



TENDER COVER PAGE

MBD 1

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF JOHANNESBURG WATER

BID NUMBER: JW14358

CLOSING DATE: 11 SEPTEMBER 2024

CLOSING TIME: 10:30 AM

DESCRIPTION: CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE

CIDB REQUIREMENTS: TENDERERS SHOULD HAVE A CONTRACTOR CIDB GRADING OF 8CE OR HIGHER

BRIEFING SESSION	COMPULSORY
BRIEFING DETAILS	DATE AND TIME: 15 AUGUST 2024 AT 11:00 AM VIRTUAL COMPULSORY PRESENTATION BRIEFING SESSION VENUE : MICROSOFT TEAMS LINK : https://events.teams.microsoft.com/event/b97ce2d2-8c1c-494c-96a6-2b80fbe1eea6@0824d779-ab6e-4b2f-b001-cf2995fc7db6 TENDERS RECEIVED FROM NON-ATTENDED BIDDERS OF A COMPULSORY BRIEFING SESSION WILL BE DISQUALIFIED
TENDER SUBMISSION DETAILS	BID DOCUMENTS MUST BE DEPOSITED IN THE TENDER BOX SITUATED AT GROUND FLOOR IN JOHANNESBURG WATER ADDRESS: TURBINE HALL, 65 NTEMI PILISO STREET, NEWTOWN, JOHANNESBURG, 2001 PLEASE ALLOW SUFFICIENT TIME TO ACCESS JOHANNESBURG WATER OFFICES IN TURBINE HALL AND DEPOSIT YOUR TENDER DOCUMENT IN THE JOHANNESBURG WATER TENDER BOX SITUATED AT RECEPTION BEFORE TENDER CLOSING TIME. TIMES: THE BUILDING WILL OPEN 7 DAYS A WEEK FROM 06:00 UNTIL 18:00

BIDDER INFORMATION				
NAME OF BIDDER				
POSTAL ADDRESS				
PHYSICAL ADDRESS				
TELEPHONE NUMBER				
CELLPHONE NUMBER				
E-MAIL ADDRESS				
VAT REGISTRATION NUMBER				
TAX COMPLIANCE STATUS	TCS PIN		MAAA No	
OTHER STATUS	COIDA Registration No		CIDB No	

EMPLOYER INFORMATION			
DEPARTMENT	PMU	DEPARTMENT	SCM
CONTACT PERSON	Sijabuliso Tshuma	CONTACT PERSON	GCINA NDELA
TELEPHONE NUMBER	011 688 1570	TELEPHONE NUMBER	011 688 1796
E-MAIL ADDRESS	sijabuliso.tshuma@jwater.co.za	E-MAIL ADDRESS	gcina.ndela@jwater.co.za



PART B TERMS AND CONDITIONS FOR BIDDING

1. BID SUBMISSION:

- 1.1. BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION.
- 1.2. **ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED–(NOT TO BE RE-TYPED) OR ONLINE**
- 1.3. THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2022, THE NEW ENGