s)

The Contractor shall ensure that a Health and Safety Representative(s) are /is elected and trained to carry out his / her functions. The appointment must be in writing. The Health and Safety Representative shall carry out regular inspection, keep records and report to the supervisor to take appropriate action. He / she shall attend Health and Safety Committee Meetings. The Health and Safety Representative shall be part of the team that will investigate incidents, accidents & non-conformances.

Health and Safety Committee

Where two or more health and safety representatives have been appointed on site, the Contractor shall ensure that monthly health and safety meetings are held with such representatives and minutes are kept on record. Meetings must be organized and chaired by the Contractor's Health and Safety Committee Chairperson. Minutes of these meetings must be publicised for reference by the employees of the contractor.

Medical Certificate of Fitness

It must be noted that the contractor must ensure that their employees on site have a valid medical certificate of fitness, specific to the construction work being performed, issued by an occupational health practitioner in the form of an Annexure 3 template (refer to the Construction Regulations 2014 on the Department of Labour website for a sample of this form).

Health and Safety Training

The Contractor shall quarterly conduct a training needs analysis to ascertain what health and safety training is required. A plan of action should be devised and forwarded to the Client for records. Once the identified people have attended the training, the Contractor must provide the Client with copies of certificates obtained.

Induction

No Contractor may allow or permit any employee or person to enter site unless they undergone health and safety induction training pertaining to the hazards prevalent on site at the time of entry. This includes visitors to site. The Contractor must ensure that visitors to site have the necessary protective equipment (PPE) and shall keep a copy of the attendance register of all his / her employees who attended the induction.

Awareness

The Contractor shall conduct, on site, periodic toolbox talks, preferably weekly or before any hazardous work takes place. The talks shall cover the relevant activity and an attendance register must be kept and signed by all attendees. A record of who attended and the content of the topic will be kept on the site health a safety file as evidence of training.

Competency

After the Contractor has identified the training to be conducted as part of the competency requirement, and based on Risk Assessment he shall send the relevant persons on appropriate courses and keep certificates of training for reference. Familiarity with the health and safety Act and regulations is an integral part of the definition of competence.

General Record Keeping

The Contractor shall keep and maintain Health and Safety records to demonstrate compliance with the Health and Safety Specification and the Occupational Health and Safety Act. The contractor shall ensure that all records of incidents, spot fines, training etc. are kept on site. All documents shall be available for inspection by the Client, or the Department of Labour's Inspectors.

General Inspection, Monitoring and Reporting

The Contractor shall carry out inspections as required by **Annexure C** in this health and safety specification, as well as by health and safety legislation.

Emergency Procedures

The Contractor shall submit a detailed Emergency Procedure for approval by the Client prior to commencement on site. The procedure shall detail the response plan including the following key personnel:

- List of key personnel,
- Details of emergency services,
- Actions or steps to be taken in the event of the emergency; and
- Information on hazardous materials / situations, including each material's hazardous potential impact or risk on the environment or human and measures to be taken in the event of an accident.

Emergency procedure(s) shall include, but shall not be limited to, fire, spills, accidents to employees, use of hazardous substances, dangers as a result of riot / service deliver protests / intimidation, etc. The Contractor shall advise the Client in writing of any on-site emergencies, together with a record of action taken, within 24 hours of the emergency occurring. A contact list of all service providers (Fire Department, Ambulance, Police, Medical and Hospital, etc.) must be maintained and available to site personnel.

First Aid Box and First Aid Equipment

The Contractor shall provide first aid box/es and appoint, in writing, First Aider(s) for this project in line with the results of the Contractor's risk assessment for the project, this health and safety specification as well as the provisions of the General Safety Regulations. The appointed First Aider(s) are to be sent for accredited first aid training before starting on site. Valid certificates are to be kept on site.

First Aid box/s must be adequately stocked at all time, accessible and be controlled by a qualified First Aider. If required by the Client, the Contractor shall have a stretcher on site to be used in case of a serious incident.

Accident / Incident Reporting and Investigation

The Contractor shall in addition to the prescribed requirements of the Occupational Health and Safety Act and General Safety Regulations investigate, record and report all Section 24 reportable incidents to the Client within 24 hours of the incident occurring. Incident investigations shall be conducted by the Contractor's appointed Accident Investigator – this Investigator must be a competent person or persons who have sufficient knowledge to carry out an investigation.

In the event of a fatality or a permanent disabling injury the Contractor must submit proof of reporting of incident to Department of Labour as well as proof of preventative measures to the Client. The Client reserves the right to conduct investigations into any incidents that they deem fit and the Contractor is required to provide full co-operation in this regard.

Hazards and Potential Situations

The Contractor shall immediately notify other Contractors of any hazardous or potentially hazardous situations, which may arise during performance of the activities.

Occupational Health and Safety Signage

The Contractor shall ascertain and provide adequate on-site health and safety signage. This signage shall include, but shall not be limited to, Hard Hat / Helmet Area; Safety Shoes to be worn on site; Dust Masks to be worn in areas where there might be exposure to excessive dust; Ear Plugs / Muffs to be worn where there might be noise exposure over 85 dB; Gloves; Safety Goggles; Safety Harness, workers in excavation, traffic management, etc. The Contractor shall be responsible to maintain the quality and replacement of signage.

Management of Contractors by Principal Contractor

The Principal Contractor shall ensure that all contractors under his control are complying with the respective health and safety plans, as well as health and safety legislation.

Stacking of Materials

In addition to the provisions for the stacking of articles in the General Safety Regulations, 2003, the contractor must ensure that –

- a competent person is appointed in writing with the duty of supervising all stacking and storage on a construction site;
- adequate storage areas are provided;
- there are demarcated storage areas; and
- storage areas are kept neat and under control.

Housekeeping and General Safeguarding on Construction Sites

A contractor must, in addition to compliance with the Environmental Regulations for Workplaces, 1987, promulgated by Government Notice No. R. 2281 of 16 October 1987, ensure that suitable housekeeping is continuously implemented on each construction site, including-

- the proper storage of materials and equipment;
- the removal of scrap, waste and debris at appropriate intervals;
- ensuring that materials required for use, are not placed on the site so as to obstruct means of access to and egress from workplaces and passageways;
- ensuring that materials which are no longer required for use, do not accumulate on and are removed from the site at appropriate intervals;
- ensuring that waste and debris are not disposed of from a high place with a chute, unless the chute complies with the requirements set out in regulation 14(6);
- ensuring that construction sites in built-up areas adjacent to a public way are suitably and sufficiently fenced off and provided with controlled access points to prevent the entry of unauthorized persons; and
- ensuring that a catch platform or net is erected above an entrance or passageway or above a place where persons work or pass under, or fencing off the danger area if work is being performed above such entrance, passageway, or place so as to ensure that all persons are kept safe in the case of danger or possibility of persons being struck by falling objects.

Construction vehicles and mobile plant

A contractor must ensure that all construction vehicles and mobile plant-

- are of an acceptable design and construction;
- are maintained in a good working order;
- are used in accordance with their design and the intention for which they were designed, having due regard to safety and health;
- are operated by a person who-
 - (i) has received appropriate training, is certified competent and in possession of proof of competency and is authorised in writing to operate those construction vehicles and mobile plant;
 - (ii) has a medical certificate of fitness to operate those construction vehicles and mobile plant, issued by an occupational health practitioner in the form of Annexure 3.;
- have safe and suitable means of access and egress;
- are properly organized and controlled in any work situation by providing adequate signaling or other control arrangements to guard against the dangers relating to the movement of vehicles and plant, in order to ensure their continued safe operation;

- are prevented from falling into excavations, water or any other area lower than the working surface by installing adequate edge protection, which may include guardrails and crash barriers;
- are fitted with structures designed to protect the operator from falling material or from being crushed should the vehicle or mobile plant overturn;
- are equipped with an acoustic warning device which can be activated by the operator;
- are equipped with an automatic acoustic reversing alarm; and
- are inspected by the authorised operator or driver on a daily basis using a relevant checklist prior to use and that the findings of such inspection are recorded in a register kept in the construction vehicle or mobile plant.

A contractor must ensure that-

- no person rides or is required or permitted to ride on a construction vehicle or mobile plant otherwise than in a safe place provided thereon for that purpose;
- every construction site is organized in such a way that, as far as is reasonably practicable, pedestrians and vehicles can move safely and without risks to health;
- the traffic routes are suitable for the persons, construction vehicles or mobile plant using them, are sufficient in number, in suitable positions and of sufficient size;
- every traffic route is, where necessary, indicated by suitable signs;
- all construction vehicles and mobile plant left unattended at night, adjacent to a public road in normal use or adjacent to construction areas where work is in progress, have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, in order to identify the location of the vehicles or plant;
- all construction vehicles or mobile plant when not in use, have buckets, booms or similar appendages, fully lowered or blocked, controls in a neutral position, motors stopped, wheels chocked, brakes set and ignition secured;
- whenever visibility conditions warrant additional lighting, all mobile plant are equipped with at least two headlights and two taillights when in operation;
- tools, material and equipment are secured and separated by means of a physical barrier in order to prevent movement when transported in the same compartment with employees;
- vehicles used to transport employees have seats firmly secured and adequate for the number of employees to be carried; and
- all construction vehicles or mobile plant travelling, working or operating on public roads comply with the requirements of the National Road Traffic Act, 1996.

Electrical installations and machinery on construction sites

A contractor must, in addition to compliance with the Electrical Installation Regulations, 2009, and the Electrical Machinery Regulations, 1988, promulgated by Government Notice No.1593 of 12 August 1988, ensure that-

- before construction commences and during the progress thereof, adequate steps are taken to ascertain the presence of and guard against danger to workers from any electrical cable or apparatus which is under, over or on the site;
- all parts of electrical installations and machinery are of adequate strength to withstand the working conditions on construction sites;
- the control of all temporary electrical installations on the construction site is designated to a competent person who has been appointed in writing for that purpose;
- all temporary electrical installations used by the contractor are inspected at least once a week by a competent person and the inspection findings are recorded in a register kept on the construction site; and
- all electrical machinery is inspected by the authorized operator or user on a daily basis using a relevant checklist prior to use and the inspection findings are recorded in a register kept on the construction site.

Use and temporary storage of flammable liquids on construction sites

A contractor must, in addition to compliance with the provisions for the use and storage of flammable liquids in the General Safety Regulations, 2003, ensure that –

- where flammable liquids are being used, applied or stored at the workplace concerned, it is done in a manner that does not cause a fire or explosion hazard, and that the workplace is effectively ventilated;
- no person smokes in any place in which flammable liquid is used or stored, and the contractor must affix a suitable and conspicuous notice at all entrances to any such areas prohibiting such smoking;
- an adequate amount of efficient fire-fighting equipment is installed in suitable locations around the flammable liquids store with the recognized symbolic signs;
- only the quantity of flammable liquid needed for work on one day is taken out of the store for use;
- all containers holding flammable liquids are kept tightly closed when not in actual use and, after their contents have been used up, are removed from the construction site and safely disposed of;
- where flammable liquids are decanted, the metal containers are bonded and earthed; and
- no flammable material, including cotton waste, paper, cleaning rags or similar material is stored together with flammable liquids

Water environments

A contractor must ensure that where construction work is done over or in close proximity to water, provision is made for-

- preventing persons from falling into water; and
- the rescuing of persons in danger of drowning.

A contractor must ensure that where a person is exposed to the risk of drowning by falling into the water, the person is provided with and wears a lifejacket.

Fire precautions on Construction Sites

A contractor must, in addition to compliance with the Environmental Regulations for Workplaces, 1987, ensure that –

- (a) all appropriate measures are taken to avoid the risk of fire;
- (b) sufficient and suitable storage is provided for flammable liquids, solids and gases;
- (c) smoking is prohibited and notices in this regard are prominently displayed in all places containing readily combustible or flammable materials;
- (d) in confined spaces and other places in which flammable gases, vapours or dust can cause danger-
 - (i) only suitably protected electrical installations and equipment, including portable lights, are used;
 - (ii) there are no flames or similar means of ignition;
 - (iii) there are conspicuous notices prohibiting smoking;
 - (iv) oily rags, waste and other substances liable to ignite are without delay removed to a safe place; and
 - (v) adequate ventilation is provided;
- (e) combustible materials do not accumulate on the construction site;
- (f) welding, flame cutting and other hot work are done only after appropriate precautions have been taken to reduce the risk of fire;
- (g) suitable and sufficient fire-extinguishing equipment is placed at strategic locations or as

- may be recommended by the Fire Chief or local authority concerned, and that such equipment is maintained in a good working order;
- (h) the fire equipment contemplated in paragraph (g) is inspected by a competent person, who has been appointed in writing for that purpose, in the manner indicated by the manufacturer thereof;
 - (i) a sufficient number of workers are trained in the use of fire-extinguishing equipment;
 - (j) where appropriate, suitable visual signs are provided to clearly indicate the escape routes in the case of a fire;
 - (k) the means of escape is kept clear at all times;
 - (l) there is an effective evacuation plan providing for all-
 - (i) persons to be evacuated speedily without panic;
 - (ii) persons to be accounted for; and
 - (iii) plant and processes to be shut down; and
 - (m) a siren is installed and sounded in the event of a fire.

Construction Employees' Facilities

A contractor must, in addition to the construction site provisions in the Facilities Regulations, 2004, promulgated by Government Notice No. R. 924 of 3 August 2004, provide at / or within reasonable access of every construction site, the following clean, hygienic and maintained facilities:

- Shower facilities after consultation with the employees or employees' representatives, or at least one shower facility for every 15 persons;
- at least one sanitary facility for each sex and for every 30 workers;
- changing facilities for each sex; and sheltered eating area.

A contractor must provide reasonable and suitable living accommodation for the workers at construction sites who are far removed from their homes and where adequate transportation between the site and their homes, or other suitable living accommodation, is not available.

Fall protection

The Contractor must:

- designate a competent person to be responsible for the preparation of a fall protection plan
- ensure that the fall protection plan contemplated in paragraph (a) is implemented, amended where and when necessary and maintained as required; and
- take steps to ensure continued adherence to the fall protection plan.

A fall protection plan contemplated above must include-

- a risk assessment of all work carried out from a fall risk position and the procedures and methods used to address all the risks identified per location;
- the processes for the evaluation of the employees' medical fitness necessary to work at a fall risk position and the records thereof;
- a programme for the training of employees working from a fall risk position and the records thereof;
- the procedure addressing the inspection, testing and maintenance of all fall protection equipment; and
- a rescue plan detailing the necessary procedure, personnel and suitable equipment required to affect a rescue of a person in the event of a fall incident to ensure that the rescue procedure is implemented immediately following the incident.

A contractor must ensure that a construction manager appointed under regulation 8(1) is in possession of the most recently updated version of the fall protection plan.

A contractor must ensure that ensure that all unprotected openings in floors, edges, slabs, hatchways and stairways are adequately guarded, fenced or barricaded or that similar means are used to safeguard any person from falling through such openings;

Also that no person is required to work in a fall risk position, unless such work is performed safely as contemplated in above and fall prevention and fall arrest equipment are approved as suitable and of sufficient strength for the purpose for which they are being used, having regard to the work being carried out and the load, including any person, they are intended to bear; and securely attached to a structure or plant, and the structure of plant and the means of attachment thereto are suitable and of sufficient strength and stability for the purpose of safely supporting the equipment and person who could fall, and fall arrest equipment is used only where it is not reasonably practicable to use fall prevention equipment.

Temporary works

A contractor must appoint a temporary works designer in writing to design, inspect and approve the erected temporary works on site before use.

A contractor must ensure that all temporary works operations are carried out under the supervision of a competent person who has been appointed in writing for that purpose.

A contractor must ensure that-

- all temporary works structures are adequately erected, supported, braced and maintained by a competent person so that they are capable of supporting all anticipated vertical and lateral loads that may be applied to them, and that no loads are imposed onto the structure that the structure is not designed to withstand;
- all temporary works structures are done with close reference to the structural design drawings, and where any uncertainty exists the structural designer should be consulted;
- detailed activity specific drawings pertaining to the design of temporary works structures are kept on the site and are available on request to an inspector, other contractors, the client, the client's agent or any employee;
- all persons required to erect, move or dismantle temporary works structures are provided with adequate training and instruction to perform those operations safely;
- all equipment used in temporary works structure are carefully examined and checked for suitability by a competent person, before being used;
- all temporary works structures are inspected by a competent person immediately before, during and after the placement of concrete, after inclement weather or any other imposed load and at least on a daily basis until the temporary works structure has been removed and the results have been recorded in a register and made available on site;
- no person may cast concrete, until authorization in writing has been given by the competent person contemplated above;
- if, after erection, any temporary works structure is found to be damaged or weakened to such a degree that its integrity is affected, it is safely removed or reinforced immediately;
- adequate precautionary measures are taken in order to-
 - secure any deck panels against displacement; and
 - prevent any person from slipping on temporary works due to the application of release agents;
- as far as is reasonably practicable, the health of any person is not affected through the use of solvents or oils or any other similar substances;
- upon casting concrete, the temporary works structure is left in place until the concrete has acquired sufficient strength to safely support its own weight and any imposed load, and is not removed until authorization in writing has been given by the competent person
- the foundation conditions are suitable to withstand the loads caused by the temporary works structure and any imposed load in accordance with the temporary works design.
- provision is made for safe access by means of secured ladders or staircases for all work to be carried out above the foundation bearing level;
- a temporary works drawing or any other relevant document includes construction sequences and methods statements;

- the temporary works designer has been issued with the latest revision of any relevant structural design drawing;
- a temporary works design and drawing is used only for its intended purpose and for a specific portion of a construction site; and
- the temporary works drawings are approved by the temporary works designer before the erection of any temporary works.

No contractor may use a temporary works design and drawing for any work other than its intended purpose.

Excavation

A contractor must-

- ensure that all excavation work is carried out under the supervision of a competent person who has been appointed in writing for that purpose; and
- evaluate, as far as is reasonably practicable, the stability of the ground before excavation work begins.

A contractor who performs excavation work-

- must take reasonable and sufficient steps in order to prevent, as far as is reasonably practicable, any person from being buried or trapped by a fall or dislodgement of material in an excavation;
- may not require or permit any person to work in an excavation which has not been adequately shored or braced: Provided that shoring and bracing may not be necessary where-
- the sides of the excavation are sloped to at least the maximum angle of repose measured relative to the horizontal plane; or such an excavation is in stable material: Provided that-
 - permission has been given in writing by the appointed competent person contemplated above upon evaluation by him or her of the site conditions; and
 - where any uncertainty pertaining to the stability of the soil still exists, the decision from a professional engineer or a professional technologist competent in excavations is decisive and such a decision must be noted in writing and signed by both the competent person and the professional engineer or technologist, as the case may be;
- must take steps to ensure that the shoring or bracing contemplated in paragraph
- is designed and constructed in a manner that renders it strong enough to support the sides of the excavation in question;
- must ensure that no load, material, plant or equipment is placed or moved near the edge of any excavation where it may cause its collapse and consequently endangers the safety of any person, unless precautions such as the provision of sufficient and suitable shoring or bracing are taken to prevent the sides from collapsing;
- must ensure that where the stability of an adjoining building, structure or road is likely to be affected by the making of an excavation, steps are taken to ensure the stability of such building, structure or road and the safety of persons;
- must cause convenient and safe means of access to be provided to every excavation in which persons are required to work, and such access may not be further than six meters from the point where any worker within the excavation is working;
- must ascertain, as far as is reasonably practicable, the location and nature of electricity, water, gas or other similar services which may in any way be affected by the work to be performed, and must before the commencement of excavation work that may affect any such service, take the steps that are necessary to render the circumstances safe for all persons involved;
- must ensure that every excavation, including all bracing and shoring, is inspected-
 - daily, prior to the commencement of each shift;
 - after every blasting operation;
 - after an unexpected fall of ground;
 - after damage to supports; and
 - after rain,
- by the competent person contemplated in sub regulation (1), in order to ensure the safety of the excavation and of persons, and those results must be recorded in a register kept on site and made available on request to an inspector, the client, the client's agent, any other contractor or any employee;

- must cause every excavation which is accessible to the public or which is adjacent to public roads or thoroughfares, or whereby the safety of persons may be endangered, to be-
 - adequately protected by a barrier or fence of at least one meter in height and as close to the excavation as is practicable; and
 - provided with warning illuminates or any other clearly visible boundary indicators at night or when visibility is poor, or have resort to any other suitable and sufficient precautionary measure where this is not practicable;
- must ensure that all precautionary measures stipulated for confined spaces as determined in the General Safety Regulations, 2003, are complied with by any person entering any excavation;
- must, where the excavation work involves the use of explosives, appoint a competent person in the use of explosives for excavation, and must ensure that a method statement is developed by that person in accordance with the applicable explosives legislation; and
- must cause warning signs to be positioned next to an excavation within which or where persons are working or carrying out inspections or tests.

Demolition work

A contractor must appoint a competent person in writing to supervise and control all demolition work on site.

A contractor must ensure that before any demolition work is carried out, and in order to ascertain the method of demolition to be used, a detailed structural engineering survey of the structure to be demolished is carried out by a competent person and that a method statement on the procedure to be followed in demolishing the structure is developed by that person.

During a demolition, the competent person contemplated in above must check the structural integrity of the structure at intervals determined in the method statement contemplated in above, in order to avoid any premature collapses.

A contractor who performs demolition work must with regard to a structure being demolished, take steps to ensure that-

- no floor, roof or other part of the structure is overloaded with debris or material in a manner which would render it unsafe;
- all reasonably practicable precautions are taken to avoid the danger of the structure collapsing when any part of the framing of a framed or partly framed building is removed, or when reinforced concrete is cut; and
- precautions are taken in the form of adequate shoring or other means that may be necessary to prevent the accidental collapse of any part of the structure or adjoining structure;
- ensure that no person works under overhanging material or a structure which has not been adequately supported, shored or braced;
- ensure that any support, shoring or bracing contemplated in paragraph (b), is designed and constructed so that it is strong enough to support the overhanging material;
- where the stability of an adjoining building, structure or road is likely to be affected by demolition work on a structure, take steps to ensure the stability of such structure or road and the safety of persons;
- ascertain as far as is reasonably practicable the location and nature of electricity, water, gas or other similar services which may in any way be affected by the work to be performed, and must before the commencement of demolition work that may affect any such service, take the steps that are necessary to render circumstances safe for all persons involved;
- cause every stairwell used and every floor where work is being performed in a building being demolished, to be adequately illuminated by either natural or artificial means;
- cause convenient and safe means of access to be provided to every part of the demolition site in which persons are required to work; and
- erect a catch platform or net above an entrance or passageway or above a place where persons work or pass under, or fence off the danger areas if work is being performed above such entrance, passageway, or place so as to ensure that all persons are kept safe where there is a danger or possibility of persons being struck by falling objects.

A contractor must ensure that no material is dropped to any point, which falls outside the exterior walls of the structure, unless the area is effectively protected

No person may dispose of waste and debris from a high place by a chute unless the chute-

- is adequately constructed and rigidly fastened;
- if inclined at an angle of more than 45 degrees to the horizontal, is enclosed on its four sides;
- if of the open type, is inclined at an angle of less than 45 degrees to the horizontal;
- where necessary, is fitted with a gate at the bottom end to control the flow of material; and discharges into a container or an enclosed area surrounded by barriers.

A contractor must ensure that every chute used to dispose of rubble is designed in such a manner that rubble does not free-fall and that the chute is strong enough to withstand the force of the debris travelling along the chute.

A contractor must ensure that no equipment is used on floors or working surfaces, unless such floors or surfaces are of sufficient strength to support the imposed loads.

Where a risk assessment indicates the presence of asbestos, a contractor must ensure that all asbestos related work is conducted in accordance with the Asbestos Regulations 2001.

Where a risk assessment indicates the presence of lead, a contractor must ensure that all lead related work is conducted in accordance with the Lead Regulations, 2001.

Where the demolition work involves the use of explosives, a method statement must be developed in accordance with the applicable explosives legislation, by an appointed person who is competent in the use of explosives for demolition work and all persons involved in the demolition works must adhere to demolition procedures issued by the appointed person.

A contractor must ensure that all waste and debris are as soon as reasonably practicable removed and disposed of from the site in accordance with the applicable legislation

Tunnelling

No person may enter a tunnel, which has a height dimension of less than 800 millimeters.

Scaffolding

A contractor must appoint a competent person in writing who must ensure that all scaffolding work operations are carried out under his or her supervision and that all scaffold erectors, team leaders and inspectors are competent to carry out their work.

A contractor using access scaffolding must ensure that such scaffolding, when in use, complies with the safety standards incorporated for this purpose into these Regulations under section 44 of the Act.

Bulk mixing plant

A contractor must ensure that the operation of a bulk mixing plant is supervised by a competent person who has been appointed in writing and is-

- (a) aware of all the dangers involved in the operation thereof; and
- (b) conversant with the precautionary measures to be taken in the interest of health and safety.

No person supervising or operating a bulk mixing plant may authorize any other person to operate the plant, unless that person is competent to operate a bulk mixing plant.

A contractor must ensure that the placement and erection of a bulk mixing plant complies with the requirements set out by the manufacturer and that such plant is erected as designed.

A contractor must ensure that all devices to start and stop a bulk mixing plant are provided and that those devices are placed in an easily accessible position and constructed in a manner to prevent accidental starting.

A contractor must ensure that the machinery and plant selected is suitable for the mixing task and that all dangerous moving parts of a mixer are placed beyond the reach of persons by means of doors, covers or other similar means.

No person may remove or modify any guard or safety equipment relating to a bulk mixing plant, unless authorized to do so by the appointed person contemplated in sub regulation (1).

A contractor must ensure that all precautionary measures stipulated for confined spaces as determined in the General Safety Regulations, 2003, are complied with when entering any silo.

A contractor must ensure that a record is kept of all repairs or maintenance to a bulk mixing plant and that the record is available on site to an inspector, the client, the client's agent or any employee.

Rope Access Work

A contractor must

- appoint a competent person in writing as a rope access supervisor with the duty of supervising all rope access work on the site, including the duty of ensuring occupational health and safety compliance in relation to rope access work: Provided that the appointment of any such person does not relieve the construction manager of any personal accountability for failing in his management duties in terms of this regulation;
- ensure that all rope access work on the construction site is carried out under the supervision of a competent person; and
- ensure that all rope access operators are competent and licensed to carry out their work.

No contractor may use or allow the use of rope access work unless-

- the design, selection and use of the equipment and anchors comply with the safety standards incorporated for this purpose into these Regulations under section 44 of the Act; and
- he or she is in possession of a site-specific fall protection plan developed by a competent person applicable to the specific work and environment prior to the commencement of the work, including records of maintenance and inspections of all the equipment used for the work operations.

A contractor must ensure that adequate measures are in place to allow rescue procedures to commence immediately in the event of a fall incident taking place

Hazardous Chemical Substances (HCS)

In addition to the requirements in the HCS Regulations, the principal contractor must provide proof in the Health and Safety Plan that:

- Material Safety Data Sheets (MSDS's) of the relevant materials / hazardous chemical substances are available prior to use by the contractor. All MSDS's shall be available for inspection by the agent at all times.
 - Risk assessments are done at least once every 6 months.
- Exposure monitoring is done according to OESSM and by an Approved Inspection Authority (AIA) and that the medical surveillance programme is based on the outcomes of the exposure monitoring.
 - How the relevant HCS's are being/going to be controlled by referring to:
 - Limiting the amount of HCS
 - Limiting the number of employees
 - Limiting the period of exposure
 - Substituting the HCS
 - Using engineering controls
 - Using appropriate written work procedures

- The correct PPE is being used.
- HCS are stored and transported according to SABS 072 and 0228.
- Training with regards to these regulations was given.

The Health and Safety plan should refer to the disposal of hazardous waste on classified sites and the location thereof (where applicable).

The First Aider must be made aware of the MSDS and trained in how to treat HCS incidents appropriately.

Noise Induced Hearing Loss

Where noise is identified as a hazard the requirements of the NIHL regulations must be complied with and the following must be included / referred to in the Health and Safety Plan:

- Proof of training with regards to these regulations.
- Risk assessment done within 1 month of commencement of work.
- That monitoring carried out by an AIA and done according to SABS 083.
- Medical surveillance programme established and maintained for the necessary employees.
- Control of noise by referring to:
 - Engineering methods considered
 - Admin control (number of employees exposed) considered
 - Personal protective equipment considered/decided on
- Describe how records are going to be kept for 40 years.

Explosives and Blasting

The Contractor shall ensure that the use of explosives and blasting (where required) be undertaken by a specialist contractor or a sub-contractor with proven track record in the type of work to be performed. Contractor may only use explosives for work purposes where the following conditions in place:

- Explosives Regulations to be complied with in all respects.
- Contractor must be in possession of a Blasting Licence
- Blasting permit to be obtained
- Permit to transport explosives to be obtained
- Method statement to be drawn up and approved by professional team
- Municipal authorities may require advance notice of planned use of explosives
- Contractor must notify Provincial Director of Department of Labour on Annexure 2 at least 7 days prior to blasting taking place
- Contractor must have Workman's Compensation and appropriate insurances in place

Personal Protective Equipment (PPE)

The Contractor shall carry out PPE or clothing needs analysis in accordance with his risk assessment, to determine the necessary PPE or clothing to be used during construction. The Contractor shall make provision and keep adequate quantities of SABS approved PPE or clothing on site at all times. The Contractor must ensure that lost, stolen, worn out or damaged PPE is replaced as required and receipt signed for by employees on site.

Asbestos

The Contractor shall ensure that all asbestos work is done only by registered "Asbestos Contractor" as prescribed by the Asbestos Regulations, 2001. The Contractor shall submit an Asbestos Certificate from

Department of Labour which refer to the prescribed requirements. The Contractor shall notify The Client if there are any asbestos materials to be used on site.

Besides the requirements listed above, should asbestos be identified as a hazard at the workplace, the following must be included in the health and safety plan or as soon as its available:

- Notification to the Provincial Director in writing, prior to commencement of asbestos work.
- Proof of a structured medical surveillance programme, drawn up by an occupational medicine practitioner.
- Proof that an initial health evaluation was carried out by an occupational health practitioner within 14 days after commencement of work.
- Copies of the results of all assessments, exposure monitoring and the written inventory of the location of the asbestos at the workplace.
- Only proof that medical surveillance has been conducted and not the actual records itself since these areas of a confidential nature.
- How records are going to be kept safe for the stipulated period of 40 years.
- Proof that asbestos demolition (if applicable) is going to be done by a registered asbestos contractor and provide proof that a plan of work for such demolition is submitted to an Approved Asbestos Inspection Authority 30 days prior to commencement of the demolition.
- Provide proof that the plan of work was approved by the asbestos AIA and submitted to the provincial director 14 days prior to commencement of demolition work together with the approved standardized procedures for demolition work.

Pressure Vessels (Including Gas Bottles)

The Contractor shall comply with Pressure Vessel Regulations, including:

- Providing competency and awareness training to the operators;
- Providing PPE or clothing;
- Providing and maintain appropriate signage in areas where pressure vessels are used, as applicable;
 - Inspect equipment regularly and keep records of inspections;
 - Providing appropriate firefighting equipment (Fire Extinguishers).

Fire Extinguishers and Fire Fighting Equipment

The Contractor shall provide adequate, regularly serviced fire extinguishers located at strategic points on site. The Contractor shall keep spare serviced portable fire extinguishers. The Contractor shall have adequate persons trained or competent to use the Fire Fighting Equipment.

Safety signage shall be posted up in all areas where fire extinguishers are located.

Lifting Machinery and Tackle

The Contractor shall ensure that lifting machinery and tackle is inspected before use and on a monthly basis. The Contractor shall have lifting machinery and tackle inspector who will inspect the equipment at intervals required by the Driven Machinery Regulations, considering that:

- All lifting machinery and tackle have a safe working load clearly indicated;
- Regular inspection and servicing are carried out;
- Records are kept of inspections and of service certificates;
- Thorough examinations are carried out by competent personnel at the frequencies required by legislation
- There is proper supervision in terms of guiding the loads which includes a trained banks man to direct and check lifting tackle if it is safe for use.

Ladders and Ladder work

The Contractor shall ensure that all ladders are numbered and inspected regularly keeping record of inspections. It should be noted that Aluminum ladders are preferred to wooden ladders.

General Machinery

The Contractor shall comply with the Driven Machinery Regulations, which include inspecting machinery regularly, appointing a competent person to inspect and ensure maintenance, issuing PPE or clothing and training those that use machinery and enforce compliance.

Portable Electrical Tools / Explosive Actuating Fastening Devices

The Contractor shall ensure that use and storage of all explosive actuating fastening devices and portable electrical tools are in compliance with relevant legislation. The Contractor shall consider that:

- A competent person undertakes routine inspections;
- Only authorised persons use the tools;
- There are safe working procedures applied;
- Awareness training is carried out and compliance is enforced at all times; and
- PPE and clothing are provided and maintained.

High Voltage Electrical Equipment

The Contractor shall ensure that, where the work is under, on or near high-voltage electrical equipment the Electrical Installation Regulations, together with safety instructions (Regulations of the Owner of the Equipment) are complied with.

Such equipment includes: -

- Eskom and the Local Authority equipment
- The Contractor's own power supply; and
- Electrical equipment being installed but not yet taken over from a Contractor by The Client.

Public Health and Safety

The Contractor shall ensure that each person working on or visiting a site, and the surrounding community, shall be made aware of the dangers likely to arise from onsite activities and the precautions to be observed to avoid or minimize those dangers. Appropriate health and safety signage shall be posted at all times.

Both the Client and the Contractor have a duty in terms of health and safety legislation to do all that is reasonably practicable to prevent members of the public and others being affected by the construction processes to be aware and put preventative measure in place. The public or visitors shall go through a brief health and safety induction detailing hazards and risks they may be exposed to and what measures are in place to control these hazards and risks.

Night Work

The Contractor shall not undertake any night work without prior arrangement and a written permit from the Client. The Contractor shall ensure that adequate lighting is provided for all night work and failure to do so shall result in work being stopped.

Environmental Conditions and Flora and Fauna

The Contractor must be mindful of adverse weather conditions upon the health and safety of the workforce. This includes inclement weather, strong wind, heat stress, extreme cold, etc. The Contractor's risk assessment process must consider the risks associated with such weather conditions. The same is true when working in an environment where there is a risk to employees' health and safety from presence of poisonous flora, or wildlife (including bees, snakes, etc.). The Contractor's risk assessment process must consider these risks.

Occupational Health

Exposure of workers to occupational health hazards and risks are very common in any work environment, especially in construction. Occupational health hazards and risks exposure is a major problem and all Contractors are to ensure that proper health and hygiene measures are put in place to prevent exposure to these hazards and risks. The occupational hazards and risks may enter the body in three ways:

- Inhalation through breathing e.g. cement dust;
- Ingestion through swallowing maybe through food intake;
- Absorption through the skin (pores) e.g. painting or use of thinners.

The contractor is required to ensure that all his personnel are medically fit prior to being allowed onto the work site.

All Contractors should ensure that Occupational Hygiene surveys are conducted as per the Occupational Health and Safety Act to ensure employees are not exposed to hazards. Risk Assessments should identify areas where surveys are to be conducted.

ANNEXURE A

The Contractor shall submit Annexure A with the Tender Document.

Item No.	HSS Requirement Submission date	OHSA Requirement	
1.	Notification of Intention to Commence Construction	Construction Regulations 2014, or latest	At least 7 days before commencement on site
2.	Construction Work Permit	Construction Regulations 2014, or latest (but only comes into effect from August 2015, and only with certain size and duration projects)	At least 30 days prior to project commencement
3.	Assignment of Responsible Person to Manage Building Work	Construction Regulations 2014, or latest	Before commencement on site
4.	Competency for Responsible Persons	Client / Client Agent requirement	Before commencement on site
5.	Compensation of Occupational Injuries and Diseases Act (COIDA) 130 of 1993	COIDA latest Requirement	Before commencement on site
6.	Occupational Health and Safety Policy	Client / Client Agent requirement	At tender stage
7.	Health and Safety Organogram.	Client / Client Agent requirement	Before commencement on site
8.	Risk Assessment, Safety Plan and Fall Protection Plan, Demolition Method Statement	Client / Client Agent requirement	Before construction work commences

Assignment of Contractor's Responsible Persons

ANNEXURE B - The contractor shall make the following appointments but not limited to:	
Chief Executive Officer (OSHACT 16(1))	Tel:
Contract Director/Manager (OSHACT 16(2))	Tel:
Construction Manager (CR 8(1))	Tel:
Construction Supervisor (CR 8(7))	Tel:
Assistant Construction Supervisor (CR 8(8))	Tel:
Construction Safety Officer (CR 8(5))	Tel:
Traffic Safety Officer	Tel:
Safety Representative (where > 20 employees on site)	Tel:
Temporary work Designer (CR 12(1))	Tel:
Temporary work Supervisor (CR12(2))	Tel:
Construction risk assessor (CR 9(1))	Tel:
Excavation Supervisor (CR13(1)(a))	Tel:
Demolition Supervisor (CR14(1))	Tel:
Scaffold Supervisor (CR16(1))	Tel:
Suspended Platform Supervisor (CR17(1))	Tel:
Material Hoist Inspector (CR19(8)(a))	Tel:
Material Hoist Operator (CR19(6))	Tel:
Bulk Mixing Plant Supervisor (CR20(1))	Tel:
Bulk Mixing Plant Operator (CR20(2))	Tel:
Controller of Explosive Actuated Fastening Devices Nails, Cartridges or Studs Issue and Collection (CR21(2)(g)(1))	Tel:
Construction Vehicle and Mobile Plant Operator (CR23(1)(d)(i))	Tel:
Controller of Temporary Electrical Installations (CR24(c))	Tel:
Stacking Supervisor (CR28(a))	Tel:
Fire Extinguishing Equipment Inspector (CR29(h))	Tel:
Fall Protection Plan Developer (CR 10(1)(a))	Tel:
Incident Investigator (OSHACT 9(2))	Tel:
Competent Person – Confined Spaces (GAR 5(1))	Tel:

OTHER HSS REQUIREMENTS

ANNEXURE C

The contractor shall comply and not be limited to the following requirements:

What	When	Output	Reference information
Awareness training (Toolbox Talks)	Weekly and before hazardous work is carried out	Attendance Register	
Health and Safety Committee Meetings	Monthly	Minutes signed by the employer (Contractor) Covering: a) Health and Safety Representative Checklist	
Health and Safety Reports	Monthly	Report covering: a) Incidents/Accidents and Investigations b) Non-conformance c) Health and Safety Training d) HIRA Updates e) Internal and External Audits	Incident reporting and investigation for The Client & Contractor form
General Inspections	As per HSS and OHSA	Report on HSS and OHSA compliance: a) Scaffolding b) Lifting Machinery c) Excavations	
General Inspections	Monthly	Covering: a) Firefighting Equipment b) Portable Electrical Equipment c) Ladders	
Record keeping	Ongoing	Covering: a) General complaints b) Fines c) General incidents d) MSDS e) Surveillance Medicals f) Inspection Register	
Permits	Before commencement with certain activities	As stipulated by the HSS and the OHSA / Construction Regulations	

BASELINE RISK ASSESSMENT FOR PROJECT

Irrespective of the risk presented on site, it will be ensured that sufficient supervision is in place on site, that personnel are trained in accordance with legislation, including the requirement for site specific inductions on site to inform personnel on site of the risks and hazards applicable to the site. Site supervision is responsible for ensuring that the control measures required below are implemented on site.

	HAZARD	RISK	RISK RATING (High / Medium / Low)	MINIMUM CONTROL MEASURES
1.	Asphalting	Fire Burns to skin Skin disease	High	<ul style="list-style-type: none"> Suitable fire extinguisher to be in place prior to commencement of works Ensure competent personnel using materials and competent and trained machinery/equipment operators Ensure there is a safe place of work at all times Ensure all personnel wear suitable and sufficient personal protective equipment (PPE) Health and safety data sheet required
2.	Compacting and Filling	Contact with tipping materials Contact with moving plant Vehicles/personnel falling into excavations Contact with underground services	Medium	<ul style="list-style-type: none"> Trained banksman to control vehicles movement Only trained personnel use plant Personal Protective Equipment to be worn Personnel to stand clear as materials are being tipped Use stop blocks and signs to warn vehicles of excavations, where applicable Stand clear of plant whilst materials are being compacted Establish position of underground services and protect services from damage
3.	Compactor Operations	Crushing of feet	Medium	<ul style="list-style-type: none"> Only trained and competent personnel to use the machine Ensure operative wears steel toe cap shoes or boots at all times
4.	Cutting Kerbs	Saw slipping, Blade disintegrating, Noise and dust	Medium	<ul style="list-style-type: none"> Only trained operators to use saw and change blades. Personal Protective Equipment must be worn. Gloves, goggles, dust mask and hearing protection. People to be kept away from the work area. Work to cease if people have to pass. Sparks etc. to be directed away from people and any flammable material.
5.	Cutting Off Disc	Noise Cuts from machine Fire (particularly at refueling) Flying debris Blade shattering Contamination by fume created or exhaust fume	Medium	<ul style="list-style-type: none"> Use competent personnel. Hot works control- fire extinguisher, fire watchman. (Permit may be required) PPE to include gloves, eye protection, hearing protection Solid working position. Clear working area Correct grade of blade must be used. Good ventilation to be provided (forced if necessary). Changing of wheels to be by competent persons only

Specifications

	HAZARD	RISK	RISK RATING (High / Medium / Low)	MINIMUM CONTROL MEASURES
				<ul style="list-style-type: none"> • Cut off discs must not be used for grinding (grinding disc thicker) • Bystanders to wear hearing protection, as applicable
6.	Electric Tools and Electrical Installations	Electric shock Fire	Low	<ul style="list-style-type: none"> • Electric tools and installations to be in good condition • Inspect electric tools before use • Do not use electric tools in wet/damp conditions • Use personal protective equipment such as insulated gloves • Electrical installations register to be maintained, inspected by competent person
7.	Fire	Injuries to workers, pedestrians, residents, road users, damage to property through fire	Medium	<ul style="list-style-type: none"> • No littering on site which could become fire hazard, maintain site in clean condition. • No fires to be lit on site. Have a working fire extinguisher at hand at all times. • No smoking or naked flame near flammable substances or in unauthorised areas • Ensure proper storage/use of Petrol/diesel/flammable substances – post warning notices
8.	Hand tools	Injuries caused by use of hand tool Impact with the tool Falls due to access problems Contamination with substance being worked	Low	<ul style="list-style-type: none"> • Ensure: • Tool is correct for job • Tool is in good order and suitably sharp • Personnel must be competent/instructed in tool usage and tool safely • Lighting is sufficient • Access is safe, working platform is secure, leading edge is guarded • Operative is wearing all necessary PPE
9.	Hazardous Substances	Injuries to workers through use of hazardous substances, e.g.: injuries to eyes, skin, etc.	Medium	<ul style="list-style-type: none"> • Use substances in accordance with data sheet, particularly reference protective clothing required (example: gloves, goggles, etc.) • Know what First Aid measures are • Have welfare facilities available for washing of hands, etc.
10.	Hot Works	Burns to eyes or other parts of the body	Medium	<ul style="list-style-type: none"> • Personal Protective Equipment to include eye, skin and hearing protection • Respirator maybe be required where cutting galvanized steel or anywhere else toxic fumes and gases arise. Dust can also be a problem and forced ventilation may be required.
11.	Kerb Laying	Nips at joints Crushing by kerbs Caustic burns	Low	<ul style="list-style-type: none"> • Impervious gloves and barrier cream to be used to protect hands. • Personnel should be aware of safe manual handling techniques when handling kerbs.

	HAZARD	RISK	RISK RATING (High / Medium / Low)	MINIMUM CONTROL MEASURES
12.	Manual Handling of General Items	Muscular skeletal injuries if the load is too heavy or awkward Operative falling/tripping Contamination from the substance being carried Fall of material being carried	Medium	<ul style="list-style-type: none"> Personnel should be aware of safe manual handling techniques Personnel to wear Personal Protective Equipment when carrying items, e.g.: safety footwear and gloves. Ensure good housekeeping against tripping/fall hazards. Operative to get assistance if load too heavy- team lift if necessary. Utilise mechanical lifting and carrying aids where possible. Personnel to ensure access equipment, ladders will take weight of operative and load being carried. Personnel to ensure item being carried is properly bonded or is not be liable to break apart whilst being manually handled.
13.	Noise and Dust	Breathing in dust can cause long term health problems, noise can damage hearing	Medium	<ul style="list-style-type: none"> Wear respiratory and hearing protection Dampen down and minimise dust where possible.
14.	Overhead Services (Working near)	Contact with live services causing injury to personnel Damage caused to services	Medium	<ul style="list-style-type: none"> Maintain safe clearance levels Establish presence of any services via proper walk through survey of site and/or means of service drawings Wear personal protective clothing Ensure height of plant/vehicles does not compromise or exceed clearance levels for overhead services Obtain information on clearance levels from service provider
15.	Plant or Vehicles and Equipment Operation	Workers injured by passing traffic Road users and pedestrians at risk from operation of tractor and mower Noise	High	<ul style="list-style-type: none"> Implement traffic protection measures Trained and competent operators must be used Check plant and vehicles on daily basis before use and record inspections. Maintain vehicles in safe condition. Medical certificates of fitness required for construction plant. Crossing of road by construction vehicles or machines must be limited to the practical minimum Plant and vehicles must be fitted with amber rotating beacons and reverse alarms. Wear appropriate protective clothing/equipment, eg: goggles, gloves, ear defenders, etc as appropriate.
16.	Protection of Members of Public	Injury to member of public and road users from site works	High	<ul style="list-style-type: none"> Barriers and signage to be in place Workers must warn away any members of public from the works Footpaths and bridges which are open to public must be closed off if in area of works or otherwise made safe so that no injury occurs to members of public

	HAZARD	RISK	RISK RATING (High / Medium / Low)	MINIMUM CONTROL MEASURES
				<ul style="list-style-type: none"> Traffic turning into site – traffic management and signage as required. Signage to be on road at site entrance warning motorists that construction traffic turning into/out of site access. Keep roads free of mud where possible Refer to plant risk assessment for details on plant safety precautions NOTE: SIGNAGE TO BE POSTED ON SITE TO WARN OF CONSTRUCTION TRAFFIC MOVEMENTS. SAFE MEANS OF ACCESS FOR BOTH CONSTRUCTION TRAFFIC TO SITE AND PRIVATE HOMEOWNERS MUST BE AGREED.
17.	Road Construction	Risk of being struck by vehicles	High	<ul style="list-style-type: none"> Ensure traffic management measures in place No construction activities to commence until adequate provision made to accommodate traffic in accordance with the South African Traffic Signs Manual. Wear reflective waistcoats when working on or near the road or road shoulder as well as any other required personal protective clothing. Crossing of road by personnel must be limited to the practical minimum Use of fencing or other barriers as appropriate
18.	Road Working – working in or next to road	Injury to workers caused by passing traffic Injury to road users and pedestrians by works	High	<ul style="list-style-type: none"> Flagmen to be used where interface with construction plant with passers-by or where hazard posed by delivery vehicles turning into/out of site. Traffic management plan to be approved by Municipality and, if necessary, traffic department No construction activities to commence until adequate provision made to accommodate traffic in accordance with the South African Traffic Signs Manual. Use safety signage to warn traffic and pedestrians of construction works Where existing walk ways/pavements affected by works, must direct pedestrian traffic away to safe walking area. Wear reflective waistcoats when working on or near the road or road shoulder as well as any other required personal protective clothing. Crossing of road by personnel must be limited to the practical minimum Use of fencing or other barriers as appropriate
19.	Scaffold Erection/ Dismantling	Personnel falling from a height Items of scaffold falling onto personnel	High	<p>Ensure</p> <ul style="list-style-type: none"> scaffold is designed to take the imposed loads scaffolding is constructed properly scaffold is not overloaded scaffolders are fully trained

	HAZARD	RISK	RISK RATING (High / Medium / Low)	MINIMUM CONTROL MEASURES
		Scaffold collapsing onto those below		<ul style="list-style-type: none"> scaffolding is regularly checked by competent person and record of inspection retained. Written inspections to be recorded on weekly basis scaffolders must adhere to the safe systems of work. all fall arrest equipment to be checked and certified in good working order that ALL understand the safe system of work
20.	White lining	Contact with moving vehicles Fire	High	<ul style="list-style-type: none"> Ensure suitable and sufficient road signs are erected, as applicable Possible road or lane closure may be required – traffic management may be required Fire Extinguisher to be situated in a suitable area, use dry powder or foam

MEASUREMENT AND PAYMENT

Item

Unit

Contractor's obligations in respect of health and safety

- (a) Minor Works with value <R200 000 day
- (b) Works with value R200 000 – R600 000 day
- (c) Works with value >R600 000 day

Payment of the tendered daily rate shall include full compensation for all costs resulting from complying with Occupational Health and Safety Act and its Construction Regulations and requirements in terms of health and safety requirements in respect of the contract as specified.

19. ELIGIBILITY CRITERIA - GENERAL INFORMATION

* **Proof of Contactable References is required, as indicated below, and must accompany each proposal.**

ELIGIBILITY EVALUATION (only applicable to Section 1 and 3 of BOQ)

Details of Key Staff Required

In order to be considered for an appointment in terms of this tender, the tenderer must have the following key personnel in its permanent employment at the close of tender.

Role	Number of Key Staff	Minimum Qualification	Experience
Contract Manager/ Project Leader	1	NQF 4 Certificate in Electrical/ Electronic Engineering. Must also be in possession of an Electrical Trade Test Certificate including a Wireman's License.	5 years' experience in traffic signal construction and maintenance
Supervisor/ Electrician	1	NQF 4 Certificate in Electrical/ Electronic Engineering. Must also be in possession of an Electrical Trade Test Certificate including a Wireman's License.	2 years' experience in traffic signal construction and maintenance
Traffic Signal Foreman	1	FET: N3 Certificate in Electrical/ Electronic Engineering. Must also be in possession of an Electrical Trade Test Certificate	2 years' experience in traffic signal construction and maintenance

The tenderer is required to submit proof of these qualifications and experience at tender submission of this contract.

- No tender will be regarded as an acceptable quotation or responsive if it fails to achieve the minimum qualifying criteria as set out above.
- Suppliers shall ensure that the below annexures have been fully and properly completed.
- Tenders that successfully submitted all their supporting documents shall be evaluated further in terms of the prescribed preference point system.

Tenderers that does not submit all their supporting documents, will be regarded as non-responsive. Successful tenderers will be placed on a panel for consideration for award of a Work Package. The panel will be valid until the tender expires.

Note: Only the information provided on Eligibility Criteria Sheet 1-3, or attached thereto, will be considered to confirm the tendering entity and key staff meets the above eligibility criteria. Failure to complete Eligibility Criteria Sheet 1-3 may result in the tender being non-responsive.

20. ELIGIBILITY CRITERIA - WORK EXPERIENCE (SHEET NO. 1)

ELIGIBILITY CRITERIA SHEETS No.1: (only applicable to Section 1 and 3 of BOQ)

PREVIOUS RELEVANT EXPERIENCE OF SUPPLIER IN THE PAST 24 MONTHS

GENERAL TRAFFIC SIGNAL AND CIVIL WORKS EXPERIENCE FOR INITIAL ASSESSMENT
PROJECT SPECIFIC EXPERIENCE FOR FINAL ASSESSMENT

The tender shall indicate on the schedule below all relevant projects that have been completed in their local office with completion dates in the past **24 months**, or that are underway at present specifically relevant to the individual assignment.

TYPE OF RELEVANT TRAFFIC SIGNAL RELATED PROJECTS WORK PREVIOUSLY PERFORMED	CLIENT'S DETAILS <i>(Where work was performed, contact name & phone number)</i>	COMPLETION DATE OF CONTRACT	VALUE OF CONTRACT
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			

Please list projects carried out by the supplier that are of a similar nature to the works as described in this tender document

The minimum number of projects to be listed:

- 7 traffic signal related projects completed in the last 24 months

Please submit installer certificates as per point F3.8.2.

Attach additional pages if more space is required. Number of sheets appended by the tenderer to this schedule <i>(If nil, enter NIL)</i>			
SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			

21. ELIGIBILITY CRITERIA - PLANT AND EQUIPMENT (SHEET NO. 2)

ELIGIBILITY CRITERIA SHEET No. 2: (only applicable to Section 1 and 3 of BOQ)

PLANT AND EQUIPMENT (OWNED OR HIRED)

PLANT AND EQUIPMENT TO BE USED ON THIS PROJECT <i>(Supplier to List)</i>	OWNED	HIRED
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

The minimum number of Plant and Equipment to be listed:

- 1x Truck with Crane (> 5 ton)
- 1x Cherry Picker truck
- 1x Pick-up Truck (< 5 ton)

Please provide proof of ownership or hired\lease agreement

Attach additional pages if more space is required.

Number of sheets appended by the tenderer to this schedule (If nil, enter NIL)			
SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			

22. ELIGIBILITY CRITERIA - STAFF (SHEET NO. 3)

ELIGIBILITY CRITERIA SHEET No: 3: STAFF (only applicable to Section 1 and 3 of BOQ)

This criterion relates to the education, training and experience of the key staff members / experts, in the electrical (traffic signals) and civil engineering infrastructure fields, including both construction and maintenance.

NAME and ID NUMBER	PROPOSED POSITION	QUALIFICATION or TRADE (Insert highest level of education achieved)	RELEVANT EXPERIENCE (Describe)	No. OF YEARS RELEVANT EXPERIENCE	PERMANENT	NON-PERMANENT
					Tick as appropriate	

Note that eligibility will apply only to 1x Contract Manager/Project Leader, 1x Supervisor/Electrician and 1x Traffic Signal Foreman

Contract Manager/Project Leader with experience in traffic signals related projects:

- Contract Manager/Project Leader with 5 years' experience in Traffic Signals construction and maintenance

Supervisor/Electrician with experience in traffic signals related projects:

- Supervisor/Electrician with 2 years' experience in Traffic Signals construction and maintenance

Traffic Signal Foreman with experience in traffic signals related projects:

- Traffic Signal Foreman with 2 years' experience in Traffic Signals construction and maintenance

Please attached curriculum vitae of listed personnel, including all qualifications.

Number of sheets appended by the tenderer to this schedule (If nil, enter NIL)			
SIGNATURE (Bidder)		FOR OFFICE USE ONLY:	
CAPACITY		Evaluated by	
NAME OF FIRM		Signature:	
NAME (PRINT)		Designation:	
DATE		Date:	

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.

DETAILS OF MAJOR EQUIPMENT THAT IS OWNED BY AND IMMEDIATELY AVAILABLE FOR THIS CONTRACT.			
QUANTITY	DESCRIPTION	SIZE	CAPACITY

Attach additional pages if mores space is required.

DETAIL OF MAJOR EQUIPMENT THAT WILL BE HIRED, ORE ACQUIRED FOR THIS CONTRACT IF MY / OUR TENDER IS ACCEPTED.			
QUANTITY	DESCRIPTION,	SIZE	CAPACITY

Attach additional pages if mores space is required.

Number of sheets appended by the tenderer to this schedule (<i>If nil, enter NIL</i>)	
------------------------------------------------------------------------------------------------	--

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			

SCHEDULE OF SUBCONTRACTORS

I/we the tenderer, notify the Stellenbosch Municipality that it is our intention to employ the following Subcontractors for work in this contract.

SUBCONTRACTORS				
Category / Type	Subcontractor Name; Address; Contact Person; Tel. No.		Items of work (pay items) to be undertaken by the Subcontractor	Estimated cost of Work (Rand)
1.	Name of firm			
	Contact person			
	Tel No			
	Address			
2.	Name of firm			
	Contact person			
	Tel No			
	Address			
3.	Name of firm			
	Contact person			
	Tel No			
	Address			
4.	Name of firm			
	Contact person			
	Tel No			
	Address			
5.	Name of firm			
	Contact person			
	Tel No			
	Address			
Number of sheets appended by the tenderer to this schedule (<i>If nil, enter NIL</i>)				

Acceptance of this tender shall not be construed as approval of all or any of the listed subcontractors. Should any of the subcontractors not be approved subsequent to acceptance of the tender, this shall in no way invalidate this tender, and the tendered unit rates for the various items of work shall remain final and binding, even in the event of a subcontractor not listed above being approved by the Engineer.

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			

SCHEDULE OF WORK EXPERIENCE OF THE TENDERER – CURRENT CONTRACTS

CURRENT CONTRACTS						
EMPLOYER (Name, Tel, Fax, Email)		Contact Person (Name, Tel, Fax, Email)		NATURE OF WORK	VALUE OF WORK (INCL. VAT)	DATE COMPLETED
Name		Name				
Tel		Tel				
Fax		Fax				
Email		Email				
Name		Name				
Tel		Tel				
Fax		Fax				
Email		Email				
Name		Name				
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Name		Name				
Tel		Tel				
Fax		Fax				
Email		Email				

Attach additional pages if mores space is required.

Number of sheets appended by the tenderer to this schedule (If nil, enter NIL)				
SIGNATURE		NAME (PRINT)		
CAPACITY		DATE		
NAME OF FIRM				

SCHEDULE OF WORK EXPERIENCE OF THE TENDERER – COMPLETED CONTRACTS

The following is a statement of similar work successfully executed by myself / ourselves:

COMPLETED CONTRACTS						
EMPLOYER (Name, Tel, Fax, Email)		Contact Person (Name, Tel, Fax, Email)		NATURE OF WORK	VALUE OF WORK (INCL. VAT)	DATE COMPLETED
Name		Name				
Tel		Tel				
Fax		Fax				
Email		Email				
Name		Name				
Tel		Tel				
Fax		Fax				
Email		Email				
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Name		Name				
Tel		Tel				
Fax		Fax				
Email		Email				

Attach additional pages if mores space is required.

Number of sheets appended by the tenderer to this schedule (If nil, enter NIL)	
--------------------------------------------------------------------------------	--

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			

CERTIFICATE OF REGISTRATION WITH CIDB

CIDB Contractor Registration Certificate

A Certificate of Contractors Registration issued by the Construction Industry Development Board (CIDB) shall be attached to this schedule.

Where a tenderer satisfies CIDB Contractor Grading designation requirements through joint venture formation, such tenderers must submit the Certificates of Contractor Registration in respect of each partner.

Number of sheets appended by the tenderer to this schedule (If nil, enter NIL)	
CRS Number:	

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			

FORM OF OFFER AND ACCEPTANCE

NOTE:

1. This form must be completed in duplicate by both the successful bidder (Part 1) and the purchaser (Part 2). Both forms must be signed in the original so that the successful bidder and the purchaser will be in possession of originally signed contracts for their respective records.
2. NO correction fluid/tape may be used.
 - a. In the event of a mistake having been made, it shall be crossed out in ink and be accompanied by an initial at each and every alteration.
3. The Bidder MUST indicate whether he/she/the entity is a registered VAT Vendor or not.
 - a. In the case of the Bidder not being a registered VAT Vendor, both columns (amount/rate excluding AND including VAT) must reflect the same amount.

	INDICATE WITH AN 'X'							
Are you/is the firm a registered VAT Vendor	YES				NO			
If "YES", please provide VAT number								

1. OFFER

- 1.1. The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract in respect of the following works: **B/SM: 82/24**
- 1.2. The tenderer, identified in the Offer signature block, has examined the draft contract as listed in the Acceptance section and agreed to provide this Offer.
- 1.3. By the representative of the Tenderer, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance, the Tenderer offers to perform all of the obligations and liabilities of the **Employer** under the contract, including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the conditions of contract identified in the Contract Data.

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF VAT IS:	
In figures:	R
In words:	

- 1.4. This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document to the Tenderer before the end of the period of validity stated in the Tender Data, whereupon the Tenderer becomes the party named as the **Contractor** in the conditions of contract identified in the Contract Data.

Signature(s)		
Name(s)		
Capacity		
Name of tenderer:		
Name of witness:	<i>(Insert name and address of organisation)</i>	Date
Signature of witness:		

2. ACCEPTANCE

- 2.1. By signing this part of this Form of Offer and Acceptance, the Employer identified below accepts the tenderer's Offer. In consideration thereof, the Employer shall pay the Contractor the amount due in accordance with the conditions of contract identified in the Contract Data. Acceptance of the tenderer's Offer shall form an agreement between the Employer and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.
- 2.2. Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Returnable Schedules as well as any changes to the terms of the Offer agreed by the tenderer and the Employer during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Form of Offer and Acceptance. No amendments to or deviations from said documents are valid unless contained in this Schedule.
- 2.3. It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the tenderer of a completed signed copy of this Agreement shall have any meaning or effect in the contract between the parties arising from this agreement.

Signature(s):			
Name(s):			
Capacity:			
For the Employer:	Stellenbosch Municipality, Plein Street, Stellenbosch		
Name of witness:		Date:	
Signature of witness:			

CONTRACT SPECIFIC DATA

CONTRACT SPECIFIC DATA

The following contract specific data, referring to the General Conditions of Contract for Construction Works, are applicable to this Contract:

Clause 1.1.1.11 (Addition to Standard Clause)

Add to end of sentence "...in terms of the Form of Offer and Acceptance of an Individual Assignment".

Clause 1.1.1.13 (Addition to Standard Clause)

The Defects Liability Period is 12 months.

Clause 1.1.1.14: (Addition to Standard Clause)

The time for achieving Practical Completion will be determined prior to the appointment of an individual assignment

Clause 1.1.15: Employer (Addition to Standard Clause)

The name of the Employer is: Stellenbosch Municipality

Clause 1.1.16: Engineer (Addition to Standard Clause)

The term Engineer means a Municipal Official or a Consulting Engineer duly authorized to act on behalf of the Municipality.

Clause 4.3.3 (Addition to Standard Clause)

The Employer and the Contractor shall enter into an agreement to complete the work required for the construction of the works in terms of the provisions of Section 37(2) of the Occupational Health and Safety Act (Act 85 of 1993) and the Construction Regulations promulgated thereunder."

Clause 4.3.4 (Addition to Standard Clause)

The Contractor shall provide proof to the Employer, within 14 days of being requested to do so, that he has paid all contributions required in terms of the Compensation for Occupational Injuries and Diseases Act, No. 130 of 1993."

Clause 5.4.2

The access and possession of Site shall not be exclusive to the Contractor and will determine prior to the appointment of an individual assignment.

Clause 5.3.1

The documentation required before commencement with Works of an individual assignment are:

- Health and Safety Plan (Refer to Clause 4.3)
- Proof of good standing with the Compensation Commission (Refer to Clause 4.3)
- Initial Programme (Refer to Clause 5.6)
- Security (Refer to Clause 6.2)
- Insurance (Refer to Clause 8.6)

Clause 5.3.2: (Addition to Standard Clause)

The time to submit the documentation required before the commencement of an individual assignment is 14 days

Clause 5.3.4: (Addition to Standard Clause)

The Contractor shall commence executing the Works within 14 days from the Commencement Date.

Clause 5.5.1: (Addition to Standard Clause)

The Due Completion Date will be determined prior to the appointment of individual assignments

Clause 5.8.1: (Addition to Standard Clause)

The non-working days are Sundays.

The special non-working days are public holidays, and the year-end break commencing on 21 December and ending on the 4 January.

Clause 5.13.1: (Addition to Standard Clause)

Penalties for failing to complete a portion or the whole of the Works (individual assignment) will be determined and agreed prior to the appointment of individual assignments is R10 000 (excl. VAT) per calendar day.

Clause 5.16.3: (Addition to Standard Clause)

The latent defect period is 10 years.

Clause 6.2.1: (Addition to Standard Clause)

The Contractor shall provide the following Guarantee:

CONTRACT AMOUNT	PERCENTAGE GUARANTEE
Up to R300 000	Nil
R300 001-R1 000 000	2.5%
R1 000 001-R3 000 000	5%
R3 000 001-R5 000 000	7.5%
R5 000 001- and above	10%

Clause 6.8.2

The value of the certificates issued shall be adjusted in accordance with the Contract Price Adjustment Schedule included in the General Conditions of Contract. (Second Edition) 2015.

$$f = (1 - x) \left(\frac{aL_t}{L_o} + \frac{bP_t}{P_o} + \frac{cM_t}{M_o} + \frac{dF_t}{F_o} - 1 \right)$$

Schedule with the following values:

- x = 0.10
- a = 0.15
- b = 0.10
- c = 0.65
- d = 0.10

"L" is consumer price index for the area of Western Cape, other urban areas

"P" is the "Plant Index"

"F" is the diesel oil index for Diesel at wholesale level- Coast.

"M" is the "Material Index"

The base date for the purposes of calculating Contract Price Adjustment (CPA) shall be the month before the tender closing date. The base date for the purposes of calculating CPA for the 2025/26 and 2026/27 financial year will be June 2024.

Clause 6.10.3: (Addition to Standard Clause)

The percentage retention on the amounts due to the Contractor is 10%.

The limit of retention money is 5% of the Contract Price, including allowances for contingencies.

The percentage retention for the Defect Liability Period is 5%.

Clause 8.6.1.1.1: (Addition to Standard Clause)

In addition to the insurances required in terms of Clauses 8.6.1.1 to 8.6.1.4 the following insurance is also required:

- 8.6.1.5.1 Insurance of Construction Equipment (including tools, offices and other temporary structures and contents) and other things (except those intended for incorporation into the Works) brought onto the site for a sum sufficient to provide for their replacement.
- 8.6.1.5.2 Insurance in terms of the provisions of the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993.
- 8.6.1.5.3 Motor Vehicle Liability Insurance comprising (as a minimum) "Balance of Third Party" Risks including Passenger Liability Indemnity.

The limit for insurance to cover the value of plant and materials will be determined prior to the appointment of an individual assignment.

Clause 8.6.1.1.2: (Addition to Standard Clause)

The limit for insurance to cover professional fees will be determined prior to the appointment of an individual assignment.

Clause 8.6.1.3: (Addition to Standard Clause)

The limit of indemnity for public liability insurance will be determined prior to the appointment of an individual assignment and shall not be less than R5 million (excl. VAT).

Clause 9.2: Termination by Employer

Clause 9.2.1.3.9 (Additional clause)

Individual works assignments would be terminated by the Employer should the tenderer not comply with the following:

- Register on Stellenbosch Municipality's Supplier Database by completing and submitting the relevant form as well as submitting and completing the Creditor Control Form, within 14 days of being requested to do so. These forms can be downloaded from the Municipality's website or can be obtained from the Municipality's Supply Chain office.
- Submit to the Municipality, written confirmation that the tenderer has the ability to carry out the works:
 - within the timeframe required by the Municipality, within 7 days of being requested to do so.
 - utilizing the proper materials, as specified in the Contract Data, within 7 days of being requested to do so.
 - utilizing the proper work methods, as specified in the Contract Data, within 7 days of being requested to do so.
- Submit to the Municipality, where the tenderer has undercut rates, the following, within 3 days of being requested to do so:
 - a detailed breakdown of the submitted and undercut rate.
 - written confirmation that the tenderer is able to absorb financial losses on a work assignment.

And on receipt of the information, the Municipality determines that the tenderer will incur appreciable losses.

Clause 10.5.3

The number of Adjudication Board Members to be appointed is one.

Clause 10.7.1

The determination of disputes shall be by arbitration.

Additional Conditions of Tender

1. Risk Analysis

Notwithstanding compliance with regard to CIDB registration or any other requirements of the tender, the employer will perform a risk analysis in respect of the following:

- reasonableness of the financial offer
- reasonableness of unit rates and prices
- the tenderer's ability to fulfil its obligations in terms of the tender document, that is, that the tenderer can demonstrate that he/she possesses the necessary professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, capacity, experience, reputation, personnel to perform the contract, etc.; the employer reserves the right to consider a tenderer's existing contracts with the Municipality in this regard.
No tenderer will be recommended for an award unless the tenderer has demonstrated to the satisfaction of the employer that he/she has the resources and skills required.

2. The Pricing Strategy is Fixed Price Contract. The rates and / or prices submitted and stated in the Pricing Data shall be final and binding throughout the period of the Contract. Where the tenderer has stipulated conditions tied to a submitted rate, the rate will be deemed null and void. Contract Price adjustment and rise and fall on bituminous and electrical items are applicable to individual appointments.
3. The quantities reflected in the bill of quantities are for evaluation purposes only. Actual quantities to be used will be indicated during the implementation of individual projects.
4. Only tenderers, who's CIDB grading is in line with the value of the individual work assignment, will be considered for appointment of an individual work assignment.
5. Tenderers cannot be considered for an individual assignment where rates have not been submitted for items that are included in the bill of quantities of an individual assignment.
6. The Municipality would endeavour to achieve a degree of equity among the listed tenderers.
7. The Municipality reserves the right not to successively appoint the same tenderer, however, the Municipality will ensure that value for money principals (economy, effectiveness and efficiency) are achieved, when making appointments for individual assignments.
8. Individual work assignments cannot be awarded, or the awarded works on traffic signals assignments would be cancelled, should the tenderer not comply with the following:
 - Submit to Municipality, all required Guarantees and Insurances, within 7 days of being requested to do so.
 - Submit to the Municipality, within 3 days, written confirmation that the tenderer has the ability to carry out the works:
 - within the timeframe required by the Municipality,
 - utilizing the proper materials and work method, as specified in the Contract Data,
 - utilizing the proper work methods, as specified in the Contract Data
 - Emergency Faults/Malfunctioning of existing Traffic Signals for example (but not limit to) traffic accidents, vandalism and natural causes that may have a safety implication – response time should not exceed 2 hours for 24 hours of the day, 7 days of the week.

9. Unbundling of Municipal Infrastructure Assets

As part of the project closeout, the contractor must also unbundle the assets. The unbundling of capital assets means breaking down the capital assets into components

according to the capital asset hierarchy as per GRAP 17 (PPE) in support of the annual compilation of a GRAP compliant Fixed Asset Register. In dealing with the unbundling of capital assets, the unbundling must occur at the end of every financial year and the end of the project. See pt 11 on page 98 for more details

24. PRICING SCHEDULE

- NOTE:**
1. Only firm prices will be accepted. Non-firm prices will not be considered.
 2. All delivery costs **MUST** be included in the bid price, for delivery at the prescribed destination.
 3. Document **MUST** be completed in non-erasable black ink.
 4. **NO** correction fluid/tape may be used.
 - a. In the event of a mistake having been made, it shall be crossed out in ink and be accompanied by an initial at each and every alteration.
 5. The Bidder **MUST** indicate whether he/she/the entity is a registered VAT Vendor or not.
 - a. In the case of the Bidder not being a registered VAT Vendor, both columns (amount/rate including VAT) must reflect the same amount.

I / We _____

(full name of Bidder) the undersigned in my capacity as _____

of the firm _____

hereby offer to Stellenbosch Municipality to render the services as described, in accordance with the specification and conditions of contract to the entire satisfaction of the Stellenbosch Municipality and subject to the conditions of tender, for the amounts indicated hereunder:

	INDICATE WITH AN 'X'							
Are you/is the firm a registered VAT Vendor	YES				NO			
If "YES", please provide VAT number								

Please note the following:

1. Stellenbosch Municipality reserves the right to downward adjust the scope of work/ quantity required to stay within its budget.
2. Only firm prices will be accepted and non-firm prices will not be considered.

PRICING SCHEDULE:

PRICING INSTRUCTION

1. All rates to exclude VAT.
2. Measurement and payment shall be in accordance with the relevant provisions of clause 8 of each of the SABS 1200 Standardised Specifications for Civil Engineering Construction referred to in the Scope of Work. The Preliminary and General items shall be measured in accordance with the provisions of SABS 1200-A, General.
3. The Pricing Strategy is Fixed Price Contract. The rates and / or prices submitted and stated in the Pricing Data shall be final and binding throughout the period of the Contract. Where the tenderer has stipulated conditions tied to a submitted rate, and the condition results in a variance in the rate, the rate will be deemed null and void.
4. For the purpose of the Bill of Quantities, the following words shall have the meanings hereby assigned to them:
 - i. **Unit:** The unit of measurement for each item of work as defined in the Standard Specifications.
 - ii. **Quantity:** The number of units of work for each item.
 - iii. **Rate:** The agreed payment per unit of measurement.
 - iv. **Amount:** The product of the quantity and the agreed rate for an item.
 - v. **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.
 - vi. **Provisional sum:** An amount provided for work the scope and/or the necessity of which is undecided and which will be dealt with in accordance with clause 6.6.1 of the General Conditions of Contract.
 - vii. **Prime cost sum:** An amount provided to cover the cost price of certain goods, services or materials in accordance with clause 6.6.2 of the General Conditions of Contract.
5. The units of measurement described in the Bill of Quantities (BOQ) are metric units. Abbreviations used in the Bill of Quantities are as follows:

%	=	percent
h	=	hour
ha	=	hectare
kg	=	kilogram
kl	=	kilolitre
km	=	kilometre
km-pass	=	kilometre-pass
kPa	=	kilopascal
kW	=	kilowatt
l	=	litre
m	=	metre
mm	=	millimetre
m ²	=	square metre
m ² -pass	=	square metre-pass
m ³	=	cubic metre
m ³ -km	=	cubic metre-kilometre
MN	=	mega newton
MN.m	=	mega newton-metre
MPa	=	mega pascal
No.	=	number
Prov sum	=	Provisional sum
PC sum	=	Prime Cost sum
R/only	=	Rate only
sum	=	lump sum
t	=	ton (1000 kg)
W/day	=	Work day

6. Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.
7. It will be assumed that prices included in the bills of quantities are based on Acts, Ordinances, Regulations, By-laws, International Standards and National Standards that were published 28 days before the closing date for tenders.
8. The prices and rates in the Bill of Quantities are to be fully inclusive prices for the work described under the several 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. Reasonable prices shall be inserted as these will be used as a basis for assessment of payment for additional work that may have to be carried out. Prices and Rates submitted are applicable to all areas falling within the Stellenbosch Municipal Area.
9. 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.
10. 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.
11. The short descriptions of the items of payment given in the 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 Works.
12. The item numbers appearing in the Schedule refer to the corresponding item numbers in the Standard Specifications.
13. The quantities reflected in the bill of quantities are for evaluation purposes only. Actual quantities to be used will be indicated during the implementation of individual projects.

Bid B/SM 82/24 - Works on Traffic Signals for a period of three (3) years until 30 June 2027

SECTION 1	SUPPLY, INSTALLATION, REMOVAL AND MAINTENANCE OF TRAFFIC SIGNAL EQUIPMENT CIDB Grading of 3 EP or higher is needed
<p>Rates to include all materials, equipment, installation and commissioning, establishment of contractor onsite, testing – commissioning and issuing of Compliance Certificates, Health and Safety requirements including all labour and transport, unless otherwise indicated. Refer to Scope of Work and Specifications for all items. Contract Price Adjustment is applicable for Year 2 and 3. The quantities reflected in the bill of quantities are for evaluation purposes only. Actual quantities to be used will be indicated during the implementation of individual projects.</p>	

Bidders Details				Bidder Name			
BBBEE Points				0			
Item No:	Description	Unit	Quantity	Rates (excl. VAT)	Total (excl. VAT)	VAT (15%)	Total (incl. VAT)
1	EARTHWORKS						
1.1	Trench Excavation (Normal material)						
1.1.1	Trench 500mm by 700mm depth	m	450				
1.1.2	Duct opening (0.5 - 2metre depth)	each	450				
1.1.3	Hole for controller (base mounted) (750mm depth)	each	450				
1.1.4	Hole for controller (pole mounted) (750mm depth)	each	40				

1.1.5	Hole for connection pillar (stubby) (750mm depth)	each	50				
1.1.6	Hole for pole (4m or short pedestrian button pole) (750mm depth)	each	150				
1.1.7	Hole for pole (6m pole) (1000mm Depth) (concrete in hole to support pole)	each	150				
1.1.8	Hole for pole (8m pole) (1200mm Depth) (concrete in hole to support pole)	each	150				
1.1.9	Hole for cantilever bolt group foundation (casting of foundation measured separately) (min 1m depth)	each	150				
1.1.10	Hole for UPS cabinet	each	150				
1.1.11	Hole for Smartlock Controller Chamber Rhino 1000	each	30				
1.1.12	Hole for Smartlock UPS Chamber Rhino 1000	each	30				
1.1.13	Hole for Smartlock stubby Chamber Rhino 600	each	30				
1.1.14	Hole for Smartlock stubby Chamber Rhino 1000	each	30				
1.1.15	Test holes (0.5 - 1metre depth)	each	30				
1.2	Trench Excavation (Intermediate material)						
1.2.1	Trench 500mm by 700mm depth	m	450				
1.2.2	Duct opening (0.5 - 2metre depth)	each	450				
1.2.3	Hole for controller (base mounted) (750mm depth)	each	450				
1.2.4	Hole for controller (pole mounted) (750mm depth)	each	40				
1.2.5	Hole for connection pillar (stubby) (750mm depth)	each	50				

1.2.6	Hole for pole (4m or short pedestrian button pole) (750mm depth)	each	150				
1.2.7	Hole for pole (6m pole) (1000mm Depth) (concrete in hole to support pole)	each	150				
1.2.8	Hole for pole (8m pole) (1200mm Depth) (concrete in hole to support pole)	each	150				
1.2.9	Hole for cantilever bolt group foundation (casting of foundation measured separately) (min 1m depth)	each	150				
1.2.10	Hole for UPS cabinet	each	150				
1.2.11	Hole for Smartlock Controller Chamber Rhino 1000	each	30				
1.2.12	Hole for Smartlock UPS Chamber Rhino 1000	each	30				
1.2.13	Hole for Smartlock stubby Chamber Rhino 600	each	30				
1.2.14	Hole for Smartlock stubby Chamber Rhino 1000	each	30				
1.2.15	Test holes (0.5 - 1metre depth)	each	30				
1.3	Trench Excavation (Hard material)						
1.3.1	Trench 500mm by 700mm depth	m	450				
1.3.2	Duct opening (0.5 - 2metre depth)	each	450				
1.3.3	Hole for controller (base mounted) (750mm depth)	each	450				
1.3.4	Hole for controller (pole mounted) (750mm depth)	each	40				
1.3.5	Hole for connection pillar (stubby) (750mm depth)	each	50				
1.3.6	Hole for pole (4m or short pedestrian button pole) (750mm depth)	each	150				

1.3.7	Hole for pole (6m pole) (1000mm Depth) (concrete in hole to support pole)	each	150				
1.3.8	Hole for pole (8m pole) (1200mm Depth) (concrete in hole to support pole)	each	150				
1.3.9	Hole for cantilever bolt group foundation (casting of foundation measured separately) (min 1m depth)	each	150				
1.3.10	Hole for UPS cabinet	each	150				
1.3.11	Hole for Smartlock Controller Chamber Rhino 1000	each	30				
1.3.12	Hole for Smartlock UPS Chamber Rhino 1000	each	30				
1.3.13	Hole for Smartlock stubby Chamber Rhino 600	each	30				
1.3.14	Hole for Smartlock stubby Chamber Rhino 1000	each	30				
1.3.15	Test holes (0.5 - 1metre depth)	each	30				
1.4	Installation of 40mm and 50mm HDPE ducts: including supply of sleeves						
1.4.1	Road crossing	m	100				
1.4.2	Directional drilling or Thrust boring (Normal) 40mm and 50mm HDPE						
1.4.2.1	Up to 6m long	m	300				
1.4.2.2	Between 6 and 12m	m	300				
1.4.2.3	Between 12 -25m	m	300				
1.4.2.4	Longer than 25m	m	150				

1.4.2.5	Extra over sub item (1.1.2.2.1 - 1.1.2.2.3) for drilling in hard pickable soil with boulders	m	100				
1.4.2.6	Extra over sub item (1.1.2.2.1 - 1.1.2.2.3) for drilling in hard material irrespective of length	m	100				
1.4.3	Directional drilling or Thrust boring (Hard Rock) 40mm and 50mm HDPE						
1.4.3.1	Up to 6m long	m	300				
1.4.3.2	Between 6 and 12m	m	300				
1.4.3.3	Between 12 -25m	m	300				
1.4.3.4	Longer than 25m	m	150				
1.4.3.5	Extra over sub item (1.1.2.3.1 - 1.1.2.3.3) for drilling in hard pickable soil with boulders	m	100				
1.4.3.6	Extra over sub item (1.1.2.3.1 - 1.1.2.3.3) for drilling in hard material irrespective of length	m	100				
1.5	Installation of 110mm HDPE ducts: including supply of sleeves						
1.5.1	Road crossing	m	300				
1.5.2	Directional drilling or Thrust boring (Normal) 110mm HDPE						
1.5.2.1	Up to 6m long	m	300				
1.5.2.2	Between 6 and 12m	m	300				
1.5.2.3	Between 12 -25m	m	300				

1.5.2.4	Longer than 25m	m	150				
1.5.2.5	Extra over sub item (1.1.3.2.1 - 1.1.3.2.3) for drilling in hard pickable soil with boulders	m	100				
1.5.2.6	Extra over sub item (1.1.3.2.1 - 1.1.3.2.3) for drilling in hard material irrespective of length	m	100				
1.5.3	Directional drilling or Thrust boring (Hard Rocks) 110mm HDPE						
1.5.3.1	Up to 6m long	m	300				
1.5.3.2	Between 6 and 12m	m	300				
1.5.3.3	Between 12 -25m	m	300				
1.5.3.4	Longer than 25m	m	150				
1.5.3.5	Extra over sub item (1.1.3.3.1 - 1.1.3.3.3) for drilling in hard pickable soil with boulders	m	100				
1.5.3.6	Extra over sub item (1.1.3.3.1 - 1.1.3.3.3) for drilling in hard material irrespective of length	m	100				
1.6	Installation of 160mm HDPE ducts: including supply of sleeves						
1.6.1	Road crossing	m	100				
1.6.2	Directional drilling or Thrust boring (Normal) 160mm HDPE						
1.6.2.1	Up to 6m long	m	300				
1.6.2.2	Between 6 and 12m	m	300				

1.6.2.3	Between 12 -25m	m	300				
1.6.2.4	Longer than 25m	m	150				
1.6.2.5	Extra over sub item (1.1.4.2.1 - 1.1.4.2.3) for drilling in hard pickable soil with boulders	m	100				
1.6.2.6	Extra over sub item (1.1.4.2.1 - 1.1.4.2.3) for drilling in hard material irrespective of length	m	100				
1.6.3	Directional drilling or Thrust boring (Hard Rock) 160mm HDPE						
1.6.3.1	Up to 6m long	m	300				
1.6.3.2	Between 6 and 12m	m	300				
1.6.3.3	Between 12 -25m	m	300				
1.6.3.4	Longer than 25m	m	150				
1.6.3.5	Extra over sub item (1.1.4.3.1 - 1.1.4.3.3) for drilling in hard pickable soil with boulders	m	100				
1.6.3.6	Extra over sub item (1.1.4.3.1 - 1.1.4.3.3) for drilling in hard material irrespective of length	m	100				
1.6.4	Import Materials						
1.6.4.1	Sand fill	m ³	65				
1.6.4.2	G5 Gravel	m ³	65				
1.7	Plinths and Reinstatements						

1.7.1	Cast controller plinth	each	10				
1.7.2	Cast connection pillar (Stubby) plinth	each	20				
1.7.3	Cast Ultra secure UPS Cabinet (Titanic) foundation	each	5				
1.7.4	Cast UPS cabinet foundation (Includes all materials, sand, gravel) excavation measured separately	each	10				
1.7.5	Cast Cantilever pole bolt group foundation (including all materials except bolt group) excavation measured separately	m ³	10				
1.7.6	Reinstate road surface – Asphalt	m ²	500				
1.7.7	Reinstate road surface – Concrete	m ²	100				
1.7.8	Reinstate road surface – Cement Slabs	m ²	100				
1.7.9	Reinstate road surface – 73mm thick Heavy-Duty Autumn Pavers	m ²	100				
1.7.10	Reinstate road surface – 73mm thick, 35MPa, De Hoop Red Pavers	m ²	100				
1.7.11	Reinstate road surface – 73mm thick, 35MPa, Double cobble White Pavers (SANS 1058-2012)	m ²	100				
1.7.12	Reinstate road surface – 80mm thick Interlocking Pavers (Class 35, Type S-A)	m ²	100				
1.7.13	Brick paving reinstatement – sidewalk surface – 50mm thick Autumn Pavers	m ²	100				
1.7.14	Brick paving reinstatement – sidewalk surface – 50mm thick De Hoop Red Pavers	m ²	100				
1.8	Supply, Installation and Removal of Kerb stones and paving – (includes supply and kerb stones and bubble paving where necessary as agreed)						

1.8.1	Supply and Installation of new Normal kerbs	m	30				
1.8.2	Supply and Installation of Dropped kerbs	m	100				
1.8.3	Supply and Install Tactile bubble paving as per SANS 784-2008 (warning indicator pattern)	m ²	120				
1.8.4	Supply and Install 73mm thick, 35MPa, Double cobble White Pavers	m ²	120				
1.8.5	Supply and Install 73mm thick Heavy-Duty Autumn Pavers	m ²	120				
1.8.6	Supply and Install 73mm thick, 35MPa, De Hoop Red Pavers	m ²	120				
1.8.7	Supply and Installation of Loop indicator stone	each	20				
1.8.8	Relay existing normal kerbs	m	100				
1.8.9	Supply and install of dipped kerbs	m	50				
1.8.10	Removal of dipped kerbs	m	50				
1.8.11	Remove existing dipped kerbs and set-aside for re-use	m	60				
1.8.12	Relay existing dipped kerbs	m	45				
1.8.13	Supply and Install of bubble paving	m ²	100				
1.8.14	Removal of Install bubble paving	m ²	10				
1.8.15	Remove existing bubble paving and set-aside for re-use	m ²	25				
1.8.16	Relay existing bubble paving	m ²	30				

2	Supply and/or Installation (planting) of Street furniture: Includes - excavation of holes to all type of materials at prescribed depth, Erection to correct height and ensuring equipment is vertical, Backfilling and compaction, Casting of foundations where necessary. Excludes – Cable installations, re-instatement and painting					
2.1	Supply and/or Installation of cabinets					
2.1.1	Supply and Install base mounted MX Maxi controllers (4 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units with a galvanized plinth bracket.	each	4			
2.1.2	Supply and Install base mounted MX Maxi controllers (8 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units with a galvanized plinth bracket.	each	4			
2.1.3	Supply and Install base mounted MX Maxi controllers (10 phase) with modem (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units with a galvanized plinth bracket.	each	4			
2.1.4	Supply and Install base mounted MX Maxi controllers (12 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units with a galvanized plinth bracket.	each	4			
2.1.5	Supply and Install base mounted MX Maxi controllers (16 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector	each	4			

	inputs. Includes detector & pedestrian interface units with a galvanized plinth bracket.						
2.1.6	Supply and Install base mounted MX M24 EL controllers (20 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Includes detector & pedestrian interface units with a galvanized plinth bracket.	each	4				
2.1.6	Supply and Install base mounted MX M24 EL controllers (24 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Includes detector & pedestrian interface units with a galvanized plinth bracket.	each	4				
2.1.7	Supply and Install MX Maxi controllers (4 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar) in a SMARTLOCK Rhino 1000 Chamber, GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Includes detector & pedestrian interface units	each	4				
2.1.8	Supply and Install MX Maxi controllers (8 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar) in a SMARTLOCK Rhino 1000 Chamber, GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Includes detector & pedestrian interface units	each	4				
2.1.9	Supply and Install MX Maxi controllers (10 phase) with modem (MikroTik hEX S RB760iGS including power adaptor or similar) in a SMARTLOCK Rhino 1000 Chamber, GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Includes detector & pedestrian interface units	each	4				

2.1.10	Supply and Install MX Maxi controllers (12 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar) in a SMARTLOCK Rhino 1000 Chamber, GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units	each	4				
2.1.11	Supply and Install MX Maxi controllers (16 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar) in a SMARTLOCK Rhino 1000 Chamber, GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units	each	4				
2.1.12	Supply and Install MX M24 EL controllers (20 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar) in a SMARTLOCK Rhino 1000 Chamber, GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units	each	4				
2.1.13	Supply and Install MX M24 EL controllers (24 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar) in a SMARTLOCK Rhino 1000 Chamber, GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units	each	4				
2.1.14	Supply and Install of Smartlock controller chamber Rhino 1000 with frame (excluding controller)	each	4				
2.1.15	1 – 6 Phase Controller Configurations (Prepare software configuration as per supplied information by the municipality)	each	5				
2.1.16	7 – 12 Phase Controller Configurations (Prepare software configuration as per supplied information by the municipality)	each	20				
2.1.17	13 – 20 Phase Controller Configurations (Prepare software configuration as per supplied information by the municipality)	each	10				

2.1.18	20 – 24 Phase Controller Configurations (Prepare software configuration as per supplied information by the municipality)	each	10				
2.1.19	Download approved traffic signal configuration software	each	6				
2.1.20	Upload traffic signal configuration software	each	12				
2.1.21	Supply and Install top hat box	each	3				
2.1.22	Supply and Install Ultra secure UPS cabinet (Titanic) only	each	5				
2.1.23	Supply and Install UPS chamber Rhino 1000 only	each	6				
2.1.24	Supply and Install connection pillar (plastic stubby – Greenbro or equivalent)) with a 2mm Hot dipped galvanised steel locking bar	each	20				
2.1.25	Supply and Install connection pillar (plastic stubby –Greenbro or similar) only with a polycarbonate locking bar	each	20				
2.1.26	Supply and Install connection pillar (steel stubby – Vandal resistant) with a locking mechanism	each	200				
2.1.27	Supply and Install of stubby chamber Rhino 600	each	30				
2.1.28	Supply and Install of stubby chamber Rhino 1000 including wooden backplane and frame	each	30				
2.1.29	Supply and Install of MX output surge module	each	20				
2.1.30	Supply and Install Circuit breaker DIN Rail: 10A 2.5 – 3ka	each	20				
2.1.31	Supply and Install Circuit breaker DIN Rail: 15A 2.5 – 3ka	each	20				
2.1.32	Supply and Install Circuit breaker DIN Rail: 60A 5 – 6ka	each	20				

2.2	Supply and Installation of poles and pole tops						
2.2.1	Supply and Install short pedestrian pole (installation of cable measured separately)	each	4				
2.2.2	Supply and Install standard poles (4m or 5m) (installation of cable measured separately)	each	35				
2.2.3	Supply and Install standard poles (6m) (installation of cable measured separately)	each	6				
2.2.4	Supply and Install removable pole (4m or 5m) (installation of cable measured separately)	each	6				
2.2.5	Supply and Install removable pole (6m) (installation of cable measured separately)	each	6				
2.2.6	Supply and Install baseplate pole (4m or 5m) (installation of cable measured separately)	each	3				
2.2.7	Supply and Install baseplate pole (6m) (installation of cable measured separately)	each	4				
2.2.8	Supply and Install baseplate pole (8m) (installation of cable measured separately)	each	4				
2.2.9	Supply and Install baseplate pole (8m Street light) (installation of cable measured separately)	each	4				
2.2.10	Supply and Install complete cantilever pole including horizontal section, upright section, swivel mechanism and bolt group (include casting of foundation) (installation of cable measured separately)	each	10				
2.2.11	Replace cantilever pole- boom only (installation of cable measured separately)	each	2				
2.2.12	Replace cantilever pole – upright section only (installation of cable measured separately)	each	2				
2.2.13	Supply and Install 8m poles (installation of cable measured separately)	each	4				
2.2.14	Supply and install of pole tops/caps (Nylon UV resistant) complete with cradle and terminals to fit standard traffic signal pole. (core termination included)	each	12				

2.2.15	Supply and Install of cable entry box (excavation measured separately) (Installation of cable measured separately)	each	14				
2.2.16	Supply and Install of 4m Hatch traffic signal pole	each	4				
2.2.17	Supply and Install of 6m Totem traffic signal pole	each	4				
2.2.18	Supply and Install of pole into temporary drum- (Drum must be supplied by contractor, 200 litre – includes all cable connections/disconnections and temporary cable joints)	each	6				
2.3	Straighten pole by rigging or undermining (includes repairs to any damaged caused to surrounding surface, touching up of any damaged caused to paint on pole and re-alignment of lanterns)	each	20				
3	Supply and Installation (hanging and mounting) of Street furniture: Includes – Erection to correct height and ensuring equipment is vertically and horizontally aligned, Cable terminations, Neat strapping of lanterns hoses and installation of brackets; including backing boards						
3.1	Supply and Install 2 aspects 210mm Lanterns including backing boards						
3.1.1	Supply and Install on 4m, 5m, 6m, 8m pole and vertical part of cantilever pole	each	20				
3.1.2	Supply and Install on cantilever boom (supply of cherry picker measured separately)	each	2				
3.2	Supply and Install 3 aspects 210mm Lanterns including backing boards						
3.2.1	Supply and Install on 4m, 5m, 6m, 8m pole and vertical part of cantilever pole	each	36				
3.2.2	Supply and Install on cantilever boom (supply of cherry picker measured separately)	each	6				

3.3	Supply and Install 4 aspects 210mm Lanterns including backing boards						
3.3.1	Supply and Install on 4m, 5m, 6m, 8m pole and vertical part of cantilever pole	each	20				
3.3.2	Supply and Install on cantilever boom (supply of cherry picker measured separately)	each	2				
3.4	Supply and Install 5 aspects 210mm Lanterns including backing boards						
3.4.1	Supply and Install on 4m, 5m, 6m, 8m pole and vertical part of cantilever pole	each	20				
3.4.2	Supply and Install on cantilever boom (supply of cherry picker measured separately)	each	2				
3.5	Supply and Install 3 aspects 210mm Pedestrian Count Down Timer Lantern (Square complete with Timer Display, Red Man & Green Man) including backing boards						
3.5.1	Supply and Install on 4m, 5m, 6m, 8m pole and vertical part of cantilever pole	each	2				
3.5.2	Supply and Install on cantilever boom (supply of cherry picker measured separately)	each	2				
3.6	Supply and Install 2 aspects 300mm Lanterns including backing boards						
3.6.1	Supply and Install on 4m, 5m, 6m, 8m pole and vertical part of cantilever pole	each	20				
3.6.2	Supply and Install on cantilever boom (supply of cherry picker measured separately)	each	2				

3.7	Supply and Install 3 aspects 300mm Lanterns including backing boards					
3.7.1	Supply and Install on 4m, 5m, 6m, 8m pole and vertical part of cantilever pole	each	36			
3.7.2	Supply and Install on cantilever boom (supply of cherry picker measured separately)	each	6			
3.8	Supply and Install 4 aspects 300mm Lanterns including backing boards					
3.8.1	Supply and Install on 4m, 5m, 6m, 8m pole and vertical part of cantilever pole	each	20			
3.8.2	Supply and Install on cantilever boom (supply of cherry picker measured separately)	each	2			
3.9	Supply and Install 5 aspects 300mm Lanterns including backing boards					
3.9.1	Supply and Install on 4m, 5m, 6m, 8m pole and vertical part of cantilever pole	each	20			
3.9.2	Supply and Install on cantilever boom (supply of cherry picker measured separately)	each	2			
3.10	Flashing lantern / Warning sign / Triangle					
3.10.2	4m, 5m, 6m, 8m pole, vertical part of cantilever pole	each	30			
3.10.2	Cantilever boom (supply of cherry picker measured separately)	each	30			
3.11	Supply and Install LED bezel complete with visor, lens, screws and split pins for:					
3.11.1	Red Traffic	each	50			

3.11.2	Amber Traffic	each	50				
3.11.3	Green Traffic	each	50				
3.11.4	Red Pedestrian	each	50				
3.11.5	Green Pedestrian	each	50				
3.11.6	Amber Arrow	each	50				
3.11.7	Green Arrow	each	50				
3.12	Supply and Install pedestrian access buttons and associated devices						
3.12.1	Supply and Install and connect Nylon pedestrian button assembly	each	6				
3.12.2	Supply and Install and connect Vandal Proof pedestrian button assembly	each	10				
3.12.3	Supply and Install and connect Audible device (buzzers)	each	30				
3.12.4	Supply and Install and connect Audio tactile controller only	each	30				
3.12.5	Supply and Install and connect Audio tactile button only	each	30				
3.12.6	Supply and Install and connect Audio tactile set (controller and buttons)	each	30				
3.12.7	Supply and Install pedestrian switch pad	each	10				
3.12.8	Supply and Install pedestrian tactile sign print sets (see attached figure SPPB-2)	each	50				
3.12.9	Supply and Install capacitive pedestrian button	each	20				
3.12.10	Supply and Install capacitive pedestrian button with LED Feedback	each	20				

3.12.11	Supply and Install of pole flat bar hangers	each	20				
3.12.12	Supply and install of vandal resistant 20mm bosal steel pipes on signals	each	30				
3.12.13	Install vandal resistant bosal pipes (Supply of Cabtyre measured separately)	each	15				
3.13	Supply and Install signs and lane lights as per SARTSM						
3.13.1	Supply and Install ST signs on 4m and 5m poles	each	30				
3.13.2	Supply and Install ST signs on 6m and 8m poles	each	30				
3.13.3	Supply and Install ST signs on upright section of cantilever pole	each	30				
3.13.4	Supply and Install ST signs on cantilever boom only	each	10				
3.14	Supply and Install traffic regulatory signs on traffic signal poles						
3.14.1	Supply and Install SS3 signs	each	30				
3.14.2	Supply and Install W301 signs	each	20				
3.14.3	Supply and Install lane lights	each	4				
3.14.4	Supply and Install "Phase change" or "3 phase" Chromadek 600mm x 600mm information sign	each	4				
3.14.5	Supply and Install of 11 Pin 220 Volt flasher units – Eagle Electric or equivalent	each	4				
3.15	Supply and Install Bracket for mounting "ST" Type Signs for above traffic signal heads:						

3.15.1	Single	each	40				
3.15.2	Double	each	40				
3.15.3	Information sign	each	40				
3.15.4	Warning sign	each	40				
3.16	Supply and installation of Traffic Signal Visors	each	200				
4	Supply and Installation of cables: Installation of cables, Ducts and Identification tape; Includes – Collection or return of cable (or pipe) from or to store (unless otherwise indicated), Ensuring trench depth is correct and that trench floor is free of stones; if necessary installing bedding sand where applicable, Installing cable neatly in trench (without crossovers), Excavation and backfill of cable entrance at street furniture, Termination of cables in street furniture, connection of cores to correct terminals. Excluding – Excavation of trenching, Any re-instatement						
4.1	Supply and Installation of cables in trenches						
4.1.1	Supply and Install 4 core 2,5 mm ² (Loop feeder cable to controller)	m	200				
4.1.2	Supply and Install 3 core 16 mm ² (power cable)	m	750				
4.1.3	Supply and Install 2 core copper cable 1,5 mm ²	m	320				
4.1.4	Supply and Install 7 Core copper cable 1,5 mm ²	m	280				
4.1.5	Supply and Install 19 core copper cable 1,5 mm ²	m	750				

4.1.6	Supply and Install 37 core copper cable 1,5 mm ²	m	1000				
4.1.7	Supply and Install 12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	m	400				
4.1.8	Supply and Install 4 Core 4 mm ² PVC SWA	m	100				
4.1.9	Supply and Install 2 Core 6 mm ² PVC SWA	m	200				
4.1.10	Supply and Install 3 Core 6 mm ² PVC SWA	m	200				
4.1.11	Supply and Install 2 Core 10 mm ² PVC SWA	m	200				
4.1.12	Supply and Install 4 Core 10 mm ² PVC SWA	m	200				
4.1.13	Supply and Install 2 Core 16 mm ² PVC SWA	m	200				
4.1.14	Supply and Install 4 Core 16 mm ² PVC SWA	m	200				
4.1.15	Supply and Install 2 Core 2.5 mm ² PVC SWA	m	200				
4.1.16	Supply and Install 4 Core 2.5 mm ² PVC SWA	m	200				
4.1.17	Supply and Install 7 Core 2.5 mm ² PVC SWA	m	200				
4.1.18	Supply and Install 12 Core 2.5 mm ² PVC SWA	m	200				
4.1.19	Supply and Install 19 Core 2.5 mm ² PVC SWA	m	200				
4.1.20	Supply and Install 27 Core 2.5 mm ² PVC SWA	m	200				
4.1.21	Supply and Install 37 Core 2.5 mm ² PVC SWA	m	200				
4.1.22	Supply and Install 7 Core 0.75 mm ² PVC Flex	m	200				
4.1.23	Supply and Install 6 mm ² bare copper earth wire	m	200				

4.1.24	Supply and Install 4 mm ² insulated earth wire	m	200				
4.1.25	Supply and Install 10 mm ² bare copper earth wire	m	200				
4.1.26	Supply and Install 16 mm ² bare copper earth wire	m	200				
4.1.27	Supply and Install cable matting	m	200				
4.1.28	Supply and Install 4 core 2.5 mm ² Anti-theft copper clad aluminium	m	200				
4.1.29	Supply and Install 11 core 2.5 mm ² Anti-theft copper clad aluminium	m	200				
4.1.30	Supply and Install CAT5 cable (outdoor)	m	200				
4.1.31	Supply and Install CAT5 cable (indoor)	m	200				
4.1.32	Supply of 4mm Solar panel wire	m	200				
4.2	Supply and Installation of cables through ducts – (excavation of duct opening measured separately)						
4.2.1	Supply and Install 4 core 2,5 mm ² (Loop feeder cable to controller)	m	100				
4.2.2	Supply and Install 3 core 16 mm ² (power cable)	m	100				
4.2.3	Supply and Install 2 core copper cable 1,5 mm ²	m	350				
4.2.4	Supply and Install 7 Core copper cable 1,5 mm ²	m	500				
4.2.5	Supply and Install 19 core copper cable 1,5 mm ²	m	200				
4.2.6	Supply and Install 37 core copper cable 1,5 mm ²	m	200				
4.2.7	Supply and Install 12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	m	200				

4.2.8	Supply and Install 4 Core 4 mm ² PVC SWA	m	200				
4.2.9	Supply and Install 2 Core 6 mm ² PVC SWA	m	200				
4.2.10	Supply and Install 3 Core 6 mm ² PVC SWA	m	200				
4.2.11	Supply and Install 2 Core 10 mm ² PVC SWA	m	200				
4.2.12	Supply and Install 4 Core 10 mm ² PVC SWA	m	200				
4.2.13	Supply and Install 2 Core 16 mm ² PVC SWA	m	200				
4.2.14	Supply and Install 4 Core 16 mm ² PVC SWA	m	200				
4.2.15	Supply and Install 2 Core 2.5 mm ² PVC SWA	m	200				
4.2.16	Supply and Install 4 Core 2.5 mm ² PVC SWA	m	200				
4.2.17	Supply and Install 7 Core 2.5 mm ² PVC SWA	m	200				
4.2.18	Supply and Install 12 Core 2.5 mm ² PVC SWA	m	200				
4.2.19	Supply and Install 19 Core 2.5 mm ² PVC SWA	m	200				
4.2.20	Supply and Install 27 Core 2.5 mm ² PVC SWA	m	200				
4.2.21	Supply and Install 37 Core 2.5 mm ² PVC SWA	m	200				
4.2.22	Supply and Install 7 Core 0.75 mm ² PVC Flex	m	200				
4.2.23	Supply and Install 6 mm ² bare copper earth wire	m	200				
4.2.24	Supply and Install 4 mm ² insulated earth wire	m	200				
4.2.25	Supply and Install 10 mm ² bare copper earth wire	m	200				

4.2.26	Supply and Install 16 mm ² bare copper earth wire	m	200				
4.2.27	Supply and Install cable matting	m	200				
4.2.28	Supply and Install 4 core 2.5 mm ² Anti-theft copper clad aluminium	m	200				
4.2.29	Supply and Install 11 core 2.5 mm ² Anti-theft copper clad aluminium	m	200				
4.2.30	Supply and Install CAT5 cable (outdoor)	m	200				
4.2.31	Supply and Install CAT5 cable (indoor)	m	200				
4.2.32	Supply of 4mm Solar panel wire	m	200				
4.3	Supply and Installation of cables into base mounted controller – (includes glanding and termination)						
4.3.1	Supply and Install 4 core 2,5 mm ² (Loop feeder cable to controller)	each	4				
4.3.2	Supply and Install 3 core 16 mm ² (power cable)	each	4				
4.3.3	Supply and Install 2 core copper cable 1,5 mm ²	each	4				
4.3.4	Supply and Install 7 Core copper cable 1,5 mm ²	each	4				
4.3.5	Supply and Install 19 core copper cable 1,5 mm ²	each	4				
4.3.6	Supply and Install 37 core copper cable 1,5 mm ²	each	4				
4.3.7	Supply and Install 12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	each	4				
4.3.8	Supply and Install 4 Core 4 mm ² PVC SWA	each	4				
4.3.9	Supply and Install 2 Core 6 mm ² PVC SWA	each	4				

4.3.10	Supply and Install 3 Core 6 mm ² PVC SWA	each	4				
4.3.11	Supply and Install 2 Core 10 mm ² PVC SWA	each	4				
4.3.12	Supply and Install 4 Core 10 mm ² PVC SWA	each	4				
4.3.13	Supply and Install 2 Core 16 mm ² PVC SWA	each	4				
4.3.14	Supply and Install 4 Core 16 mm ² PVC SWA	each	4				
4.3.15	Supply and Install 2 Core 2.5 mm ² PVC SWA	each	4				
4.3.16	Supply and Install 4 Core 2.5 mm ² PVC SWA	each	4				
4.3.17	Supply and Install 7 Core 2.5 mm ² PVC SWA	each	4				
4.3.18	Supply and Install 12 Core 2.5 mm ² PVC SWA	each	4				
4.3.19	Supply and Install 19 Core 2.5 mm ² PVC SWA	each	4				
4.3.20	Supply and Install 27 Core 2.5 mm ² PVC SWA	each	4				
4.3.21	Supply and Install 37 Core 2.5 mm ² PVC SWA	each	4				
4.3.22	Supply and Install 7 Core 0.75 mm ² PVC Flex	each	4				
4.3.23	Supply and Install 6 mm ² bare copper earth wire	each	4				
4.3.24	Supply and Install 4 mm ² insulated earth wire	each	4				
4.3.25	Supply and Install 10 mm ² bare copper earth wire	each	4				
4.3.26	Supply and Install 16 mm ² bare copper earth wire	each	4				
4.3.27	Supply and Install cable matting	each	4				

4.3.28	Supply and Install 4 core 2.5 mm ² Anti-theft copper clad aluminium	each	4				
4.3.29	Supply and Install 11 core 2.5 mm ² Anti-theft copper clad aluminium	each	4				
4.3.30	Supply and Install CAT5 cable (outdoor)	each	4				
4.3.31	Supply and Install CAT5 cable (indoor)	each	4				
4.3.32	Supply of 4mm Solar panel wire	each	4				
4.4	Supply and Installation of cables in pole mounted controller – (includes glanding and termination)						
4.4.1	Supply and Install 4 core 2,5 mm ² (Loop feeder cable to controller)	each	4				
4.4.2	Supply and Install 3 core 16 mm ² (power cable)	each	4				
4.4.3	Supply and Install 2 core copper cable 1,5 mm ²	each	4				
4.4.4	Supply and Install 7 Core copper cable 1,5 mm ²	each	4				
4.4.5	Supply and Install 19 core copper cable 1,5 mm ²	each	4				
4.4.6	Supply and Install 37 core copper cable 1,5 mm ²	each	4				
4.4.7	Supply and Install 12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	each	4				
4.4.8	Supply and Install 4 Core 4 mm ² PVC SWA	each	4				
4.4.9	Supply and Install 2 Core 6 mm ² PVC SWA	each	4				
4.4.10	Supply and Install 3 Core 6 mm ² PVC SWA	each	4				
4.4.11	Supply and Install 2 Core 10 mm ² PVC SWA	each	4				

4.4.12	Supply and Install 4 Core 10 mm ² PVC SWA	each	4				
4.4.13	Supply and Install 2 Core 16 mm ² PVC SWA	each	4				
4.4.14	Supply and Install 4 Core 16 mm ² PVC SWA	each	4				
4.4.15	Supply and Install 2 Core 2.5 mm ² PVC SWA	each	4				
4.4.16	Supply and Install 4 Core 2.5 mm ² PVC SWA	each	4				
4.4.17	Supply and Install 7 Core 2.5 mm ² PVC SWA	each	4				
4.4.18	Supply and Install 12 Core 2.5 mm ² PVC SWA	each	4				
4.4.19	Supply and Install 19 Core 2.5 mm ² PVC SWA	each	4				
4.4.20	Supply and Install 27 Core 2.5 mm ² PVC SWA	each	4				
4.4.21	Supply and Install 37 Core 2.5 mm ² PVC SWA	each	4				
4.4.22	Supply and Install 7 Core 0.75 mm ² PVC Flex	each	4				
4.4.23	Supply and Install 6 mm ² bare copper earth wire	each	4				
4.4.24	Supply and Install 4 mm ² insulated earth wire	each	4				
4.4.25	Supply and Install 10 mm ² bare copper earth wire	each	4				
4.4.26	Supply and Install 16 mm ² bare copper earth wire	each	4				
4.4.27	Supply and Install cable matting	each	4				
4.4.28	Supply and Install 4 core 2.5 mm ² Anti-theft copper clad aluminium	each	4				
4.4.29	Supply and Install 11 core 2.5 mm ² Anti-theft copper clad aluminium	each	4				

4.4.30	Supply and Install CAT5 cable (outdoor)	each	4				
4.4.31	Supply and Install CAT5 cable (indoor)	each	4				
4.4.32	Supply of 4mm Solar panel wire	each	4				
4.5	Supply and Installation of cables into connection pillar – Stubby (includes glanding and termination)						
4.5.1	Supply and Install 4 core 2,5 mm ² (Loop feeder cable to controller)	each	20				
4.5.2	Supply and Install 3 core 16 mm ² (power cable)	each	20				
4.5.3	Supply and Install 2 core copper cable 1,5 mm ²	each	100				
4.5.4	Supply and Install 7 Core copper cable 1,5 mm ²	each	100				
4.5.5	Supply and Install 19 core copper cable 1,5 mm ²	each	20				
4.5.6	Supply and Install 37 core copper cable 1,5 mm ²	each	20				
4.5.7	Supply and Install 12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	each	40				
4.5.8	Supply and Install 4 Core 4 mm ² PVC SWA	each	40				
4.5.9	Supply and Install 2 Core 6 mm ² PVC SWA	each	40				
4.5.10	Supply and Install 3 Core 6 mm ² PVC SWA	each	40				
4.5.11	Supply and Install 2 Core 10 mm ² PVC SWA	each	40				
4.5.12	Supply and Install 4 Core 10 mm ² PVC SWA	each	40				
4.5.13	Supply and Install 2 Core 16 mm ² PVC SWA	each	40				

4.5.14	Supply and Install 4 Core 16 mm ² PVC SWA	each	40				
4.5.15	Supply and Install 2 Core 2.5 mm ² PVC SWA	each	40				
4.5.16	Supply and Install 4 Core 2.5 mm ² PVC SWA	each	40				
4.5.17	Supply and Install 7 Core 2.5 mm ² PVC SWA	each	40				
4.5.18	Supply and Install 12 Core 2.5 mm ² PVC SWA	each	40				
4.5.19	Supply and Install 19 Core 2.5 mm ² PVC SWA	each	40				
4.5.20	Supply and Install 27 Core 2.5 mm ² PVC SWA	each	40				
4.5.21	Supply and Install 37 Core 2.5 mm ² PVC SWA	each	40				
4.5.22	Supply and Install 7 Core 0.75 mm ² PVC Flex	each	40				
4.5.23	Supply and Install 6 mm ² bare copper earth wire	each	40				
4.5.24	Supply and Install 4 mm ² insulated earth wire	each	40				
4.5.25	Supply and Install 10 mm ² bare copper earth wire	each	40				
4.5.26	Supply and Install 16 mm ² bare copper earth wire	each	40				
4.5.27	Supply and Install cable matting	each	40				
4.5.28	Supply and Install 4 core 2.5 mm ² Anti-theft copper clad aluminium	each	40				
4.5.29	Supply and Install 11 core 2.5 mm ² Anti-theft copper clad aluminium	each	40				
4.5.30	Supply and Install CAT5 cable (outdoor)	each	40				
4.5.31	Supply and Install CAT5 cable (indoor)	each	40				

4.5.32	Supply of 4mm Solar panel wire	each	40				
4.6	Supply and Installation of cables in poles – 4m, 5m hatch, 6m hatch, cantilever hatch and short pedestrian button pole – includes termination						
4.6.1	Supply and Install 4 core 2,5 mm ² (Loop feeder cable to controller)	each	20				
4.6.2	Supply and Install 3 core 16 mm ² (power cable)	each	20				
4.6.3	Supply and Install 2 core copper cable 1,5 mm ²	each	20				
4.6.4	Supply and Install 7 Core copper cable 1,5 mm ²	each	20				
4.6.5	Supply and Install 19 core copper cable 1,5 mm ²	each	20				
4.6.6	Supply and Install 37 core copper cable 1,5 mm ²	each	20				
4.6.7	Supply and Install 12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	each	20				
4.6.8	Supply and Install 4 Core 4 mm ² PVC SWA	each	20				
4.6.9	Supply and Install 2 Core 6 mm ² PVC SWA	each	20				
4.6.10	Supply and Install 3 Core 6 mm ² PVC SWA	each	20				
4.6.11	Supply and Install 2 Core 10 mm ² PVC SWA	each	20				
4.6.12	Supply and Install 4 Core 10 mm ² PVC SWA	each	20				
4.6.13	Supply and Install 2 Core 16 mm ² PVC SWA	each	20				
4.6.14	Supply and Install 4 Core 16 mm ² PVC SWA	each	20				

4.6.15	Supply and Install 2 Core 2.5 mm ² PVC SWA	each	20				
4.6.16	Supply and Install 4 Core 2.5 mm ² PVC SWA	each	20				
4.6.17	Supply and Install 7 Core 2.5 mm ² PVC SWA	each	20				
4.6.18	Supply and Install 12 Core 2.5 mm ² PVC SWA	each	20				
4.6.19	Supply and Install 19 Core 2.5 mm ² PVC SWA	each	20				
4.6.20	Supply and Install 27 Core 2.5 mm ² PVC SWA	each	20				
4.6.21	Supply and Install 37 Core 2.5 mm ² PVC SWA	each	20				
4.6.22	Supply and Install 7 Core 0.75 mm ² PVC Flex	each	20				
4.6.23	Supply and Install 6 mm ² bare copper earth wire	each	20				
4.6.24	Supply and Install 4 mm ² insulated earth wire	each	20				
4.6.25	Supply and Install 10 mm ² bare copper earth wire	each	20				
4.6.26	Supply and Install 16 mm ² bare copper earth wire	each	20				
4.6.27	Supply and Install cable matting	each	20				
4.6.28	Supply and Install 4 core 2.5 mm ² Anti-theft copper clad aluminium	each	20				
4.6.29	Supply and Install 11 core 2.5 mm ² Anti-theft copper clad aluminium	each	20				
4.6.30	Supply and Install CAT5 cable (outdoor)	each	20				
4.6.31	Supply and Install CAT5 cable (indoor)	each	20				
4.6.32	Supply of 4mm Solar panel wire	each	20				

4.7	Supply and Installation of cables into cable entry boxes (Includes termination)						
4.7.1	Supply and Install 4 core 2,5 mm ² (Loop feeder cable to controller)	each	20				
4.7.2	Supply and Install 3 core 16 mm ² (power cable)	each	20				
4.7.3	Supply and Install 2 core copper cable 1,5 mm ²	each	20				
4.7.4	Supply and Install 7 Core copper cable 1,5 mm ²	each	20				
4.7.5	Supply and Install 19 core copper cable 1,5 mm ²	each	20				
4.7.6	Supply and Install 37 core copper cable 1,5 mm ²	each	20				
4.7.7	Supply and Install 12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	each	20				
4.7.8	Supply and Install 4 Core 4 mm ² PVC SWA	each	20				
4.7.9	Supply and Install 2 Core 6 mm ² PVC SWA	each	20				
4.7.10	Supply and Install 3 Core 6 mm ² PVC SWA	each	20				
4.7.11	Supply and Install 2 Core 10 mm ² PVC SWA	each	20				
4.7.12	Supply and Install 4 Core 10 mm ² PVC SWA	each	20				
4.7.13	Supply and Install 2 Core 16 mm ² PVC SWA	each	20				
4.7.14	Supply and Install 4 Core 16 mm ² PVC SWA	each	20				
4.7.15	Supply and Install 2 Core 2.5 mm ² PVC SWA	each	20				
4.7.16	Supply and Install 4 Core 2.5 mm ² PVC SWA	each	20				

4.7.17	Supply and Install 7 Core 2.5 mm ² PVC SWA	each	20				
4.7.18	Supply and Install 12 Core 2.5 mm ² PVC SWA	each	20				
4.7.19	Supply and Install 19 Core 2.5 mm ² PVC SWA	each	20				
4.7.20	Supply and Install 27 Core 2.5 mm ² PVC SWA	each	20				
4.7.21	Supply and Install 37 Core 2.5 mm ² PVC SWA	each	20				
4.7.22	Supply and Install 7 Core 0.75 mm ² PVC Flex	each	20				
4.7.23	Supply and Install 6 mm ² bare copper earth wire	each	20				
4.7.24	Supply and Install 4 mm ² insulated earth wire	each	20				
4.7.25	Supply and Install 10 mm ² bare copper earth wire	each	20				
4.7.26	Supply and Install 16 mm ² bare copper earth wire	each	20				
4.7.27	Supply and Install cable matting	each	20				
4.7.28	Supply and Install 4 core 2.5 mm ² Anti-theft copper clad aluminium	each	20				
4.7.29	Supply and Install 11 core 2.5 mm ² Anti-theft copper clad aluminium	each	20				
4.7.30	Supply and Install CAT5 cable (outdoor)	each	20				
4.7.31	Supply and Install CAT5 cable (indoor)	each	20				
4.7.32	Supply of 4mm Solar panel wire	each	20				
4.8	Cable Joints: Includes supply of splicing kits						

4.8.1	Straight jointing cables: 1 - 4 core SWA 10 - 16mm ² Mains cable	each	30				
4.8.2	Straight jointing cables: 1 – 2 core 1.5 - 4mm ²	each	30				
4.8.3	Straight jointing cables: 1.5mm ² x 19 core SWA	each	30				
4.8.4	Straight jointing cables: 1.5mm ² x 37 core SWA	each	30				
4.9	Supply and Installation of earth spike						
4.9.1	Supply and Install 1,2m Spike	each	10				
4.9.2	Supply and Install 1,5m Spike	each	10				
4.9.3	Supply and Install 1,8m Spike	each	10				
4.9.4	Testing of earth spike and provision of Certificate of Compliance	each	10				
4.10	Supply and Installation of cables in SMARTLOCK Chamber controller – (includes glanding and termination)						
4.10.1	Supply and Install 4 core 2,5 mm ² (Loop feeder cable to controller)	each	20				
4.10.2	Supply and Install 3 core 16 mm ² (power cable)	each	20				
4.10.3	Supply and Install 2 core copper cable 1,5 mm ²	each	20				
4.10.4	Supply and Install 7 Core copper cable 1,5 mm ²	each	20				
4.10.5	Supply and Install 19 core copper cable 1,5 mm ²	each	20				

4.10.6	Supply and Install 37 core copper cable 1,5 mm ²	each	20				
4.10.7	Supply and Install 12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	each	20				
4.10.8	Supply and Install 4 Core 4 mm ² PVC SWA	each	20				
4.10.9	Supply and Install 2 Core 6 mm ² PVC SWA	each	20				
4.10.10	Supply and Install 3 Core 6 mm ² PVC SWA	each	20				
4.10.11	Supply and Install 2 Core 10 mm ² PVC SWA	each	20				
4.10.12	Supply and Install 4 Core 10 mm ² PVC SWA	each	20				
4.10.13	Supply and Install 2 Core 16 mm ² PVC SWA	each	20				
4.10.14	Supply and Install 4 Core 16 mm ² PVC SWA	each	20				
4.10.15	Supply and Install 2 Core 2.5 mm ² PVC SWA	each	20				
4.10.16	Supply and Install 4 Core 2.5 mm ² PVC SWA	each	20				
4.10.17	Supply and Install 7 Core 2.5 mm ² PVC SWA	each	20				
4.10.18	Supply and Install 12 Core 2.5 mm ² PVC SWA	each	20				
4.10.19	Supply and Install 19 Core 2.5 mm ² PVC SWA	each	20				
4.10.20	Supply and Install 27 Core 2.5 mm ² PVC SWA	each	20				
4.10.21	Supply and Install 37 Core 2.5 mm ² PVC SWA	each	20				

4.10.22	Supply and Install 7 Core 0.75 mm ² PVC Flex	each	20				
4.10.23	Supply and Install 6 mm ² bare copper earth wire	each	20				
4.10.24	Supply and Install 4 mm ² insulated earth wire	each	20				
4.10.25	Supply and Install 10 mm ² bare copper earth wire	each	20				
4.10.26	Supply and Install 16 mm ² bare copper earth wire	each	20				
4.10.27	Supply and Install cable matting	each	20				
4.10.28	Supply and Install 4 core 2.5 mm ² Anti-theft copper clad aluminium	each	20				
4.10.29	Supply and Install 11 core 2.5 mm ² Anti-theft copper clad aluminium	each	20				
4.10.30	Supply and Install CAT5 cable (outdoor)	each	20				
4.10.31	Supply and Install CAT5 cable (indoor)	each	20				
4.10.32	Supply of 4mm Solar panel wire	each	20				
5	Painting of street furniture, Road markings and solar powered LED Road Studs						
5.1	Paint new traffic signal poles (2 coats of red oxide primer and 3 coats golden yellow)						
5.1.1	Paint new traffic signal 4m pole	each	5				
5.1.2	Paint new traffic signal 5m pole	each	5				

5.1.3	Paint new traffic signal 6m pole	each	30				
5.1.4	Paint new traffic signal 8m pole	each	5				
5.1.5	Paint new traffic signal short pedestrian button pole	each	5				
5.1.6	Paint new traffic signal cantilever pole complete	each	10				
5.2	Painting of existing traffic signal poles						
5.2.1	Paint existing traffic signal 4m pole	each	5				
5.2.2	Paint existing traffic signal 5m pole	each	5				
5.2.3	Paint existing traffic signal 6m pole	each	80				
5.2.4	Paint existing traffic signal 8m pole	each	2				
5.2.5	Paint existing traffic signal short pedestrian button pole	each	5				
5.2.6	Paint existing traffic signal cantilever pole complete	each	20				
5.2.7	Paint existing traffic signal vertical part of cantilever pole complete	each	10				
5.2.8	Paint street lighting pole up to top lantern bracket	each	5				
5.3	Painting of Cabinets						
5.3.1	Paint base mounted cabinet	each	20				
5.3.2	Paint pole mounted cabinet (includes painting of mounting pole)	each	2				

5.3.3	Paint connection pillar	each	10				
5.4	Traffic signal pole retro reflectivity						
5.4.1	Standard pole reflective tape strips, "Fluorescent Yellow Diamond Grade" (3 lines 120mm-150mm width each)	each	200				
5.4.2	Standard pole tamper proof "rigid reflective pole cover"	each	100				
5.4.3	Extended range / Cantilever pole reflective tape strips, "Fluorescent Yellow Diamond Grade" (3 lines 120mm-150mm width each)	each	50				
5.4.4	Extended range / Cantilever pole tamper proof "rigid reflective pole cover"	each	50				
5.5	Road markings (material, procured, supplied and applied in accordance with SARTSM)						
5.5.1	Retro-reflective roadmarking paint (Machine application – Type 1, solvent-borne)						
	a) White lines (broken or unbroken)						
	(1) 100mm wide	m	2000				
	(2) 150mm wide	m	1000				
	(3) 200mm wide	m	100				
	(4) 300mm wide	m	100				
	b) Yellow lines (broken or unbroken)						
	(1) 100mm wide	m	2000				

	(2) 150mm wide	m	1000				
	(3) 200mm wide	m	100				
	(4) 300mm wide	m	100				
	c) Red lines (broken or unbroken)						
	(1) 100mm wide	m	1000				
	(2) 150mm wide	m	2000				
	(3) 200mm wide	m	100				
	(4) 300mm wide	m	100				
	d) White lettering and symbols	m ²	150				
	e) Yellow lettering and symbols	m ²	150				
	f) Transverse Lines and Traffic Island markings (any colour)	m ²	500				
	g) Kerb markings (any colour)	m ²	500				
5.5.2	Retro-reflective roadmarking paint (Hand application – Type 2, solvent-borne)						
	a) White lines (broken or unbroken)						
	(1) 100mm wide	m	2000				
	(2) 150mm wide	m	1000				
	(3) 200mm wide	m	100				

	(4) 300mm wide	m	100				
	b) Yellow lines (broken or unbroken)						
	(1) 100mm wide	m	2000				
	(2) 150mm wide	m	1000				
	(3) 200mm wide	m	100				
	(4) 300mm wide	m	100				
	c) Red lines (broken or unbroken)						
	(1) 100mm wide	m	1000				
	(2) 150mm wide	m	2000				
	(3) 200mm wide	m	100				
	(4) 300mm wide	m	100				
	d) White lettering and symbols	m ²	300				
	e) Yellow lettering and symbols	m ²	300				
	f) Transverse Lines and Traffic island markings (any colour)	m ²	500				
	g) Kerb markings (any colour)	m ²	500				
5.5.3	Thermo-plastic road marking						
	a) White lines (broken or unbroken)						

	(1) 100mm wide	m	2000				
	(2) 150mm wide	m	1000				
	(3) 200mm wide	m	100				
	(4) 300mm wide	m	100				
	b) Yellow lines (broken or unbroken)						
	(1) 100mm wide	m	2000				
	(2) 150mm wide	m	1000				
	(3) 200mm wide	m	100				
	(4) 300mm wide	m	100				
	c) Red lines (broken or unbroken)						
	(1) 100mm wide	m	1000				
	(2) 150mm wide	m	2000				
	(3) 200mm wide	m	100				
	(4) 300mm wide	m	100				
	d) White lettering and symbols	m ²	300				
	e) Yellow lettering and symbols	m ²	300				
	f) Transverse Lines and Traffic island markings (any colour)	m ²	500				
	g) Kerb markings (any colour)	m ²	500				

5.5.4	Variations in rate of application: (Rate ONLY!!!!)						
	(a) White paint	litre	100				
	(b) Yellow paint	litre	100				
	(d) Retro-reflective beads	kg	50				
	(f) Thermo plastic road-marking material	kg	50				
	(g) Cold plastic road-marking material	kg	50				
	(i) White lettering and symbols	m ²	30				
	(ii) Yellow lettering and symbols	m ²	30				
	(iii) Transverse lines, painted island	m ²	30				
	(iv) Kerb markings (any colour)	m ²	30				
5.5.5	Removal of existing, temporary or permanent road markings by:						
	(a) Sandblasting and applying VIASEAL	m ²	500				
	(b) Over painting as temporary measure	m ²	100				
	(c) By peeling of non-permanent road markings	m ²	50				
5.5.6	Apply additional anti-skid silica sand for skid proof surfaces	m ²	100				

5.5.7	Apply Armour Base coating paint for paved or cement surfaces		m ²	100				
5.6	Setting out and pre-marking of lines (excluding traffic-island markings, lettering and symbols)		km	300				
5.7	Supply and Installation of Road Studs							
5.7.1	Installation of Plastic Road Studs ONLY		each	300				
5.7.2	Supply and Installation of Road Studs; McNaughtan's Ferro Lynx A200 with 43 reflective elements, all colours		No.	1500				
5.7.3	Supply and Installation of solar powered LED Road Studs							
5.7.3.1	Reflective Side: Singled Sided	Lighting Functionalities: Flashing mode	Red	each	150			
			Amber	each	150			
			White	each	150			
5.7.3.2	Reflective Side: Singled Sided	Lighting Functionalities: Static mode	Red	each	150			
			Amber	each	150			
			White	each	150			
5.7.3.3	Reflective Side: Singled Sided	Lighting Functionalities: Flashing mode	Red & Red	each	250			
			Red & Amber	each	250			

			Amber & Amber	each	250				
			Red & White	each	250				
			Amber & White	each	250				
			White & White	each	250				
5.7.3.4	Reflective Side: Doubled Sided	Lighting Functionalities: Static mode	Red & Red	each	250				
			Red & Amber	each	250				
			Amber & Amber	each	250				
			Red & White	each	250				
			Amber & White	each	250				
			White & White	each	250				
6	Installation of Detection equipment								
6.1	Loop Detection								
6.1.1	Testing of induction Loops			each	20				
6.1.2	Cutting of vehicle, Extension loops (includes supply of all materials and equipment - installation of 1mm silicone wire) in Asphalt			m	1000				
6.1.3	Refilling and sealing of existing loops (includes supply of all materials and equipment)			m	1000				
6.2	Detector lead in cables 1.5mm² x 2 Core PVC SWA.			m	200				

6.3	Slot through concrete kerb and channel.	m	200				
6.4	Supply and Installation of Video Detection equipment						
6.4.1	Scheduled preventative maintenance as per specification	each	5				
6.4.2	Supply and Install WIRED Traficam or safewalk (Wide angle 89°) on 4m, 5m, 6m pole (supply cherry picker measured separately)	each	10				
6.4.2	Supply and Install WIRED Traficam or safewalk (each	7				
6.4.3	Narrow angle 37°) on 4m, 5m, 6m pole (supply cherry picker measured separately)	each	5				
6.4.4	Adjustment positioning of Traficam on 4m, 5m, 6m, 8m and upright part of cantilever pole including all hardware, cabling, set-up and configuration, including the Traficam base unit/PSU.	each	5				
6.4.5	Supply and Install WIRED Traficam or safewalk (Narrow angle 37°) on cantilever pole boom (supply of cherry picker measured separately) including all hardware, cabling, set-up and configuration, including the Traficam base unit/PSU.	each	5				
6.4.6	Adjust positioning of TrafiCam on 4m, 5m, 6m, 8m and upright part of cantilever pole. (supply of cherry picker measured separately)	each	5				
6.4.7	Supply and Install WIRELESS Traficam or safewalk (Wide angle 89°) on 4m, 5m, 6m, 8m pole including all hardware, cabling, set-up and configuration, including the Traficam base unit/PSU.	each	10				
6.4.8	Supply and Install WIRELESS Traficam or safewalk (Narrow angle 37°) on 4m, 5m, 6m, 8m pole including all hardware, cabling, set-up and configuration, including the Traficam base unit/PSU.	each	5				

6.4.9	Supply and Install WIRELESS Thermicam (Narrow angle) on 4m, 5m, 6m, 8m pole including all hardware, cabling, set-up and configuration, including the Traficam base unit/PSU.	each	5				
6.4.10	Supply and Install WIRELESS Thermicam (Medium angle) on 4m, 5m, 6m, 8m pole including all hardware, cabling, set-up and configuration, including the Traficam base unit/PSU.	each	5				
6.4.11	Supply and Install WIRELESS Thermicam (Wide angle) on 4m, 5m, 6m, 8m pole including all hardware, cabling, set-up and configuration, including the Traficam base unit/PSU.	each	5				
6.4.12	Supply and Install WIRELESS Thermicam (Narrow angle) on cantilever pole boom (supply of cherry picker measured separately) including all hardware, cabling, set-up and configuration, including the Traficam base unit/PSU.	each	5				
6.4.13	Supply and Install WIRELESS Thermicam (Medium angle) on cantilever pole boom (supply of cherry picker measured separately) including all hardware, cabling, set-up and configuration, including the Traficam base unit/PSU.	each	5				
6.4.14	Supply and Install WIRELESS Thermicam (Wide angle) on cantilever pole boom (supply of cherry picker measured separately) including all hardware, cabling, set-up and configuration, including the Traficam base unit/PSU.	each	5				
6.4.15	Supply and Install WIRELESS Traficam or safewalk (Wide angle 89°) on cantilever pole boom (supply of cherry picker measured separately) including all hardware, cabling, set-up and configuration, including the Traficam base unit/PSU.	each	5				
6.4.16	Supply and Install WIRELESS Traficam or safewalk (Narrow angle 37°) on cantilever pole boom (supply of cherry picker measured separately) including all hardware, cabling, set-up and configuration, including the Traficam base unit/PSU.	each	5				
6.4.17	Supply and Install Traficam interface unit (1TI) with waterproof housing on 4m,5m and 6m, 8m pole	each	5				
6.4.18	Supply and Install Traficam interface unit (4TI) with waterproof housing on 4m,5m and 6m, 8m pole	each	5				

6.4.19	Supply and Mount TRAFICAM unit 1Ti or 4Ti in Traffic Controller	each	5				
6.4.20	Supply and Install Traficam interface unit (1TI) X-Stream with waterproof housing on 4m,5m and 6m, 8m pole	each	5				
6.4.21	Supply and Install Traficam interface unit (4TI) X-Stream with waterproof housing on 4m,5m and 6m, 8m pole	each	5				
6.4.22	Supply and Mount Interface unit X-Stream in Traffic Controller	each	5				
6.4.23	Supply and Install wireless transceiver module with waterproof housing on 4m, 5m and 6m, 8m pole	each	5				
6.4.24	Supply and Install Traficam PSU with waterproof housing on 4m, 5m, 6m, 8m and upright part of cantilever pole	each	5				
6.4.25	Supply and Install Traficam solar power kit on 4m, 5m, 6m, 8m and upright part of cantilever pole	each	5				
6.4.26	Supply and Install Traficam PSU with waterproof housing on cantilever pole boom (cherry picker measured separately)	m	5				
6.4.27	Supply and Install Traficam solar power kit on cantilever pole boom (supply of cherry picker measured separately)	m	5				
6.4.28	Supply and Install Traficam Interface unit inside traffic controller	each	5				
6.4.29	Supply and Install wireless transceiver module inside traffic controller	each	5				
6.4.30	Assemble and configure x-stream monitoring kit	each	4				
6.4.31	Supply and Install x-stream monitoring kit on 4m,5m, 6m or 8m pole	each	4				
6.4.32	Supply and Install Traficam communications cable in trench (rate to include trenching of 500mm x 700mm)	m	750				
6.4.33	Supply and Install Traficam communications cable in sleeves (rate to include duct opening)	m	350				

6.4.34	Supply and Install FLIR TI XP BPL board 16 Outputs	each	10				
6.4.35	Supply and Install FLIR TI XP BPL Expansion board 16 Outputs	each	10				
6.4.36	Setup and Configuration of Traficam system	each	6				
6.4.37	Onsite changes to software configuration	each	10				
6.4.38	Exchange existing Traficam unit on 4m, 5m, 6m or 8m pole	each	4				
6.4.39	Supply, Install and configure 4G router in controller	each	5				
6.4.40	Remote changes to software configuration	each	10				
6.4.41	Supply and Replacement of old, damaged, faulty Standard 24V TRAFICAM PSU ONLY	each	5				
6.4.42	Supply and Replacement of old, damaged, faulty Industrial 3G router ONLY	each	5				
6.4.43	Supply and Replacement of old, damaged, faulty 0.5mm ² x 3 Pair Mylar screened + earth (drain) wire.	m	200				
6.4.44	Supply and Replacement of old, damaged, faulty 0.22 x 4 Core \92pair) OAM PVC grey Defspec colour cores (red, blue, yellow, green and shield) cabling ONLY	m	200				
6.4.45	Supply and Replacement of old, damaged, faulty Power Cable 2 core, 1mm Cabtyre cabling ONLY	m	200				
6.4.46	Supply and Replacement of old, damaged, faulty Ethernet – CAT5 – 0.5m long cabling ONLY	each	4				
6.4.47	Supply and installation of 2.5m extension pole Black for Traficam	each	16				
6.4.48	Supply and installation of Traficam pole (110mm diameter 8m long hot dip galvanized steel pole)	each	22				
6.4.49	Maintenance of Traficam – Wash and clean etc.	each	200				

6.4.50	Supply of compact 3G Industrial OpenWRT Router	each	40				
6.4.51	Supply of LTE Dual SIM Industrial OpenWRT Router	each	40				
6.4.52	Install Router in controller	each	40				
6.5	Supply and install of Magnetometer						
6.5.1	Supply and install Wireless magnetometer sensor in asphalt including core drilling including fixing epoxy and clear plastic shell	each	26				
6.5.2	Supply and install Wireless magnetometer sensor (at grind resistant sensor depth) in asphalt including core drilling including fixing epoxy and clear plastic shell	each	13				
6.5.3	Supply and install Access Point (SPP0; SPP1) on 6m,8m pole	each	26				
6.5.4	Supply and install of Contact closure card in 2 slot rack with serial interface	each	26				
6.5.5	Supply and install of Card rack for 2 CC/EX cards inside controller	each	26				
6.5.6	Supply and install Communications cable in trench (rate to include trenching of 500mm x 700mm)	m	26				
6.5.7	Communications cable in sleeves (under paving and roadway)	m	26				
6.5.8	Supply and install of Wireless Repeater on 6m,8m pole	each	26				
6.5.9	3G router in traffic controller	each	38				
6.5.10	Supply and Install flex solar repeater on 6m or 8m (supply of cherry picker measured separately)	each	38				
6.5.11	Supply and Install flush mount wireless sensor including application of epoxy	each	38				
6.5.12	Supply and Install Flex Control Unit in traffic signal controller	each	38				

6.5.13	Move repeater from one pole to another pole	each	50				
6.5.14	Adjust positioning of repeater or access point on 6m,8m (supply of cherry picker measured separately)	each	40				
6.5.15	Exchange repeater or access point on 6m,8m (supply of cherry picker measured separately)	each	40				
6.5.16	Exchange repeater battery on 6m,8m (supply of cherry picker measured separately)	each	40				
6.5.17	Change contact closure interface to direct Ethernet interface	each	40				
6.5.18	Setup and configure traffic controller for direct Ethernet communications	each	40				
6.5.19	Setup and configuration of system	each	40				
6.5.20	On site changes to configuration	each	40				
6.5.21	Remote changes to configuration	each	40				
6.5.22	Test and connect communications cable inside traffic controller	each	40				
6.5.23	Design intersection layout using wireless magnetometer system	each	40				
6.5.24	Programming of detection: Magnetometer	each	26				
6.5.25	Commissioning of detection: Magnetometer	each	26				
7	Supply and Installation of Wireless Hardware Equipment						
7.1	MikroTik LHG 5GHz AC PtP 24dBi CPE RBLHGG-5acD – Satellite dish	each	20				
7.2	PoE Power Adapter for the Radio	each	20				

7.3	MikroTik hEX S RB760iGS including power adaptor - router	each	20				
7.4	Pole Clamps for "MikroTik LHG 5GHz AC PtP 24dBi CPE RBLHGG-5acD"	each	20				
7.5	Outdoor Shielded Heavy-Duty Cable Run 30m	each	20				
7.6	Installations and provisioning on Traffic signal pole	each	20				
8	Uninterrupted Power Supply Units						
8.1	Scheduled preventative maintenance as per specification. (Including service or replacement of batteries and control unit) (Batteries and control units supplied by the municipality) see spec	each	30				
8.2	Supply and Install a new Ultra secure Titanic UPS cabinet with SS3000 36V 1kVA/1000W, 6x12V 105 Ah St. Deep cycle - low maintenance Absorbent Glass Mat (AGM) sealed batteries, UPS Communication cable to MX traffic controller and control unit.	each	10				
8.3	Supply and Install a new Ultra secure Titanic UPS cabinet with SS3000 36V 2kVA/1800W, 6x12V 105 Ah St. Deep cycle - low maintenance Absorbent Glass Mat (AGM) sealed batteries, UPS Communication cable to MX traffic controller and control unit.	each	10				
8.4	Supply and Install a new Ultra secure Titanic UPS cabinet with SS3000 48V 3kVA/2250W, 8x12V 105 Ah St. Deep cycle - low maintenance Absorbent Glass Mat (AGM) sealed batteries, UPS Communication cable to MX traffic controller and control unit.	each	10				
8.4	Supply and Replacement of existing UPS cabinet ONLY (includes disconnection of batteries and control unit) (Excavation measured separately)	each	6				
8.5	Supply and Replacement of old, damaged, faulty UPS unit with a new SS300 36V 1kVA/1000W output UPS unit ONLY	each	10				
8.6	Supply and Replacement of old, damaged, faulty UPS unit with a new SS300 36V 2kVA/1800W output UPS unit ONLY	each	10				

8.7	Supply and Replacement of old, damaged, faulty UPS unit with a new SS300 48V 3kVA/2250W output UPS unit ONLY	each	10				
8.8	Supply and Replacement of old, damaged, faulty 12V 105Ah ST. Deep cycle sealed - low maintenance Absorbent Glass Mat (AGM) sealed batteries ONLY (includes disconnection and reconnection)	each	36				
8.9	Permanent removal of complete UPS system (cabinet, batteries, control unit)	each	10				
8.10	Supply and Install UPS communication cable	m	50				
8.11	Supply and Installation of Smartlock UPS chamber Rhino 1000 with frame (All UPS equipment ordered separately)	each					
9	Supply and installation of Energy storage modules devices						
9.1	Supply and Install 48V 5kW Volta Lithium Ion Battery in Titanic or Underground chamber	each	30				
9.2	Supply and Install 48V 5kW Hubble AM5 Lithium Ion Battery in Titanic or Underground chamber	each	30				
9.3	Supply and Install of Hubble RIOT cloud link device including programming and setup	each	30				
10	Supply and install Inverters and communication devices						
10.1	Supply and Install Victron 48V 1600VA inverter including programming	each	20				
10.2	Supply and Install Victron 48V 2000VA inverter including programming	each	20				
10.3	Supply and Install Victron 48V 3000VA inverter including programming	each	20				

10.4	Supply and Install Victron 48V 3000VA Easy solar II GX 250/70 inverter including programming	each	20				
10.5	Supply and Install Victron 48V 5000VA Easy solar II GX 250/100 inverter including programming	each	20				
10.6	Supply and Install of Victron 48V Smart Solar 250/70 VE.Can MPPT charger	each	20				
10.7	Supply and Install of Victron Cerbo GX Device	each	20				
10.8	Supply and Install Victron Cerbo GX device including programming	each	20				
10.9	Supply and Install Victron MPPT charger device including programming	each	20				
10.10	Supply and Install of Victron 4G LTE device-SIM Card provided by Municipality	each	20				
10..11	Supply and Install Victron 4G LTE device in controller or chamber including programming	each	20				
10.12	Supply and install Victron VE.BUS Smart Dongle with full comms for 12 months	each	20				
10.13	Supply and Install of Mikrotik LTE CAT 6 router	each	20				
10.14	Supply and Install of Mikrotik Quickmount Pro bracket	each	20				
10.15	Supply and Install of Mikrotik SFP v7 ECC Router	each	20				
10.16	Supply and Install of Mikrotik Gigabit ethernet router	each	20				

10.17	Supply and Install of SFP Module Singel Mode	each	20				
10.18	Supply and Install of Mikrotik LTE6 or similar router including setup-SIM Card provided by municipality	each	20				
11	Installation of solar power kit for traffic lights						
11.1	Supply and Install of 6m Galvanized pole with frame to house 3 x solar panels including casting 25MPA concrete base and steel rebar	each	20				
11.2	Supply and Install TIER 1 solar panels 665 watt or stronger on 6m pole (supply of cherry picker measured separately	each	20				
11.3	Supply and Install 1x Canadian solar panels 350 watt or stronger on 6m pole (supply of cherry picker measured separately	each	10				
11.4	Supply and install 6 meter galvanised steel mast including steel reinforced concrete footing to house 6x panels of 2m x 1m each. Also supply a fully approved engineering plan for concrete footing of steel mast.	each	10				
11.5	Supply and Install of 4mm Solar panel wire and accessories including male/female connectors	each	20				
11.6	Supply and Install of Solar panel clips to fasten panels	each	20				
11.7	Supply and install wind turbine for off grid traffic light	each	20				
11.8	Setup and commissioning of solar pole and system including comms	each	20				

12	Day Works: Unspecified Work – work required to be done but not detailed elsewhere in the schedule						
12.1	Normal Time: 07h30 to 16:30						
12.1.1	Supervisor/ Electrician (Artisan x1)	p/h	480				
12.1.2	Traffic Signal Foreman	p/h	1440				
12.1.3	Skilled Labourer (from the contractor)	p/h	1440				
12.1.4	Unskilled Labourer (from community)	p/h	1440				
12.1.5	Security Guard	p/h	1440				
12.1.6	Cable Thumping (inclusive of equipment plus operator)	p/h	1440				
12.2	After hours: 16h30 to 07:30 and Saturdays						
12.2.1	Supervisor/ Electrician (Artisan x1)	p/h	240				
12.2.2	Traffic Signal Foreman	p/h	720				
12.2.3	Skilled Labourer (from the contractor)	p/h	720				
12.2.4	Unskilled Labourer (from community)	p/h	720				
12.2.5	Security Guard	p/h	720				
12.2.6	Cable Thumping (inclusive of equipment plus operator)	p/h	720				
12.3	Sunday and Public Holidays						

12.3.1	Supervisor/ Electrician (Artisan x1)	p/h	240				
12.3.2	Traffic Signal Foreman	p/h	720				
12.3.3	Skilled Labourer (from the contractor)	p/h	720				
12.3.4	Unskilled Labourer (from community)	p/h	720				
12.3.5	Security Guard	p/h	720				
12.3.6	Cable Thumping (inclusive of equipment plus operator)	p/h	720				
13	Extra vehicle and plant cost (for use by the contractor only) – these items are only for use by agreement, as normal tendered rates for items described in this schedule must include for any vehicle or plant costs.						
13.1	Truck with crane (>5 ton)	day	30				
13.2	Cherry picker truck	day	30				
13.3	Sedan / LDV	day	60				
13.4	Truck (>5 ton)	day	30				
13.5	Compressor plus two jackhammers and two paving breakers; including hoses (7 m ³ /minute mass approximately 150 cpm)	hrs	30				
13.6	Vibratory Roller (10 – 14-ton, single drum smooth)	hrs	16				
13.7	Static Roller (11 – 13 ton)	hrs	16				
13.8	Pedestrian roller (800 – 900 kg, 630 mm wide drum)	hrs	16				

13.9	Small compaction equipment (plate vibrator)	hrs	16				
13.10	Pneumatic roller (27 ton)	hrs	16				
13.11	Concrete mixer (350 litre)	hrs	8				
13.12	Portable generator (5 kVA)	hrs	8				
13.13	Flatbed truck of 5-ton capacity with drop sides	km	7500				
14	Traffic Controllers						
14.1	Normal time (07:30-16:30)	Hrs	352				
14.2	After Hours: 16:30- 07:30 and Saturdays	Hrs	176				
14.3	Sundays and Public holidays	Hrs	88				
15	Inspection and Report (Contractor must have the staff and resources to complete the inspections and compile a report indicating faulty sites and equipment)	each	60				
16	Controllers						
16.1	Faults – Callout and Repair (includes: travel distance, contractor must maintain adequate supply of spares to repair any fault. Fault response Time is a minimum of 2 hours from time of Call.						
16.1.1	Normal Time: 07h30 to 16:30	p/h	160				

16.1.2	After hours: 16h30 to 07:30 and Saturdays	p/h	80				
16.1.3	Sunday and Public Holidays	p/h	80				
16.1.4	SCM upgrade, installation and removal	each	10				
17	Removal of Street furniture or Damaged equipment: Includes – Excavations, Disconnection of cables, Transportation to depot, Backfilling and Excludes - Reinstatements						
17.1	Removal of Cabinets						
17.1.1	Remove base mounted controllers	each	2				
17.1.2	Remove pole mounted controllers	each	2				
17.1.3	Remove top hat box	each	4				
17.1.4	Remove Ultra Secure UPS cabinet (Titanic)	each	4				
17.1.5	Remove Connection pillar (Stubby)	each	6				
17.1.6	Remove TMPC controllers	each	6				
17.2	Removal of poles and pole tops						
17.2.1	Remove short pedestrian pole	each	2				
17.2.2	Remove standard pole (4m, 5m)	each	20				
17.2.3	Remove standard pole (6m)	each	4				

17.2.4	Remove removable pole (4m, 5m)	each	4				
17.2.5	Remove removable pole (6m)	each	4				
17.2.6	Remove removable pole (8m)	each	4				
17.2.7	Remove removable pole (8m) street light	each	4				
17.2.8	Remove baseplate pole (4m, 5m)	each	4				
17.2.9	Remove baseplate pole (6m)	each	4				
17.2.10	Remove Complete cantilever pole (including boom, upright pole and bolt group)	each	4				
17.2.11	Replace cantilever pole – boom only	each	4				
17.2.12	Replace cantilever pole – upright section only	each	4				
17.2.13	Remove 8m pole	each	4				
17.2.14	Remove pole tops (core termination included)	each	4				
17.2.15	Remove cable entry box (installation of cable measured separately)	each	4				
17.2.16	Remove temporary pole (Includes all disconnection / connections)	each	4				
17.3	Remove 2 aspects 210mm Lanterns						
17.3.1	Remove on 4m, 5m, 6m, 8m pole and vertical part of cantilever pole	each	10				
17.3.2	Remove on cantilever boom (supply of cherry picker measured separately)	each	10				

17.4	Remove 3 aspects 210mm Lanterns						
17.4.1	Remove on 4m, 5m, 6m, 8m pole and vertical part of cantilever pole	each	30				
17.4.2	Remove on cantilever boom (supply of cherry picker measured separately)	each	30				
17.5	Remove 4 aspects 210mm Lanterns						
17.5.1	Remove on 4m, 5m, 6m, 8m pole and vertical part of cantilever pole	each	10				
17.5.2	Remove on cantilever boom (supply of cherry picker measured separately)	each	10				
17.6	Remove 5 aspects 210mm Lanterns						
17.6.1	Remove on 4m, 5m, 6m, 8m pole and vertical part of cantilever pole	each	20				
17.6.2	Remove on cantilever boom (supply of cherry picker measured separately)	each	20				
17.7	Remove pedestrian access buttons and associated devices						
17.7.1	Remove Nylon pedestrian button assembly	each	10				
17.7.2	Remove Vandal Proof pedestrian button assembly	each	4				
17.7.3	Remove Audible device (buzzers)	each	10				
17.7.4	Remove Audio tactile controller only	each	10				
17.7.5	Remove Audio tactile button only	each	10				

17.7.6	Remove Audio tactile set (controller and buttons)	each	10				
17.7.7	Remove pedestrian switch pad	each	5				
17.8	Remove signs and lane lights						
17.8.1	Remove ST signs on 4m, 5m, 6m poles and upright section of cantilever pole	each	4				
17.8.2	Remove ST signs on cantilever boom only	each	4				
17.8.3	Remove traffic regulatory signs on traffic signal poles	each	4				
17.8.4	Remove SS3 signs	each	4				
17.8.5	Remove W301 signs	each	10				
17.8.6	Remove lane lights	each	2				
17.9	Upgrading signal aspects to LED (Light Emitting Diodes) (includes removal of individual incandescent or halogen, LED aspect, in situ, and installing LED aspect						
17.9.1	Aspects on 4m, 5m, 6m, 8m pole, vertical part of cantilever	each	100				
17.9.2	Aspects on cantilever boom (supply of cherry picker is measured separately)	each	20				
18	Removal of cables from trenches, ducts and street furniture						
18.1	Remove cables (or pipe/tape) from trenches – excavation measured separately	each	30				
18.1.1	7 Core 1,5 mm ²	each	30				

18.1.2	4 core 2,5 mm ² (Loop feeder cable to controller)	each	30				
18.1.3	3 core 16 mm ² (power cable)	each	30				
18.1.4	19 core 1,5 mm ²	each	30				
18.1.5	12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	each	30				
18.1.6	2 Core 6 mm ² PVC SWA	each	30				
18.1.7	3 Core 6 mm ² PVC SWA	each	30				
18.1.8	2 Core 10 mm ² PVC SWA	each	30				
18.1.9	4 Core 10 mm ² PVC SWA	each	30				
18.1.10	2 Core 16 mm ² PVC SWA	each	30				
18.1.11	4 Core 16 mm ² PVC SWA	each	30				
18.1.12	2 Core 2.5 mm ² PVC SWA	each	30				
18.1.13	4 Core 2.5 mm ² PVC SWA	each	30				
18.1.14	7 Core 2.5 mm ² PVC SWA	each	30				
18.1.15	12 Core 2.5 mm ² PVC SWA	each	30				
18.1.16	19 Core 2.5 mm ² PVC SWA	each	30				
18.1.17	27 Core 2.5 mm ² PVC SWA	each	30				
18.1.18	37 Core 2.5 mm ² PVC SWA	each	30				
18.1.19	7 Core 0.75 mm ² PVC Flex	each	30				

18.1.20	6 mm ² bare copper earth wire	each	30				
18.1.21	4 mm ² insulated earth wire	each	30				
18.1.22	10 mm ² bare copper earth wire	each	30				
18.1.23	16 mm ² bare copper earth wire	each	30				
18.1.24	4 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				
18.1.25	11 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				
18.1.26	CAT5 cable	each	30				
18.1.27	Ducting 50-110mm	each	30				
18.2	Removal of cables from ducts – excavation of duct opening measured separately						
18.2.1	7 Core 1,5 mm ²	each	30				
18.2.2	4 core 2,5 mm ² (Loop feeder cable to controller)	each	30				
18.2.3	3 core 16 mm ² (power cable)	each	30				
18.2.4	19 core 1,5 mm ²	each	30				
18.2.5	12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	each	30				
18.2.6	2 Core 6 mm ² PVC SWA	each	30				
18.2.7	3 Core 6 mm ² PVC SWA	each	30				

18.2.8	2 Core 10 mm ² PVC SWA	each	30				
18.2.9	4 Core 10 mm ² PVC SWA	each	30				
18.2.10	2 Core 16 mm ² PVC SWA	each	30				
18.2.11	4 Core 16 mm ² PVC SWA	each	30				
18.2.12	2 Core 2.5 mm ² PVC SWA	each	30				
18.2.13	4 Core 2.5 mm ² PVC SWA	each	30				
18.2.14	7 Core 2.5 mm ² PVC SWA	each	30				
18.2.15	12 Core 2.5 mm ² PVC SWA	each	30				
18.2.16	19 Core 2.5 mm ² PVC SWA	each	30				
18.2.17	27 Core 2.5 mm ² PVC SWA	each	30				
18.2.18	37 Core 2.5 mm ² PVC SWA	each	30				
18.2.19	7 Core 0.75 mm ² PVC Flex	each	30				
18.2.20	6 mm ² bare copper earth wire	each	30				
18.2.21	4 mm ² insulated earth wire	each	30				
18.2.22	10 mm ² bare copper earth wire	each	30				
18.2.23	16 mm ² bare copper earth wire	each	30				
18.2.24	4 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				
18.2.25	11 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				

18.2.26	CAT5 cable	each	30				
18.3	Removal of cables from base mounted controller – (includes unglinding and disconnection)						
13.3.1	7 Core 1,5 mm ²	each	30				
18.3.2	4 core 2,5 mm ² (Loop feeder cable to controller)	each	30				
18.3.3	3 core 16 mm ² (power cable)	each	30				
18.3.4	19 core 1,5 mm ²	each	30				
18.3.5	12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	each	30				
18.3.6	2 Core 6 mm ² PVC SWA	each	30				
18.3.7	3 Core 6 mm ² PVC SWA	each	30				
18.3.8	2 Core 10 mm ² PVC SWA	each	30				
18.3.9	4 Core 10 mm ² PVC SWA	each	30				
18.3.10	2 Core 16 mm ² PVC SWA	each	30				
18.3.11	4 Core 16 mm ² PVC SWA	each	30				
18.3.12	2 Core 2.5 mm ² PVC SWA	each	30				
18.3.13	4 Core 2.5 mm ² PVC SWA	each	30				
18.3.14	7 Core 2.5 mm ² PVC SWA	each	30				
18.3.15	12 Core 2.5 mm ² PVC SWA	each	30				

18.3.16	19 Core 2.5 mm ² PVC SWA	each	30				
18.3.17	27 Core 2.5 mm ² PVC SWA	each	30				
18.3.18	37 Core 2.5 mm ² PVC SWA	each	30				
18.3.19	7 Core 0.75 mm ² PVC Flex	each	30				
18.3.20	6 mm ² bare copper earth wire	each	30				
18.3.21	4 mm ² insulated earth wire	each	30				
18.3.22	10 mm ² bare copper earth wire	each	30				
18.3.23	16 mm ² bare copper earth wire	each	30				
18.3.24	4 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				
18.3.25	11 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				
18.3.26	CAT5 cable	each	30				
18.4	Removal of cables from pole mounted controller – (includes ungrounding and disconnection)						
18.4.1	7 Core 1,5 mm ²	each	30				
18.4.2	4 core 2,5 mm ² (Loop feeder cable to controller)	each	30				
18.4.3	3 core 16 mm ² (power cable)	each	30				
18.4.4	19 core 1,5 mm ²	each	30				

18.4.5	12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	each	30				
18.4.6	2 Core 6 mm ² PVC SWA	each	30				
18.4.7	3 Core 6 mm ² PVC SWA	each	30				
18.4.8	2 Core 10 mm ² PVC SWA	each	30				
18.4.9	4 Core 10 mm ² PVC SWA	each	30				
18.4.10	2 Core 16 mm ² PVC SWA	each	30				
18.4.11	4 Core 16 mm ² PVC SWA	each	30				
18.4.12	2 Core 2.5 mm ² PVC SWA	each	30				
18.4.13	4 Core 2.5 mm ² PVC SWA	each	30				
18.4.14	7 Core 2.5 mm ² PVC SWA	each	30				
18.4.15	12 Core 2.5 mm ² PVC SWA	each	30				
18.4.16	19 Core 2.5 mm ² PVC SWA	each	30				
18.4.17	27 Core 2.5 mm ² PVC SWA	each	30				
18.4.18	37 Core 2.5 mm ² PVC SWA	each	30				
18.4.19	7 Core 0.75 mm ² PVC Flex	each	30				
18.4.20	6 mm ² bare copper earth wire	each	30				
18.4.21	4 mm ² insulated earth wire	each	30				
18.4.22	10 mm ² bare copper earth wire	each	30				

18.4.23	16 mm ² bare copper earth wire	each	30				
18.4.24	4 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				
18.4.25	11 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				
18.4.26	CAT5 cable	each	30				
18.5	Removal of cables from connection pillar – Stubby (includes unglazing and disconnection)						
18.5.1	7 Core 1,5 mm ²	each	30				
18.5.2	4 core 2,5 mm ² (Loop feeder cable to controller)	each	30				
18.5.3	3 core 16 mm ² (power cable)	each	30				
18.5.4	19 core 1,5 mm ²	each	30				
18.5.5	12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	each	30				
18.5.6	2 Core 6 mm ² PVC SWA	each	30				
18.5.7	3 Core 6 mm ² PVC SWA	each	30				
18.5.8	2 Core 10 mm ² PVC SWA	each	30				
18.5.9	4 Core 10 mm ² PVC SWA	each	30				
18.5.10	2 Core 16 mm ² PVC SWA	each	30				
18.5.11	4 Core 16 mm ² PVC SWA	each	30				

18.5.12	2 Core 2.5 mm ² PVC SWA	each	30				
18.5.13	4 Core 2.5 mm ² PVC SWA	each	30				
18.5.14	7 Core 2.5 mm ² PVC SWA	each	30				
18.5.15	12 Core 2.5 mm ² PVC SWA	each	30				
18.5.16	19 Core 2.5 mm ² PVC SWA	each	30				
18.5.17	27 Core 2.5 mm ² PVC SWA	each	30				
18.5.18	37 Core 2.5 mm ² PVC SWA	each	30				
18.5.19	7 Core 0.75 mm ² PVC Flex	each	30				
18.5.20	6 mm ² bare copper earth wire	each	30				
18.5.21	4 mm ² insulated earth wire	each	30				
18.5.22	10 mm ² bare copper earth wire	each	30				
18.5.23	16 mm ² bare copper earth wire	each	30				
18.5.24	4 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				
18.5.25	11 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				
18.5.26	CAT5 cable	each	30				
18.6	Removal of cables in poles – 4m, 5m hatch, 6m hatch, 8m, cantilever hatch and short pedestrian button pole – includes unglancing and disconnection + excavation and backfill at base						

18.6.1	7 Core 1,5 mm ²	each	30				
18.6.2	4 core 2,5 mm ² (Loop feeder cable to controller)	each	30				
18.6.3	3 core 16 mm ² (power cable)	each	30				
18.6.4	19 core 1,5 mm ²	each	30				
18.6.5	12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	each	30				
18.6.6	2 Core 6 mm ² PVC SWA	each	30				
18.6.7	3 Core 6 mm ² PVC SWA	each	30				
18.6.8	2 Core 10 mm ² PVC SWA	each	30				
18.6.9	4 Core 10 mm ² PVC SWA	each	30				
18.6.10	2 Core 16 mm ² PVC SWA	each	30				
18.6.11	4 Core 16 mm ² PVC SWA	each	30				
18.6.12	2 Core 2.5 mm ² PVC SWA	each	30				
18.6.13	4 Core 2.5 mm ² PVC SWA	each	30				
18.6.14	7 Core 2.5 mm ² PVC SWA	each	30				
18.6.15	12 Core 2.5 mm ² PVC SWA	each	30				
18.6.16	19 Core 2.5 mm ² PVC SWA	each	30				
18.6.17	27 Core 2.5 mm ² PVC SWA	each	30				
18.6.18	37 Core 2.5 mm ² PVC SWA	each	30				

18.6.19	7 Core 0.75 mm ² PVC Flex	each	30				
18.6.20	6 mm ² bare copper earth wire	each	30				
18.6.21	4 mm ² insulated earth wire	each	30				
18.6.22	10 mm ² bare copper earth wire	each	30				
18.6.23	16 mm ² bare copper earth wire	each	30				
18.6.24	4 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				
18.6.25	11 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				
18.6.26	CAT5 cable	each	30				
18.7	Removal of cables into cable entry boxes – includes unglancing and disconnection						
18.7.1	7 Core 1,5 mm ²	each	30				
18.7.2	4 core 2,5 mm ² (Loop feeder cable to controller)	each	30				
18.7.3	3 core 16 mm ² (power cable)	each	30				
18.7.4	19 core 1,5 mm ²	each	30				
18.7.5	12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	each	30				
18.7.6	2 Core 6 mm ² PVC SWA	each	30				
18.7.7	3 Core 6 mm ² PVC SWA	each	30				
18.7.8	2 Core 10 mm ² PVC SWA	each	30				

18.7.9	4 Core 10 mm ² PVC SWA	each	30				
18.7.10	2 Core 16 mm ² PVC SWA	each	30				
18.7.11	4 Core 16 mm ² PVC SWA	each	30				
18.7.12	2 Core 2.5 mm ² PVC SWA	each	30				
18.7.13	4 Core 2.5 mm ² PVC SWA	each	30				
18.7.14	7 Core 2.5 mm ² PVC SWA	each	30				
18.7.15	12 Core 2.5 mm ² PVC SWA	each	30				
18.7.16	19 Core 2.5 mm ² PVC SWA	each	30				
18.7.17	27 Core 2.5 mm ² PVC SWA	each	30				
18.7.18	37 Core 2.5 mm ² PVC SWA	each	30				
18.7.19	7 Core 0.75 mm ² PVC Flex	each	30				
18.7.20	6 mm ² bare copper earth wire	each	30				
18.7.21	4 mm ² insulated earth wire	each	30				
18.7.22	10 mm ² bare copper earth wire	each	30				
18.7.23	16 mm ² bare copper earth wire	each	30				
18.7.24	4 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				
18.7.25	11 core 2.5 mm ² Anti-theft copper clad aluminium	each	30				
18.7.26	CAT5 cable	each	30				

19	Removal of Street Furniture or Damaged Equipment- Includes:1) Excavations 2) Disconnection of Cables 3) Transportation to Depot 4) Backfilling Excludes- Reinstatement						
19.1	Removal of Traffic Controller Cabinets						
19.1.1	Base mounted controllers	each	10				
19.1.2	Pole mounted controllers	each	10				
19.1.3	Top hat box	each	30				
19.1.4	Ultra-secure UPS cabinet (Titanic)	each	38				
19.1.5	Connection pillar(stubby)	each	80				
19.2	Removal of Video Detection Equipment						
19.2.1	Remove Traficam or safewalk on 4m, 5m, 6m, 8m pole	each	6				
19.2.2	Remove Traficam or safewalk on cantilever pole boom (supply of cherry picker measured separately)	each	6				
19.2.3	Remove TI unit with waterproof housing on 4m,5m and 6m pole	each	6				
19.2.4	Remove wireless transceiver module with waterproof housing on 4m, 5m, 6m and 8m pole	each	6				
19.2.5	Remove Traficam PSU with waterproof housing on 4m, 5m, 6m, 8m and upright part of cantilever pole	each	6				
19.2.6	Remove Traficam solar power kit on 4m, 5m, 6m, 8m and upright part of cantilever pole	each	6				

19.2.7	Remove Traficam PSU with waterproof housing on cantilever pole boom (supply of cherry picker measured separately)	each	6				
19.2.8	Remove Traficam solar power kit on cantilever pole boom (supply of cherry picker measured separately)	each	6				
19.3	Removal of Magnetometer Detection						
19.3.1	Complete wireless magnetometer sensor from asphalt	each	100				
19.3.2	Replace wireless magnetometer sensor from asphalt	each	100				
19.3.3	Access Point or SPP0; SPP1 from 6m,8m poles	each	38				
19.3.4	Repeater from 6m,8m poles	each	38				
19.3.5	Communications cable in trench and sleeves	m	500				
20	Pre-commission test of equipment – includes ensuring equipment is correctly labelled, all phases meggered, continuity checked, operation checked, and earth resistances measured and recorded. Claims for pre-commission testing can only be made for new construction. Tendered rates for work at existing sites must include pre-commission testing	each	10				
21	Commissioning: Claims for commissioning can only be made for new construction. Tendered rates for work at existing sites must include re-commissioning.	each	10				

22	<u>CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS</u>						
	(a) Fixed obligations	Per Site	5				
	(b) Time-related obligations	Per Day	60				
	(c) Fixed obligations for Minor Works <R400 000	Per Site	4				
	(d) Time-related obligations for Minor Works <R400 000	Per Day	60				
	(e) Fixed obligations for Minor Works >R400 000	Per Site	4				
	(f) Time-related obligations for Minor Works >R400 000	Per Day	60				
	(g) Contract Signboard see drawing SG1	No	4				
	(h) Application for wayleave	No	6				
	(i) Signal layout diagram as per SARTSM Traffic Signal Design Manual	No	6				
	(j) Certificate of Compliance (COC) for electrical installations	No	4				
	(k) Megger cable, including the disconnection and re-connection of ends.	No	4				
	(l) Earth resistance test	No	4				
23	<u>ACCOMODATION OF TRAFFIC</u>						
	Road traffic signs and markings						

23.1	Temporary traffic control facilities:					
	a) Functional Flagmen (Possible Labour-Intensive Activity refer to Pricing Instructions)	Man days	132			
	b) Portable STOP and GO-RY signs	No	10			
	d) Amber flicker lights	No	10			
	e) Road signs R and TR series 900mm dia.					
	i) Mounted on stands	No	30			
	ii) Fixed in ground	No	30			
	f) Road signs W and TW series 1200mm sides					
	i) Mounted on stands	No	30			
	ii) Fixed in ground	No	30			
	g) Road signs STW, DTG, TGS and TG (excluding delineators and barricades)					
	i) Mounted on stands	m ²	100			
	ii) Fixed in ground	m ²	100			
	h) Delineators					
	i) Single sided, size 150mm x 600mm	No	100			
	ii) Double sided, size 150mm x 600mm	No	100			
	i) Movable barricade road sign combination TW411/TR104 or 103 (2400mm x 400mm and 600mm dia.)	No	20			

	j) Day-Glow Traffic cones TD4 (minimum height 600mm)	No	200				
	l) Temporary information signs (TIN), mounted on stands						
	i) Mounted on stands	m ²	100				
	ii) Fixed in ground	m ²	100				
	m) Two-way communication devices	No	4				
24	<u>ROAD TRAFFIC SIGNS</u>						
24.1	Road sign boards with painted or colour semi-matt background. Symbols, lettering and borders in semi-matt black or in Class 1 retro-reflective material, where the sign board is constructed from:						
	(c) Repainted galvanized steel plate chromadek 1,4 mm thick or approved equivalent):						
	(i) Area not exceeding 2 m ²	m ²	25				
	(ii) Area exceeding 2 m ² but not 10 m ²	m ²	75				
24.2	Extra over item 1.18.1 for using:						
	(a) Background of retro-reflective material of:						
	(i) Class 1 (Engineering grade)	m ²	30				
	(iii) Class 3 (High-intensity grade)	m ²	10				
	(b) Lettering, symbols, numbers, arrows, emblems and borders of retro-reflective material:						

	(ii) Class 3	m ²	10				
24.3	Road sign supports (overhead road sign structures excluded):						
	(a) Steel						
	(i) 1.6m x 3mm dia. Galvanized Steel Poles with pigs and pole cap.	m	30				
	(ii) 3.2 m x 3mm dia. Galvanized Steel Poles with pigs and pole cap.	m	40				
	(iii) 4.8 m x 3mm dia. Galvanized Steel Poles with pigs and pole cap.	m	20				
	(b) Timber						
	(i) 75 mm top dia. CCA treated	m	30				
	(ii) 100 mm top dia. CCA treated	m	40				
	(iii) 150 mm top dia. CCA treated	m	20				
	(c) Clamps						
	(i) 1117 Clamps	No.	100				
	(ii) 1118 Clamps	No.	100				
	(iii) 1119 Clamps	No.	100				
	(iv) 1120 Clamps	No.	100				
	(v) 1121 Clamps	No.	100				
	(vi) 1122 Clamps	No.	100				

	(vii) 1123 Clamps	No.	100				
	(viii) 1124 Clamps	No.	100				
	(vx) 1125 Clamps	No.	100				
24.4	Excavation and backfilling for road sign supports	m ³	5				
24.5	Extra over item 1.18.4 for cement-treated soil backfill	m ³	5				
24.6	Dismantling, storing and re-erecting road signs with a surface area of:						
	(a) Up to 2 m ²	No	8				
	(b) Exceeding 2 m ² but not 10 m ²	No	2				
24.7	Provision and erection of danger plates at various locations:						
	(a) Dismantle, store and re-erect existing danger plates	No	2				
	(b) Erect new danger plates 600mm x 150mm)	No	12				
25	<u>HEALTH AND SAFETY REQUIREMENTS</u>						
25.1	Contractor's obligations in respect of Health and Safety						
	(a) Minor Works with value <R200 000	day	150				

(b) Works with value R200 000 – R600 000	day	180				
(c) Works with value >R600 000	day	132				
Total Estimated Bid Price (incl. VAT)						

SECTION 2	SUPPLY, UPGRADE, REPAIR AND DELIVERY OF TRAFFIC SIGNAL EQUIPMENT (NO CIDB Grading is needed)
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Rates to include all materials, equipment, installation and commissioning, establishment of contractor onsite, testing – commissioning and issuing of Compliance Certificates, Health and Safety requirements including all labour and transport, unless otherwise indicated. Refer to Scope of Work and Specifications for all items. **(NO CIDB Grading Required)**. Contract Price Adjustment is applicable for Year 2 and 3. The quantities reflected in the bill of quantities are for evaluation purposes only. Actual quantities to be used will be indicated during the implementation of individual projects.

Contractor / Suppliers				Bidder Name				
BBBEE POINTS				0				
Item No:	Description	Unit	Quantity	Rates (excl. VAT)	Total (excl. VAT)	VAT (15%)	Total (incl. VAT)	Delivery Period (Weeks)
1	Traffic Controllers (new)							
1.1	Supply a base mounted controller (MX Maxi 4 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor	each	6					

	module,8 off detector inputs. Incudes detector & pedestrian interface units with a galvanised plinth bracket.							
1.2	Supply a base mounted controller (MX Maxi 8 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units with a galvanised plinth bracket.	each	1					
1.3	Supply a base mounted controller (MX Maxi 10 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units with a galvanised plinth bracket.	each	4					
1.4	Supply a base mounted controller (MX Maxi 12 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units with a galvanised plinth bracket.	each	4					
1.5	Supply a base mounted controller (MX Maxi 16 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units with a galvanised plinth bracket.	each	4					

1.6	Supply a base mounted controller (MX M24 EL 20 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units with a galvanised plinth bracket.	each	4					
1.7	Supply a base mounted controller (MX M24 EL 24 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units with a galvanised plinth bracket.	each	4					
1.8	Supply a base mounted controller (MX Plus Ped 2 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units with a galvanised plinth bracket.	each	4					
1.9	Supply a base mounted controller (MX Plus Ped 4 phase) with router (MikroTik hEX S RB760iGS including power adaptor or similar), GPS clock and predrilled dual antenna and sealing plug, including touch screen system processor module,8 off detector inputs. Incudes detector & pedestrian interface units with a galvanised plinth bracket.	each	4					
1.10	Supply a base mounted 8 phase MX Maxi Controller Cabinet ONLY complete with all wiring	each	2					
1.11	Supply a base mounted 12 phase MX Maxi Controller Cabinet ONLY complete with all wiring	each	4					
1.12	Supply a base mounted 16 phase MX Maxi Controller Cabinet ONLY complete with all wiring	each	4					

1.13	Supply of 8 phase MX Smartlock controller kit complete	each	4					
1.14	Supply of 12 phase MX Smartlock controller kit complete	each	4					
1.15	Supply of 16 phase MX Smartlock controller kit complete	each	4					
1.16	Supply of 20 phase MX Smartlock controller kit complete	each	4					
1.17	Supply of 24 phase MX Smartlock controller kit complete	each	4					
1.18	Supply of Smartlock controller chamber Rhino 1000 with frame (excluding controller)	each	4					
1.19	Supply of Bluetooth LE Smart Key (Long) with carry case kit	each	4					
1.20	Supply of Eccentric Frictional Key - AH	each	4					
2	Supply NEW MX Traffic Controllers Spares							
2.1	MX Detector interface module 16 channel, or equivalent	each	10					
2.2	MX Output Lightning Protection Printed Circuit Board (PCB) assy 8 to 12 phase, or equivalent	each	10					
2.3	MX Output Lightning Protection PCB assy 12 phase, or equivalent	each	10					
2.4	MX System Processor Module Lite	each	10					
2.5	MX System Processor Module Standard, or equivalent	each	10					
2.6	MX System Processor Module with Display, or equivalent	each	10					

2.7	MX Services Module Standard, or equivalent	each	10					
2.8	MX Services Module Lite, or equivalent	each	10					
2.9	MX Output Module 2 Phase, or equivalent	each	10					
2.10	MX Output Module 4 Phase, or equivalent	each	10					
2.11	MX Global Positioning System (GPS) Module, or equivalent	each	10					
2.12	MX General Packet Radio Service (GPRS) Modem, or Equivalent	each	10					
2.13	MX 4 Channel loop detector module, or equivalent	each	10					
2.14	MX Pedestrian detection module 4 channel, or equivalent	each	10					
2.15	MX Spare Fuses: Output Module 3.15Amp (Pack of 10)	each	10					
2.16	MX Spare Fuses: Services Module 3.15Amp (Pack of 10)	each	10					
2.17	MX Spare Fuses: Services Module 6.3Amp (Pack of 10)	each	10					
2.18	MX Spare Fuses: 10 Amp (Pack of 10)	each	10					
2.19	MX output surge module	each	10					
3	Repair of MX Traffic Controllers Spares							
3.1	MX Detector interface module 16 channel, or equivalent	each	5					

3.2	MX Output Lightning Protection Printed Circuit Board (PCB) assy 8 to 12 phase, or equivalent	each	5					
3.3	MX Output Lightning Protection PCB assy 12 phase, or equivalent	each	5					
3.4	MX System Processor Module Lite	each	5					
3.5	MX System Processor Module Standard, or equivalent	each	5					
3.6	MX System Processor Module with Display, or equivalent	each	5					
3.7	MX Services Module Standard, or equivalent	each	5					
3.8	MX Services Module Lite, or equivalent	each	5					
3.9	MX Output Module 2 Phase, or equivalent	each	5					
3.10	MX Output Module 4 Phase, or equivalent	each	5					
3.11	MX Global Positioning System (GPS) Module, or equivalent	each	5					
3.12	MX General Packet Radio Service (GPRS) Modem, or Equivalent	each	5					
3.13	MX 4 Channel loop detector module, or equivalent	each	5					
3.14	MX Pedestrian detection module 4 channel, or equivalent	each	5					

4	Controllers Configurations (Prepared as per information supplied by Stellenbosch Municipality) (new)							
4.1	Prepare software configuration as per supplied information							
4.1.1	2 - 6 Phase controller	each	1					
4.1.2	7 - 12 Phase controller	each	10					
4.1.3	13 - 18 Phase controller	each	2					
4.1.4	19 - 24 Phase controller	each	1					
4.1.5	Download approved software configuration	each	5					
4.1.6	Upload software configuration	each	10					
4.1.7	Syntell onsite support (Hardware or Software)	hrs	100					
5	Traffic Signal lanterns (new)							
5.1	Supply NEW Syntell / TSA or similar: Complete signal head with Square Nylon Housing including Lanterns (equipped to install LED aspects – 210mm diameter)							
5.1.1	5 Aspect Right Turn	each	30					
5.1.2	5 Aspect Left Turn	each	30					
5.1.3	3 Aspect	each	50					
5.1.4	2 Aspect	each	20					
5.1.5	1 Aspect	each	10					

5.1.6	Visors	each	100					
5.2	Supply NEW Syntell / TSA or similar: Nylon Housings (Square housing only) (equipped to install LED aspects – 210mm diameter)							
5.2.1	5 Aspect Right Turn	each	10					
5.2.2	5 Aspect Left Turn	each	10					
5.2.3	3 Aspect	each	30					
5.2.4	2 Aspect	each	20					
5.2.5	1 Aspect	each	2					
5.2.6	Visors	each	20					
5.3	Supply NEW LED Traffic Signal Modules – Clear Lenses (210mm diameter) (Lanterns ONLY)							
5.3.1	Traffic Signal Red	each	50					
5.3.2	Traffic Signal Yellow	each	50					
5.3.3	Traffic Signal Green	each	50					
5.3.4	Pedestrian Red Man	each	20					
5.3.5	Pedestrian Green Man	each	20					
5.3.6	Red Arrow	each	20					
5.3.7	Yellow Arrow	each	20					
5.3.8	Green Arrow	each	20					
5.3.9	Red Bicycle	each	10					
5.3.10	Green Bicycle	each	10					

5.4	Supply NEW LED Traffic Signal Modules – Clear Lenses (210mm diameter) (Lanterns ONLY							
5.4.1	Traffic Signal Red (Dimmable - ITE Compliant)	each	20					
5.4.2	Traffic Signal Yellow (Dimmable - ITE Compliant)	each	20					
5.4.3	Traffic Signal Green (Dimmable - ITE Compliant)	each	20					
5.4.4	Pedestrian Red (Dimmable - ITE Compliant)	each	20					
5.4.5	Pedestrian Green (Dimmable - ITE Compliant)	each	20					
5.4.6	Count Down Timer for Peds	each	20					
5.4.7	Arrow Red (Dimmable - ITE Compliant)	each	20					
5.4.8	Arrow Yellow (Dimmable - ITE Compliant)	each	20					
5.4.9	Arrow Green (Dimmable - ITE Compliant)	each	20					
5.4.10	Bicycle Red (Dimmable - ITE Compliant)	each	20					
5.4.11	Bicycle Green (Dimmable - ITE Compliant)	each	20					
5.4.12	Bus Green (Dimmable - ITE Compliant)	each	20					
5.4.13	Bus Yellow (Dimmable - ITE Compliant)	each	20					
6	Supply NEW Traffic Signal Modules accessories							

6.1	TSA Extension Bracket - 5 Way	each	10					
6.2	E5,3,2 + 1 Aspect bracket clamps	each	10					
6.3	Cantilever bracket clamps	each	10					
6.4	Signal head pole Clamps	each	10					
6.5	Upper "Z" signal Head Bracket	each	10					
6.6	Lower Signal Head Bracket	each	10					
6.7	Supply 3 aspect Nylon Traffic signal Housing with Incorporated ST-Sign	each	10					
6.8	Supply SS3 signs	each	10					
6.9	Supply W301 signs	each	10					
6.10	Supply Lane Light Upper RED	each	10					
6.11	Supply Lane Light Lower RED	each	10					
7	Supply NEW Round Glass Fibre Backing boards (fit 210mm lanterns) (new)							
7.1	Supply TSA Backing board 2 Aspect	each	10					
7.2	Supply TSA Backing board 3 Aspect	each	10					
7.3	Supply TSA Backing board 4 Aspect	each	30					
7.4	Supply TSA Backing board 5 Aspect	each	10					
7.5	Supply Automotor Backing board 2 Aspect	each	10					

7.6	Supply Automotor Backing board 3 Aspect	each	10					
7.7	Supply Automotor Backing board 4 Aspect	each	30					
7.8	Supply Automotor Backing board 5 Aspect	each	10					
8	Supply NEW Pedestrian Count Down Timer Lantern							
8.1	TSA 3 Aspect Signal Heads (Square complete with Timer Display, Red Man & Green Man)	each	100					
8.2	Automotor 3 Aspect Signal Heads (Square complete with Timer Display, Red Man & Green Man)	each	100					
9	Supply of NEW Video Detection Equipment							
9.1	Supply NEW Traficams Spares							
9.1.1	Trafficon, WIRED Traficam (wide angle – 89 degree)	each	10					
9.1.2	Trafficon, WIRED Traficam (narrow angle – 37 degree)	each	10					
9.1.3	Trafficon NV, WIRELESS Traficam (wide angle – 89 degree)	each	10					
9.1.4	Trafficon NV, WIRELESS Traficam (narrow angle – 37 degree)	each	10					
9.1.5	Trafficon NV, WIRELESS Thermicam (wide angle – 89 degree)	each	10					
9.1.6	Trafficon NV, WIRELESS Thermicam (narrow angle – 37 degree)	each	10					

9.1.7	Trafficon NV, WIRELESS Thermicam (medium angle)	each	10					
9.1.8	FLIR TI XP BPL board 16 outputs	each	10					
9.1.9	FLIR TI XP BPL Expansion board 16 outputs	each	10					
9.1.10	Traficam Wireless Transceiver	each	10					
9.1.11	Traficam Base Unit/PSU	each	10					
9.1.12	Wireless Traficam PSU Complete	each	10					
9.1.13	Traficam 4TI Interface card	each	10					
9.1.14	Traficam 1TI Interface card	each	10					
9.1.15	Traficam X-Stream 4TI Interface card	each	10					
9.1.16	Traficam X-Stream 1TI Interface card	each	10					
9.1.17	Traficon X-stream (live streaming, colour)	each	10					
9.1.18	Traficon Safewalk (pedestrian stereoscopic sensor)	each	10					
9.1.19	Pedestrian interface card	each	10					
9.1.20	CAT 5 LAN Network cable for Traficam connection including complete with connectors on both sides	m	50					
9.1.21	Cable 0.5mm ² x 3 Pair Mylar screened + earth (drain) wire.	m	100					
9.1.22	Communication cable: 0.22 x 4 Core (2pair) OAM PVC grey Defspec colour coded cores (red, blue, yellow, green, shield)	m	100					
9.1.23	Traficam and Safewalk pole mount bracket (3 position adjustable aluminium pole mounting bracket, 600mm long, 50mm wide)	each	10					

9.1.24	Traficam pole extension bracket (2,5m long hot dip galvanized extension pole bracket with 4 strapping points)	each	10					
9.1.25	Traficam pole (110mm diameter 8m long hot dip galvanized steel pole)	each	10					
9.1.26	Supply wireless transceiver pole mount	each	13					
9.1.27	Supply wireless transceiver controller unit	each	15					
9.1.28	Supply Pole mount Wireless TraficCam PSU (Signal Head Powered):	each	18					
9.1.29	Supply Pole mount 24V TraficCam PSU (230V Powered):	each	15					
9.1.30	Supply solar power kit	each	11					
9.1.31	Supply TraficCam solar power kit:	each	12					
9.1.32	Supply wireless transceiver module	each	10					
9.1.33	Supply of compact 3G Industrial OpenWRT Router	each	15					
9.1.34	Supply of LTE Dual SIM Industrial OpenWRT Router	each	15					
9.1.35	Set-up and Configuration	each	10					
9.1.36	Installation including travel, labour, material and testing	each	20					
9.2	Repair of Supply Traficams Spares							
9.2.1	Traficam interface unit 1TI	service	5					
9.2.2	Traficam interface unit 4TI	service	5					
9.2.3	Wireless Transceiver	service	5					

9.2.4	FLIR X-stream (live streaming, colour) or equivalent	service	5					
9.2.5	FLIR ThermiCam	service	5					
9.2.6	FLIR SafeWalk (pedestrian stereoscopic sensor) or equivalent	service	5					
9.2.7	C-Walk	service	5					
9.2.8	X-stream Traficam interface unit	service	5					
10	New Magnetometer Vehicle detection equipment							
10.1	Supply of New Magnetometer Vehicle detection equipment							
10.1.1	Access Point W/ Contact Closure Interface and Wired IP Connectivity	each	30					
10.1.2	Access Point W/ Contact Closure Interface and Wired IP Connectivity Contact closure (serial) interface for detection data	each	30					
10.1.3	ACCESS POINT 48vdc power supply & poe injector (for ap240-e, eg, ec or equivalent)	each	30					
10.1.4	Master Card for Type 170, Type 2070 Or Ts1 Traffic Controllers	each	30					
10.1.5	Access Box for Contact Closure Master Card	each	30					
10.1.6	Repeater (Including 57 Ah Battery Pack)	each	30					
10.1.7	Long life repeater (RP-240-BH-LL)	each	30					
10.1.8	Supply flush mount wireless sensor including epoxy and clear plastic shell	each	15					
10.1.9	Supply flex solar repeater	each	15					

10.1.10	Supply Flex Control Unit for traffic signal controller	each	12					
10.1.11	Supply communications cable	m	100					
10.2	Repair of Magnetometer Vehicle detection equipment							
10.2.1	Access Point W/ Contact Closure Interface and Wired IP Connectivity	service	5					
10.2.2	Access Point W/ Contact Closure Interface and Wired IP Connectivity Contact closure (serial) interface for detection data	service	5					
10.2.3	ACCESS POINT 48vdc power supply & poe injector (for ap240-e, eg, ec or equivalent)	service	5					
10.2.4	Master Card for Type 170, Type 2070 Or Ts1 Traffic Controllers	service	5					
10.2.5	Access Box for Contact Closure Master Card	service	5					
10.2.6	Repeater (Including 57 Ah Battery Pack)	service	5					
10.2.7	Long life repeater (RP-240-BH-LL)	service	5					
11	Supply of NEW Wireless Hardware equipment							
11.1	MikroTik LHG 5GHz AC PtP 24dBi CPE RBLHGG-5acD – Satellite Dish	each	20					
11.2	(MikroTik hEX S RB760iGS including power adaptor - router	each	20					
11.3	Pole Clamps for “MikroTik LHG 5GHz AC PtP 24dBi CPE RBLHGG-5acD – Satellite Dish”	each	20					
11.4	Outdoor Shielded Heavy-Duty Cable Run 30m	each	20					

12	Pedestrian push buttons							
12.1	Supply of NEW pedestrian push buttons							
12.1.1	Pedestrian Push Button: Audible tactile type DUAT 811 Complete Set (NEW)	each	50					
12.1.2	Supply Pedestrian Push Button: Audible tactile type DUAT 811 ONLY!!!!	each	20					
12.1.3	Supply accessible pedestrian signal (APS) pedestrian control unit	each	10					
12.1.4	Supply capacitive pedestrian button	each	10					
12.1.5	Supply capacitive pedestrian button with LED Feedback	each	10					
12.1.6	Supply surface mount pedestrian Switch Pad Kit	each	15					
12.1.7	Supply of pole clamps	each	12					
12.1.8	Supply of pole flat bar hangers	each	12					
12.1.9	Supply of vandal resistant 20mm bosal steel pipes on signals	m	60					
12.2	Repair of pedestrian push buttons							
12.2.1	Capacitive pedestrian push button with no moveable parts	service	5					
12.2.2	Accessible Pedestrian Systems (APS) Control unit	service	5					
12.2.3	APS pedestrian push button	service	5					
12.2.4	Pedestrian Push Button: Audible tactile type DUAT 811	service	5					

13	Repair of 3G Modem							
13.1	IP65 pole mount 24V power supply with cabling, enclosure 200mm x 120mm x 75mm	service	5					
13.2	RAKTEL 4010 loop counter (8 Lane), or equivalent	service	5					
14	Supply of Poles							
14.1	Supply short pedestrian pole	each	30					
14.2	Supply standard 4m pole	each	20					
14.3	Supply standard 5m pole with hatch	each	100					
14.4	Supply standard 6m pole with hatch	each	40					
14.5	Supply removable 4m pole with hatch	each	50					
14.6	Supply removable 5m pole with hatch	each	50					
14.7	Supply removable 6m pole with hatch	each	50					
14.8	Supply 4m base plate pole with hatch	each	50					
14.9	Supply 5m base plate pole with hatch	each	50					
14.10	Supply 6m base plate pole with hatch	each	50					
14.11	Supply 8m traffic signal pole	each	20					
14.12	Supply 8m streetlight pole	each	20					

14.13	Supply cantilever pole vertical section only (excluding bolt group)	each	20					
14.14	Supply cantilever pole horizontal section only supply of cable measured separately	each	20					
14.15	Supply complete cantilever pole including horizontal section, upright section, swivel mechanism and bolt group (include casting of foundation)	each	20					
14.16	Supply Cantilever Pole Bolt group only (Base)	each	15					
14.17	Supply pole top complete with cradle and terminals to fit standard traffic signal pole core termination included	each	10					
14.18	Supply cable entry box (supply of cable measured separately)	each	10					
14.19	Straighten pole by rigging or undermining (includes repairs to any damaged caused to surrounding surface, touching up of any damaged caused to paint on pole and re-alignment of lanterns)	each	10					
15	Supply of paint and accessories							
15.1	Red Oxide primer water based	5 litres	20					
15.2	Golden yellow enamel	5 litres	20					
15.3	High gloss black enamel	5 litres	20					
15.4	Supply pole numbers (set 0 - 9)	each	30					
15.5	Supply of standard 4m pole Standard pole reflective tape strips, "Fluorescent Yellow Diamond Grade" (3 lines 120mm-150mm width each)	each	30					
15.6	Supply of reflective tape strips, "Fluorescent Yellow Diamond Grade" (3 lines 120mm-150mm width each) for cantilever pole	each	30					

15.7	Supply of "Drawing SPPB-2: Pedestrian Tactile Signage print set"	each	30					
16	Supply of Connection pillars (Stubby)							
16.1	Supply connection pillar (plastic stubby – Greenbro or equivalent)) with a 2mm Hot dipped galvanised steel locking bar	each	10					
16.2	Supply connection pillar (plastic stubby –Greenbro or similar) only with a polycarbonate locking bar	each	10					
16.3	Supply connection pillar (steel stubby – Vandal resistant) with a locking mechanism	each	10					
16.4	Supply of stubby chamber Rhino 600	each	10					
16.5	Supply of stubby chamber Rhino 1000 including wooden backplane and frame	each	10					
17	Uninterrupted Power Supply							
17.1	Supply of NEW UPS equipment							
17.1.1	Supply of new Ultrasecure Titanic UPS cabinet with SS3000 36V 1kVA/1000W, 6x12V 105 Ah St. Deep cycle sealed batteries, UPS Communication cable to MX traffic controller and control unit.	each	20					
17.1.2	Supply of new Ultrasecure Titanic UPS cabinet with SS3000 36V 2kVA/1800W, 6x12V 105 Ah St. Deep cycle sealed batteries, UPS Communication cable to MX traffic controller and control unit.	each	20					
17.1.3	Supply of new Ultrasecure Titanic UPS cabinet with SS3000 48V 3kVA/2250W, 8x12V 105 Ah St. Deep cycle sealed batteries, UPS Communication cable to MX traffic controller and control unit.	each	20					

17.1.4	Supply of new 1x12V DC 105 Ah St. Deep cycle sealed batteries – low maintenance	each	20					
17.1.5	Supply of new UPS unit with SS3000 36V 1kVA/1000W output	each	20					
17.1.6	Supply of new UPS unit with SS3000 36V 2kVA/1800W output	each	20					
17.1.7	Supply of new UPS unit with SS3000 36V 3kVA/2250W output	each	20					
17.1.8	Supply of new Ultrasecure Titanic UPS cabinet ONLY.... to host a UPS inverter and at least 6x12V 105 Ah St. Deep cycle sealed batteries, 2 ventilation fans and a ready electrical distribution box including galvanised plinth bracket.	each	20					
17.1.9	Supply of Smartlock UPS chamber Rhino 1000 with frame only	each	20					
17.1.10	Supply 5KW 48V Hubble AM5 Lithium Ion Battery	each	20					
17.1.11	Supply 5KW 48V Volta Lithium Ion Battery	each	20					
17.1.12	Supply of Hubble RIOT cloud link device	each	20					
17.1.13	Supply Victron 48V 1600VA inverter including programming	each	20					
17.1.14	Supply Victron 48V 2000VA inverter including programming	each	20					
17.1.15	Supply Victron 48V 3000VA inverter including programming	each	20					
17.1.16	Supply Victron 48V 3000VA Easy solar II GX 250/70 inverter including programming	each	20					
17.1.17	Supply Victron 48V 5000VA Easy solar II GX 250/100 inverter including programming	each	20					
17.1.18	Supply of Victron 12V Blue Smart IP22 charger (12V 15/20/30a	each	20					
17.1.19	Supply of Victron 24V Blue Smart IP22 charger (24V 8/12/16A)	each	20					

17.1.20	Supply of Victron 48V Smart Solar 250/70 VE.Can MPPT charger	each	20					
17.1.21	Supply of Victron Cerbo GX Device	each	20					
17.1.22	Supply of Mikrotik LTE CAT 6 router	each	20					
17.1.23	Supply if Mikrotik Quick mount Pro bracket	each	20					
17.1.24	Supply of Mikrotik SFP v7 ECC Router	each	20					
17.1.25	Supply of Mikrotik Gigabit ethernet router	each	20					
17.1.26	Supply of SFP Module Single Mode	each	20					
17.2	Repair of UPS equipment							
17.2.1	36V 1kVA/1000W output Module	each	5					
17.2.2	36V 2kVA/1800W Module	each	5					
17.2.3	48V 3kVA/2250W Module	each	5					
17.2.4	Victron 48V 1600VA inverter	each	5					
17.2.5	Victron 48V 2000VA inverter	each	5					
17.2.6	Victron 48V 3000VA inverter	each	5					
17.2.7	Victron 48V 3000VA Easy solar II GX 250/70 inverter	each	5					
17.2.8	Victron 48V 5000VA Easy solar II GX 250/100 inverter	each	5					

18	Solar power kit for traffic lights							
18.1	Supply of 6m Galvanized pole with frame and steel root to house 3 x solar panels	each	10					
18.2	Supply of TIER 1 solar panels 665 watt or stronger	each	10					
18.3	Supply of 4mm Solar panel wire and accessories including male/female connectors	each	10					
18.4	Supply of Solar panel clips to fasten panels	each	10					
18.5	Supply and install wind turbine for off grid traffic light	each	10					
19	Cables and Accessories (new)							
19.1	37 core 1.5mm ² PVC Insulated SWA Cable	m	100					
19.2	27 core 1.5mm ² PVC Insulated SWA Cable	m	100					
19.3	19 core 1.5mm ² PVC Insulated SWA Cable	m	100					
19.4	12 core 1,5 mm ² 600/1000 v PVC (Feeder cables)	m	100					
19.5	2 core 1.5mm ² PVC Insulated SWA Cable	m	100					
19.6	4 core 1.5mm ² PVC Insulated SWA Cable	m	100					
19.7	4 core 2.5 mm ² (Loop feeder cable to controller)	m	100					
19.8	2.5mm ² x 2 Core PVC SWA	m	100					
19.9	2.5mm ² x 4 Core PVC SWA	m	100					
19.10	2.5mm ² x 7 Core PVC SWA	m	100					
19.11	2.5mm ² x 12 Core PVC SWA	m	100					

19.12	2.5mm ² x 19 Core PVC SWA	m	100					
19.13	2.5mm ² x 27 Core PVC SWA	m	100					
19.14	2.5mm ² x 37 Core PVC SWA	m	100					
19.15	6mm ² x 2 Core PVC SWA	m	100					
19.16	6mm ² x 3 Core PVC SWA	m	100					
19.17	10mm ² x 2 Core PVC SWA	m	100					
19.18	10mm ² x 4 Core PVC SWA	m	100					
19.19	6mm ² x 2 Core PVC SWA	m	100					
19.20	6mm ² x 4 Core PVC SWA	m	100					
19.21	7 Core 0.75 mm ² PVC flex	m	100					
19.22	8 pair 1.0 mm ² I/O screened APL cable	m	100					
19.23	2 core 16mm ² mains PVC Insulated SWA Cable	m	100					
19.24	3 core 16mm ² mains PVC Insulated SWA Cable	m	100					
19.25	4 core 16mm ² mains PVC Insulated SWA Cable	m	100					
19.26	7 core Cabtyre 1,5mm ²	m	100					
19.27	Ripcord (2 core) 1.5mm	m	100					

19.28	4mm ² insulated earth wire single core	m	100					
19.29	6mm ² Bare copper earth wire single core	m	100					
19.30	10mm ² Bare copper earth wire single core	m	100					
19.31	3 core 16mm ² Bare copper (Mains) earth wire single core	m	100					
19.32	4 core 2.5 mm ² Anti-theft copper clad aluminium	m	100					
19.33	4mm x 4core SWA copper cables for flashers and chamber termination	m	100					
19.34	4mm Solar panel wire	m	100					
19.35	11 core 2.5 mm ² Anti-theft copper clad aluminium	m	100					
19.36	Outdoor CAT 5 cable	m	100					
19.37	Indoor CAT 5 cable	m	100					
19.38	Cable Matting - 300mm (30kg)	m	50					
19.39	Chevron Tape - 75mm	each	10					
19.40	Cable Ties Large (50) T120R	each	20					
19.41	Cable Ties Medium (100) T50R	each	20					
19.42	Cable Ties Small (100) T18R	each	20					
19.43	Cable Ties Marker - White (100) It50R9C	each	20					
19.44	# 3 Gland+ Shroud	each	5					

19.45	# 2 Gland+ Shroud	each	5					
19.46	# 1 Gland+ Shroud	each	5					
19.47	# 0 Gland+ Shroud	each	5					
19.48	Compression Gland	each	5					
19.49	K-Clamp 32mm	each	4					
19.50	K-Clamp 26mm	each	4					
19.51	K-Clamp 20mm	each	4					
19.52	Earth Spike 1,2m	each	4					
19.53	Earth Spike 1,5m	each	4					
19.54	Earth Spike 1,8m	each	2					
19.55	Earth Clamp for Earth Spike	each	2					
19.56	Earth Spike Drive bolt	each	2					
19.57	Earth Spike Coupling	each	2					
19.58	11 Pin 220 Volt flasher units – eagle Electric or equivalent	each	4					
20	Sundries							
20.1	Electrical Insulation Tape	each	30					

20.2	Padlocks (according to Stellenbosch Municipality combination)	each	30					
20.3	Circuit breaker DIN Rail: 10A 2.5 – 3ka	each	30					
20.4	Circuit breaker DIN Rail: 15A 2.5 – 3ka	each	30					
20.5	Circuit breaker DIN Rail: 60A 2.5 – 3ka	each	30					
20.6	Circuit breaker DIN Rail: 63A Earth leakage	each	30					
20.7	63A Manual Change-over-Switch 2 pole	each	30					
20.8	63A Dual Power Automatic Transfer Switch 2 pole	each	30					
20.9	“Spirits of Salts” Acid-Based Cleaner (5 liter)	each	30					
20.10	Original HP 953 Ink Valuepack (consisting of 1x Black, 1x Cyan, 1x Magenta and 1x Yellow)	each	10					
20.11	Brother P-Touch H110 Label Printer	each	2					
20.12	Brother P-Touch H110 Laminated Tape Tze221 Black-on-White (9mmx8m)	each	20					
20.13	Brother P-Touch D210 Laminated Tape Tze221 Black-on-White (12mmx8m)	each	20					
20.14	Hellermann Tyton: ELECKT – 16-piece Electrical Tool kit	each	4					
20.15	Hellerman Tyton: ELECBP – 32-piece Electrician’s Backpack Tool kit	each	4					
20.16	T235H Electrician’s Digital Multimeter	each	4					
20.17	Fluke 302 Clamp Multimeter	each	4					

20.18	3000W Modified Sineware Inverter with USB	each	6					
20.19	Fuse Finder – Automatic Scanning Receiver and Transmitter (230V 50Hz <20mA)	each	4					
20.20	65 pieces Gedore Red Tool set including metal tool chest	each	4					
20.21	Cordless 18v Brushless Rotary Hammer Drill driver including battery and charger	each	4					
20.22	Cordless 18v Brushless Angle Grinder including battery and charger	each	4					
20.23	STiHL HTA85 Cordless Pole Chainsaw 18/v Li-Ion, including battery and charger	each	10					
20.24	STIHL Telescopic Rod (up to 456cm) + STIHL PR38CT saw	each	4					
20.25	Digital Vernier (300mm Calliper)	each	4					
20.26	800w Electric Mixer and Spiral Stirrer	each	10					
20.27	Multi-Epoxy 1309 (1x 500mg resin and 1x 500mg hardener)	each	40					
20.28	Pole Cap + Cradle (Nylon resistant) with terminals to fit standard 4, 5 and 6m traffic signal poles. (NEW)	each	10					
20.29	Self-Fusing 3m Tape – 9m x 19mm	each	30					
20.30	Button Assembly	each	10					
20.31	Ripcord 1,5mm	meter	100					
20.32	Buzzers - Continuous	each	10					
20.33	Buzzers - Intermittent	each	10					

20.34	GPRS Modem with external dual antennae for MX Controller (with RMS software)	each	10					
20.35	GPS Time Sync Clock with external antennae for MX Controller (NEW)	each	10					
20.36	MX GPS AND GPRS Dual External antennae only (NEW)	each	10					
20.37	<u>Traffic Signal Controller configuration and download device (NEW)</u>	each	6					
	DELL Latitude 7410 or similar;							
	<u>Minimum requirements;</u> Intel Core i7 vPRO Latitude 7410 processor or higher Windows 10 Professional 64-bit or higher 16GB memory or higher 14,0" FHD display 512GB SSD or higher 802.11 a/b/n WiFi, plus Bluetooth 4.0 or higher Intel UHD Graphics ThBlt & FgrPr & SmtCd Cam & Mic WLAN + BT Backlit Kb 4 Cell 3Y ProSpt Serial Port MECER USB to Serial adaptor							

	Wireless keyboard and mouse External DVD/CD reader & writer 5 metre x CAT 5 LAN cable for Traficam connection Dell pro backpack 15 <u>The following software must be pre-installed;</u> Simulator for MX traffic signal controller Analyser for MX traffic signal controller Emulator for MX traffic signal controller Configurator for MX traffic signal controller Traficam setup tools Operating System MS Windows 10 Pro or higher Full MS Office package (latest) Anti-Virus (latest) valid for 2 years							
20.38	30 Amp Terminal Strip (pack of 10) Brass Screws	each	20					
20.39	Loop Joints D1	each	20					
20.40	Earth lugs (6x10mm)	each	20					
20.41	Brass screws - 5x25mm (100)	each	20					
20.42	Brass washers flat - 5mm (100)	each	20					
20.43	Nuts - 5mm (100)	each	20					
20.44	Self-tapping screws - 5x12 (100)	each	20					
20.45	Self-fusing 3M tape – 9m x 19mm	each	20					

20.46	Electric Airless DIY Spray Guns (0.06kW, 230V, Max. Flow = 1000 l/min)	each	6					
20.47	15 pce Impact Socket 12.5mm Drive, 75mm Deep Metric (10 -24mm)	each	6					
20.48	Fluke 107 Multimeter	each	4					
20.49	High Speed Steel Titanium 25pce Drill Bit Sets (1 – 13mm)	each	10					
20.50	23pcs Terminal release tool set (size 1 -23)	each	4					
20.51	41pcs Star set	each	4					
20.52	6 pcs Pick and Hook Set	each	4					
20.53	9pcs Heavy Duty T-Handle Allen key set	each	4					
20.54	Industrial Step Drill 5 -35mm HSS (13mm Shank)	each	10					
20.55	¼ x 5/16 Magnetic Socket	each	10					
20.56	146pcs Stainless Steel Lock nut assortment	each	4					
20.57	10mm x 10 Copper crimping Lug (pack of 100)	each	10					
20.58	Rotosure 1000 Deluxe Measuring wheel with brakes and carry bag	each	6					
20.59	USB 3.0 flash drive 128gb	each	30					
20.60	Foldable Handtruck Aluminium trolley 100kg	each	4					
20.61	Telescopic Ladder 3.2m – 10 steps	each	4					
20.62	Traffic Signal Pole heavy duty self-adhesive vinyl numbers - 0 to 9 (White Reflective Background: Height=103mm, width=83mm and Black Number: Height=85mm, width=55mm)	each	15					
20.63	Seizer 80 SC (1 litre bottle)	each	20					
20.64	15 Amp Terminal Strip (pack of 10) Brass Screws	each	20					

21	Supply and Delivery of New Connection pillar (Stubby)								
21.1	New Steel Vandal Resistant Connection pillar (stubby) powder coated grey complete with locking mechanisms			each	30				
21.2	New Connection plastic pillar complete with locking bar (Greenbro or equivalent) Polycarbonate			each	30				
21.3	New Connection plastic pillar complete with 2mm Hot dipped Galvanised Steel locking bar			each	30				
21.4	Supply Connection pillar locking bar (Greenbro or equivalent) Polycarbonate ONLY			each	30				
21.5	Supply Connection pillar 2mm Hot dipped Galvanised Steel locking bar ONLY			each	30				
21.6	Supply of stubby chamber Rhino 600			each	30				
21.7	Supply of stubby chamber rhino 1000 including wooden backplane and frame			each	30				
22	Supply and Delivery of Solar powered LED Road Studs:								
22.1	Single Sided	Flashing Light	Red	each	100				
			Amber	each	100				
			White	each	100				
22.2	Single Sided	Static Light	Red	each	100				
			Amber	each	100				
			White	each	100				
22.3	Double Sided	Flashing Light	Red & Red	each	200				
			Red & Amber	each	200				
			Amber & Amber	each	200				
			Red & White	each	200				
			Amber & White	each	200				

			White & White	each	200					
22.4	Double Sided	Static Light	Red & Red	each	200					
			Red & Amber	each	200					
			Amber & Amber	each	200					
			Red & White	each	200					
			Amber & White	each	200					
			White & White	each	200					
Total Estimated Bid Price (incl. VAT)										

SECTION 3	INSTALLATION OF TRAFFIC SIGNAL EQUIPMENT (CIDB Grading of 3 EP or higher is needed)
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Rates to include ONLY installation and commissioning, establishment of contractor onsite, testing – commissioning and issuing of Compliance Certificates, Health and Safety requirements including all labour and transport, unless otherwise indicated. Refer to Scope of Work and Specifications for all items. (CIDB Grading of 3 EP or higher is needed). Contract Price Adjustment is applicable for Year 2 and 3. The quantities reflected in the bill of quantities are for evaluation purposes only. Actual quantities to be used will be indicated during the implementation of individual projects.

Contractor / Suppliers				Bidder Name			
				BBBEE POINTS		0	
	Description:	Unit	Quantity			VAT (15%)	

Item No:				Rates (excl. VAT)	Total (excl. VAT)		Total (incl. VAT)
1	Installation (Planting) of street furniture - Includes: 1) Erection to correct depth in hole, ensuring equipment is vertical, 2) Backfilling and compaction. Excludes: 3) Excavations of holes 4) Cable installations 5) Re-instatement						
1.1	Install Controllers –						
1.1.1	Base mounted controllers	each	20				
1.1.2	Pole mounted controllers	each	20				
1.1.3	Install (Planting) Connection pillars (excavation measured separately) (Installation of cable measured separately)	each	20				
2	Smartlock Chambers (excavation measured separately)						
2.1	Install Controller Chamber Rhino 1000	each	20				
2.2	Install UPS Chamber Rhino 1000	each	20				
2.3	Install Stubby Chamber Rhino 1000	each	20				
2.4	Installation of Fibre link cables in to chambers	each	20				

3	Install (Planting) Poles (excavation measured separately) (Poles to be planted 750mm deep) (Installation of cable measured separately)						
3.1	Install short pedestrian button pole	each	30				
3.2	Install standard 4m pole with hatch	each	30				
3.3	Install standard 5m pole with hatch	each	30				
3.4	Install standard 6m pole with hatch	each	30				
3.5	Install removable 4m, 5m or 6m pole with hatch	each	30				
3.6	Install 4m, 5m or 6m base plate pole	each	30				
3.7	Install 8m pole	each	30				
3.8	Install 8m streetlight pole	each	30				
3.9	Install cantilever pole vertical section only _installation of cable measured separately (casting of foundation measured separately) (cherry picker measured separately)	each	30				
3.10	Install cantilever pole horizontal section only, installation of cable measured separately (cherry picker measured separately)	each	30				
3.11	Install complete cantilever pole including horizontal section, upright section, swivel mechanism and bolt group (include casting of foundation) and installation of cable measured separately (cherry picker measured separately)	each	30				

3.12	Pole tops (core termination Included)	each	30				
3.13	Cable entry box (excavation measured separately) (Installation of cable measured separately)	each	30				
4	Installation of complete traffic lanterns, pedestrian lanterns and other mountable equipment (includes connection to relevant cable core) (includes fitting of backing screens)						
4	210mm traffic signal lanterns complete						
4.1	Install 1 aspect 210mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
4.2	Install 2 aspect 210mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
4.3	Install 2 aspect lantern 210 mm on horizontal section of cantilever pole (supply of cherry picker measured separately)	each	20				
4.4	Install 3 aspect 210mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
4.5	Install 3 aspect lantern 210 mm on horizontal section of cantilever pole (supply of cherry picker measured separately)	each	20				
4.6	Install 4 aspect 210mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
4.7	Install 4 aspect lantern 210 mm on horizontal section of cantilever pole (supply of cherry picker measured separately)	each	20				

4.8	Install 5 aspect 210mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
4.9	Install 5 aspect lantern 210 mm on horizontal section of cantilever pole (supply of cherry picker measured separately)	each	20				
4.10	Install pole clamps	each	20				
4.11	Install hangers for signals	each	20				
5	300mm traffic signal lanterns complete						
5.1	Install 1 aspect 300mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	10				
5.2	Install 1 aspect lantern 300 mm on horizontal section of cantilever pole (supply of cherry picker measured separately)	each	10				
5.3	Install 2 aspect 300mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	10				
5.4	Install 2 aspect lantern 300 mm on horizontal section of cantilever pole (supply of cherry picker measured separately)	each	10				
5.5	Install 3 aspect 300mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	10				
5.6	Install 3 aspect lantern 300 mm on horizontal section of cantilever pole (supply of cherry picker measured separately)	each	10				
5.7	Install 5 aspect 300mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	10				

5.8	Install 5 aspect lantern 300mm on horizontal section of cantilever pole (supply of cherry picker measured separately)	each	10				
5.9	Install flashing lantern triangle on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	10				
5.10	Install standard pedestrian button assembly (INCLUDES installing 2 core and connections)	each	10				
5.11	Install audible device (including connections) (set)	each	10				
5.12	Install audio tactile controller and buttons (Including all connections) (Set)	each	10				
5.13	Install audible device (including connections) (set)	each	10				
5.14	Install audio tactile controller and buttons (Including all connections) (Set)	each	10				
5.15	Install capacitive pedestrian button	each	10				
5.16	Install surface mount pedestrian switch pad	each	10				
6	Install signs and lane lights refer to Construction Procedure on section 12						
6.1	Install 3 aspect Nylon Traffic signal Housing with Incorporated ST-Sign on 4m, 5m pole	each	20				
6.2	Install 3 aspect Nylon Traffic signal Housing with Incorporated ST-Sign on 6m, 8m poles	each	20				

6.3	Install 3 aspect Nylon Traffic signal Housing with Incorporated ST-Sign on vertical section of cantilever pole	each	20				
6.4	Install 3 aspect Nylon Traffic signal Housing with Incorporated ST-Sign on horizontal section of cantilever pole	each	20				
7	Traffic regulatory signs on traffic signals poles						
7.1	Install SS3 signs	each	20				
7.2	Install W301 signs	each	20				
7.3	Install Lane lights	each	20				
8	CABLES: Installation of cables, Ducts and Identification tape (refer item of the spec) – INCLUDING: 1) Ensuring trench is correct depth(see item 1.1.1 above) and that trench floor is free of stones; if necessary installing bedding sand 2) Installing cable neatly in trench (without crossovers) 3) Excavation and backfill of cable entrance at street furniture. 4) termination of cables in street furniture. 5) Connection of cores to correct terminals. EXCLUDING: 1) Excavation of trenching 2) Any re-instatement.						
8	Cables (or pipe/tape) in trenches – excavation measured separately						
8.1	Install 1 - 4 core cable 10 - 16mm (Mains)	m	20				

8.2	Install 2 core copper cable 1.5mm ²	m	80				
8.3	Install 19 core copper cable 1.5mm ²	m	100				
8.4	Install 37 core copper cable 1.5mm ²	m	100				
8.5	Install 8 pair copper wire 1mm ²	m	100				
8.6	Install earth wire 10mm	m	50				
8.7	Install cable matting	m	20				
8.8	Install ducting 20mm-110mm	m	200				
8.9	Install CAT5	m	100				
9	Cables through ducts – (excavation of duct opening measured separately)						
9.1	Install 1 - 4 core cable 10 - 16mm (Mains)	m	20				
9.2	Install 2 core copper cable 1.5mm ²	m	80				
9.3	Install 19 core copper cable 1.5mm ²	m	100				
9.4	Install 37 core copper cable 1.5mm ²	m	100				

9.5	Install 8 pair copper cable 1mm2	m	100				
9.6	Install earth wire 10mm	m	50				
9.7	Install CAT5	m	100				
10	Cables into controller (base mounted controller) – (includes glanding of cable) (Includes termination, excavation and backfill)						
10.1	Install 1 - 4 core cable 10 - 16mm (Mains)	each	20				
10.2	Install 2 core copper cable 1.5mm ²	each	80				
10.3	Install 19 core copper cable 1.5mm ²	each	100				
10.4	Install 37 core copper cable 1.5mm ²	each	100				
10.5	Install 8 pair copper cable 1mm2	each	100				
10.6	Install earth wire 10mm	each	50				
10.7	Install CAT5	each	100				

11	Cables in controller – pole mounted controller (includes glanding of cable) (Includes termination, excavation and backfill)						
11.1	Install 1 - 4 core cable 10 - 16mm (Mains)	each	20				
11.2	Install 2 core copper cable 1.5mm ²	each	80				
11.3	Install 19 core copper cable 1.5mm ²	each	100				
11.4	Install 37 core copper cable 1.5mm ²	each	100				
11.5	Install 8 pair copper cable 1mm ²	each	100				
11.6	Install earth wire 10mm	each	50				
11.7	Install CAT5	each	100				
12	Cables into connection pillar – (Stubby) (Includes termination, excavation and backfill)						
12.1	Install 1 - 4 core cable 10 - 16mm (Mains)	each	20				
12.2	Install 2 core copper cable 1.5mm ²	each	80				
12.3	Install 19 core copper cable 1.5mm ²	each	100				

12.4	Install 37 core copper cable 1.5mm ²	each	100				
12.5	Install 8 pair copper cable 1mm ²	each	100				
12.6	Install earth wire 10mm	each	50				
12.7	Install CAT5	each	100				
13	Cables in poles-- (Includes termination, excavation and backfill)						
13.1	Install 2 core copper cable 1.5mm ²	each	20				
13.2	Install 19 core copper cable 1.5mm ²	each	100				
13.3	Install earth wire 10mm	each	50				
13.4	Install 7 core cabtyre (From hatch in cantilever to lantern on horizontal section of cantilever pole)	each	50				
13.5	Install CAT5	each	100				
14	Straight jointing cables - jointing cable with heat shrink or compound joint type as required, fitting ferrules (sweated or crimped as required), and filling joint box. Any excavation and re-instatement work to be measured separately.						

14.1	16mm ² x 3 core SWA (Mains)	each	50				
14.2	1.5mm ² x 19 core SWA	each	50				
14.3	1.5mm ² x 37 core SWA	each	50				
14.4	1.5mm ² x 2 core SWA	each	50				
15	Install earth spike – including testing and supply of Certificate of Compliance						
15.1	Install 1,2m Spike	each	10				
15.2	Install 1,5m Spike	each	10				
15.3	Install 1,8m Spike	each	10				
15.4	Testing of earth spike and provision of Certificate of Compliance	each	20				
16	Painting of poles and boxes and Road Markings (refer to specification section) (Includes the supply of all materials including galvanize wash, plumbate and paint). Paint to be of 2 coats of red oxide primer and 3 coats golden yellow						

16	Painting existing poles-Paint supplied by municipality						
16.1	Paint existing traffic signal 4m pole	each	20				
16.2	Paint new traffic signal 4m pole	each	20				
16.3	Paint existing traffic signal 5m pole	each	20				
16.4	Paint new traffic signal 5m pole	each	20				
16.5	Paint existing traffic signal 6m pole	each	20				
16.6	Paint new traffic signal 6m pole	each	20				
16.7	Paint existing traffic signal cantilever pole vertical section only	each	20				
16.8	Paint new traffic signal cantilever pole vertical section only	each	20				
16.9	Paint existing traffic signal cantilever pole complete	each	20				
16.10	Paint new traffic signal cantilever pole complete	each	20				
16.11	Install of standard 4m pole Standard pole reflective tape strips, "Fluorescent Yellow Diamond Grade" (3 lines 120mm-150mm width each)	each	20				
16.12	Install of reflective tape strips, "Fluorescent Yellow Diamond Grade" (3 lines 120mm-150mm width each) for cantilever pole	each	20				

16.13	Installation of Pole numbers on pole-Number supplied by municipality	each	20				
16.14	Installation of "Drawing SPPB-2: Pedestrian Tactile Signage print set"	each	20				
17	Installation of Detection Equipment						
17	Loop Detection						
17.1	Cutting of vehicle actuated, Extension and Scoot Loops (includes supply of all materials)	m	50				
17.2	Refilling and Sealing of existing loops (includes supply of all materials)	m	50				
17.3	Testing of loops	each	10				
18	Installation of Video detection equipment						
18.1	Install wired TrafiCam or Safewalk on 4m,5m, 6m	each	20				
18.2	Install TrafiCam or Safewalk on 8m or on vertical/ horizontal section of cantilever pole (supply of cherry picker measure separately)	each	20				
18.3	Adjust positioning of TrafiCam on 4m,5m or 6m (supply of cherry picker measured separately)	each	20				

18.4	Adjust positioning of TrafiCam or Safewalk on 8m, vertical or horizontal section cantilever pole boom (supply of cherry picker measured separately)	each	20				
18.5	Install TI unit inside Traffic Controller	each	20				
18.6	Install Camera cable in trench	m	100				
18.7	Install Camera cable in sleeve	m	100				
19	Installation of solar/Wind power kit for traffic lights						
19.1	Install 6m Galvanized pole with concrete foundation	each	20				
19.2	Install solar panels on 6m pole (supply of cherry picker measured separately)	each	20				
19.3	Setup and commissioning of solar pole and system including comms	each	20				
19.4	Supply and install Wind powered turbine to for off grid traffic light	each	20				
20	Installation of Router						
20.1	Install compact 4G Industrial OpenWRT Router	each	20				

20.2	Install LTE Dual SIM Industrial OpenWRT Router	each	20				
21	Magnetometer Detection						
21.1	Install flush mount wireless sensor in asphalt including core drilling including fixing epoxy tube and clear plastic shell	each	20				
21.2	Install Access Point on 6m or 8m pole (supply of cherry picker measured separately)	each	20				
21.3	Install flex solar repeater on 6m,8m (supply of cherry picker measured separately)	each	20				
21.4	Install Flex Control Unit	each	20				
21.5	Install communications cable in trench (rate to include trenching of 500mm x 700mm)	m	100				
21.6	Install communications cable in sleeves (under paving and roadway)	m	100				
21.7	Move repeater from one pole to another pole (supply of cherry picker measured separately)	each	20				
21.8	Adjust positioning of repeater or access point on 6m or 8m (supply of cherry picker measured separately)	each	20				
21.9	Exchange repeater or access point on 6m or 8m (supply of cherry picker measured separately)	each	20				
21.10	Exchange repeater battery on 6m or 8m (supply of cherry picker measured separately)	each	20				
21.11	Change contact closure interface to direct Ethernet interface	each	20				

21.12	Setup and configure traffic controller for direct Ethernet communications	each	20				
21.13	Setup and configuration of system	each	20				
21.14	On site changes to configuration	each	20				
21.15	Remote changes to configuration	each	20				
21.16	Test and connect communications cable inside traffic controller	each	20				
21.17	Design intersection layout using wireless magnetometer system	each	20				
22	Uninterrupted Power Supply Units						
22.1	Scheduled maintenance (Including service or replacement of batteries and control unit) (Batteries and control units supplied by the municipality)	each	20				
22.2	Install UPS cabinet only	each	20				
22.3	Install UPS inverter only	each	20				
22.4	Install batteries 12V AGM or Lead Type	each	20				
22.5	Install Lithium batteries 48v 5kw	each	20				

22.6	Permanent removal of complete UPS system cabinet, batteries, control unit	each	20				
22.7	Install UPS comms Cable for Traffic Signal Controller	each	20				
23	UNSPECIFIED WORK Refer to Construction work required to be done but not detailed elsewhere in this schedule						
23	Normal Time: 07:30 to 16:00						
23.1	Design and write Lunar or MX Configuration	each	20				
23.2	Amend Lunar or Mx Configuration	each	20				
23.3	Download and commission configuration	each	20				
23.4	Supervisor/ Electrician (Artisan)	hour	45				
23.5	Traffic Signal Foreman	hour	45				
23.6	Skilled Labourer (from the contractor)	hour	45				
23.7	Unskilled Labourer (from community)	hour	45				
23.8	Security Guard x1	hour	45				
23.9	Cable Thumping (inclusive of equipment plus operator)	hour	30				

24	Overtime: 16:00 to 07:30 and Saturdays						
24.1	Supervision/ Electrician (Artisan)	hour	20				
24.2	Traffic Signal Foreman	hour	20				
24.3	Skilled Labourer (from the contractor)	hour	20				
24.4	Unskilled Labourer (from community)	hour	20				
24.5	Security Guard x1	hour	20				
24.6	Cable Thumping (inclusive of equipment plus operator)	hour	20				
25	Sunday and Public Holiday Time						
25.1	Supervision/ Artisan (Electrician)	hour	20				
25.2	Traffic Signal Foreman	hour	20				
25.3	Skilled Labourer (from the contractor)	hour	20				
25.4	Unskilled Labourer (from community)	hour	20				

25.5	Security Guard x1	hour	20				
25.6	Cable Thumping (inclusive of equipment plus operator)	hour	20				
26	Extra Vehicle and Plant Cost (For use by the Contractor only)- these items are only for use by agreement with Project Coordinator as normally tendered rates for items described in this schedule must include for any vehicle or plant costs.						
26.1	Truck (5 ton or greater)	day	30				
26.2	Truck with crane (>5 ton)	day	30				
26.3	Cherry picker truck	day	30				
26.4	Jackhammers and Compressor equipment	hrs	30				
26.5	Vibratory Roller (10 – 14-ton, single drum smooth)	hrs	16				
26.6	Static Roller (11 – 13 ton)	hrs	16				
26.7	Pedestrian roller (800 – 900 kg, 630 mm wide drum)	hrs	16				
26.8	Small compaction equipment (plate vibrator)	hrs	16				
26.9	Pneumatic roller (27 ton)	hrs	16				

26.10	Concrete mixer (350 litre)	hrs	8				
26.11	Portable generator (5 kVA)	hrs	8				
26.12	Flatbed truck of 5-ton capacity with drop sides	km	7500				
27	Traffic Controllers						
27.1	Normal time (07h30-16h00)	hour	45				
27.2	After Hours: 16h00- 07h30 and Saturdays	hour	20				
27.3	Sundays and Public holidays	hour	20				
27.4	SCM upgrade, installation and removal	each	15				
28	Removal of street furniture or damaged equipment Includes: 1) Excavations 2) Disconnection of cables 3) Backfilling. Excludes: 1) Re-instatement 2) Cable removal						
28	Remove Controllers: (includes disconnection of cores)						
28.1	Base mounted controllers	each	20				
28.2	Pole mounted controllers	each	20				

28.3	Remove Connection pillars (includes disconnection of cores)	each	20				
28.4	Remove Chamber Rhino 1000	each	20				
29	Remove UPS equipment from Titanic or Chamber						
29.1	Remove UPS cabinet only	each	20				
29.2	Remove UPS inverter only	each	20				
29.3	Remove batteries 12V AGM or Lead Type	each	20				
29.4	Remove Lithium batteries 48v 5kw	each	20				
29.5	Permanent removal of complete UPS system cabinet, batteries, control unit	each	20				
29.6	Remove UPS comms Cable for Traffic Signal Controller	each	20				
30	Remove Poles (includes disconnection of cores)						
30.1	Remove short pedestrian pole	each	20				
30.2	Install short pedestrian pole	each	20				

30.3	Remove standard 4m pole with hatch	each	20				
30.4	Remove standard 5m pole with hatch	each	20				
30.5	Remove standard 6m pole with hatch	each	20				
30.6	Remove removable 4m pole with hatch	each	20				
30.7	Remove removable 5m pole with hatch	each	20				
30.8	Remove removable 6m pole with hatch	each	20				
30.9	Remove 4m base plate pole	each	20				
30.10	Remove 5m base plate pole	each	20				
30.11	Remove 6m base plate pole	each	20				
30.12	Remove 8m pole	each	20				
30.13	Remove complete cantilever pole including horizontal section, upright section.	each	20				
30.14	Remove Cantilever concrete foundation	each	20				
30.15	Remove pole top -core termination included	each	20				

31	Removal of complete traffic and pedestrian lanterns and other mountable equipment (includes disconnection from relevant cable cores) (includes delivery of lanterns to store or maintenance depot)						
31	210MM TRAFFIC SIGNAL LANTERNS COMPLETE						
31.1	Remove 1 aspect 210mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
31.2	Remove 2 aspect 210mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
31.3	Remove 2 aspect lantern 210 mm on horizontal I section of cantilever pole (supply of cherry picker measured separately)	each	20				
31.4	Remove 3 aspect 210mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
31.5	Remove 3 aspect lantern 210 mm on horizontal section of cantilever pole (supply of cherry picker measured separately)	each	20				
31.6	Remove 4 aspect 210mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
31.7	Remove 4 aspect lantern 210 mm on horizontal I section of cantilever pole (supply of cherry picker measured separately)	each	20				
31.8	Remove 5 aspect 210mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
31.9	Remove 5 aspect lantern 210 mm on horizontal I section of cantilever pole (supply of cherry picker measured separately)	each	20				
32	300MM TRAFFIC SIGNAL LANTERNS COMPLETE						

32.1	Remove 1 aspect 300mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
32.2	Remove 1 aspect lantern 300 mm on horizontal section of cantilever pole (supply of cherry picker measured separately)	each	20				
32.3	Remove 2 aspect 300mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
32.4	Remove 2 aspect lantern 300 mm on horizontal section of cantilever pole (supply of cherry picker measured separately)	each	20				
32.5	Remove 3 aspect 300mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
32.6	Remove 3 aspect lantern 300 mm on horizontal section of cantilever pole (supply of cherry picker measured separately)	each	20				
32.7	Remove 5 aspect 300mm lantern on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
32.8	Remove 5 aspect lantern 300mm on horizontal section of cantilever pole (supply of cherry picker measured separately)	each	20				
32.9	Remove flashing lantern Triangle on 4m pole, 5m, 6m pole,8m, vertical part of cantilever pole	each	20				
32.10	Remove standard pedestrian button assembly	each	20				
32.11	Remove audible device	each	20				
32.12	Remove audio tactile controller and button (set of one button and one controller)	each	20				
32.13	Remove capacitive pedestrian button	each	20				
32.14	Remove surface mount pedestrian Switch Pad Kit	each	20				

33	Traffic regulatory signs on traffic signals poles						
33.1	Remove SS3 signs	each	20				
33.2	Remove W301 signs	each	20				
33.3	Remove Lane lights	each	20				
34	Removal of cables (or pipe/tape) from trenches, ducts and Street Furniture (refer to spec on page 230 section 25) – INCLUDES: 1) Return of cable (or pipe/tape) to area depot (unless otherwise indicated) 2) Excavation (750mm) at pole, controller or stubby base 3) Disconnections of cables from street furniture EXCLUDING: Excavation of trenches and duct openings and any re-instatement. complete removal of old cables from ducts						
34	Remove cables (or pipe/tape) from trenches – excavation measured separately						
34.1	Remove 1 - 4 core cable 10 - 16mm (Mains)	m	150				
34.2	Remove 2 core copper cable 1.5mm ²	m	150				
34.3	Remove 19 core copper cable 1.5mm ²	m	150				
34.4	Remove 37 core copper cable 1.5mm ²	m	150				

34.5	Remove 8 pair copper cable 1mm ²	m	150				
34.6	Remove Earth wire 10mm	m	150				
34.7	Remove Cable matting	m	150				
34.8	Remove Ducting 50-110mm	m	150				
35	Removal of cables from ducts – excavation of duct opening measured separately						
35.1	Remove 1 - 4 core 10 - 16mm (Mains)	m	150				
35.2	Remove 2 core copper cable 1.5mm ²	m	150				
35.3	Remove 19 core copper cable 1.5mm ²	m	150				
35.4	Remove 37 core copper cable 1.5mm ²	m	150				
35.5	Remove 8 pair copper cable 1mm ²	m	150				
35.6	Remove Earth wire 10 mm	m	150				
35.7	Remove CAT5	m	150				

36	Removal of cables from controller (base mounted controller) Includes disconnection, excavation and backfill at base						
36.1	Remove 1 - 4 core 10 - 16mm (Mains)	each	20				
36.2	Remove 2 core copper cable 1.5mm ²	each	20				
36.3	Remove 19 core copper cable 1.5mm ²	each	20				
36.4	Remove 37 core copper cable 1.5mm ²	each	20				
36.5	Remove 8 pair copper cable 1mm ²	each	20				
36.6	Remove earth wire 10mm	each	20				
36.7	Remove CAT5	each	20				
37	Removal of cables from controller – pole mounted controller - Includes disconnection, excavation and backfill at base						
37.1	Remove 1 - 4 core 10 - 16mm (Mains)	each	22				
37.2	Remove 2 core copper cable 1.5mm ²	each	22				
37.3	Remove 19 core copper cable 1.5mm ²	each	22				
37.4	Remove 37 core copper cable 1.5mm ²	each	22				

37.5	Remove 8 pair cable 1mm ²	each	22				
37.6	Remove earth wire 10mm	each	22				
37.7	Remove CAT5	each	22				
38	Removal of cables from connection pillar – (Stubby) Includes disconnection, excavation and backfill at base						
38.1	Remove 1 - 4 core 10 - 16mm (Mains)	each	20				
38.2	Remove 2 core copper cable 1.5 mm ²	each	20				
38.3	Remove 19 core copper cable 1.5mm ²	each	20				
38.4	Remove 37 core copper cable 1.5mm ²	each	20				
38.5	Remove 8 pair copper cable 1mm ²	each	20				
38.6	Remove Earth wire 10mm	each	20				
38.7	Remove CAT5	each	20				

39	Removal of cables in poles - 4m, 5m, 6m, 8m, cantilever and short pedestrian button pole – (Includes termination, excavation and backfill)						
39.1	Remove 1 - 4 core 10 - 16mm (Mains)	each	15				
39.2	Remove 2 core copper cable 1.5mm ²	each	15				
39.3	Remove 19 core copper cable 1.5mm ²	each	15				
39.4	Remove 37 core copper cable 1.5mm ²	each	15				
39.5	Remove 8 pair copper cable 1mm ²	each	15				
40	Removal of cables from cable entry box - Includes disconnection, excavation and backfill at base of pole						
40.1	Remove 1 - 4 core 10 - 16mm (Mains)	each	20				
40.2	Remove 2 core copper cable 1.5mm ²	each	20				
40.3	Remove 19 core copper cable 1.5mm ²	each	20				
40.4	Remove 37 core copper cable 1.5mm ²	each	20				
50	Removal of Video detection Equipment						

50.1	Remove wired TrafiCam or Safewalk on 4m,5m,6m,	each	20				
50.2	Remove TrafiCam or Safewalk on 8m pole or horizontal section of cantilever pole (supply of cherry picker measure separately)	each	20				
50.3	Remove TI unit with waterproof housing on 4m,5m,6m or 8m pole	each	20				
50.4	Remove wireless transceiver on 4m,5m,6m or 8m pole (supply of cherry picker measure separately)	each	20				
50.5	Remove TrafiCam PSU with waterproof housing on 4m,5m,6m	each	20				
50.6	Remove TrafiCam PSU with waterproof housing on 8m or vertical/ horizontal section of cantilever pole (supply of cherry picker measured separately)	each	20				
50.7	Remove solar power kit on 4m,5m,6m	each	20				
50.8	Remove solar power kit on 8m or vertical/ horizontal section of cantilever pole (supply of cherry picker measured separately)	each	20				
50.9	Remove TI unit inside Traffic Controller	each	20				
50.10	Remove x-stream monitoring kit on 4m,5m,6m,8m poles	each	20				
50.11	Remove communications cable in trench (rate to include trenching of 500mmx 700mm)	m	100				
50.12	Remove radar kit on the top of 4m,5m,6m,8m and vertical section of cantilever pole	each	20				
50.13	Remove radar kit on horizontal section of cantilever boom (supply of cherry picker measured separately)	each	20				

50.14	Remove radar communications cable in trench and sleeves	m	100				
50.15	Remove radar communications cable in sleeves (under paving and roadway)	m	100				
51	Removal of Magnetometer Detection						
51.1	Remove complete flush mount wireless sensor from asphalt	each	20				
51.2	Remove access point on 6m,8m pole (supply of cherry picker measured separately)	each	20				
51.3	Remove flex solar repeater on 6m,8m (supply of cherry picker measured separately)	each	20				
51.4	Remove communications cable in trench or sleeves	m	100				
51.5	Remove repeater from 6m or 8m pole	each	20				
Total Estimated Bid Price (incl. VAT)							

DECLARATION BY TENDERER

I / We acknowledge that I / we am / are fully acquainted with the contents of the conditions of tender of this tender document and that I / we accept the conditions in all respects.

I / We agree that the laws of the Republic of South Africa shall be applicable to the contract resulting from the acceptance of *my / our tender and that I / we elect *domicillium citandi et executandi* (physical address at which legal proceedings may be instituted) in the Republic at:

I / We accept full responsibility for the proper execution and fulfillment of all obligations and conditions devolving in me / us under this agreement as the principal liable for the due fulfillment of this contract.

I / We furthermore confirm I / we satisfied myself / ourselves as to the corrections and validity of my / our tender; that the price quoted cover all the work / items specified in the tender documents and that the price(s) cover all my / our obligations under a resulting contract and that I / we accept that any mistake(s) regarding price and calculations will be at my / our risk.

I / We furthermore confirm that my / our offer remains binding upon me / us and open for acceptance by the Purchases / Employer during the validity period indicated and calculated from the closing date of the bid.

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			
WITNESS 1		WITNESS 2	
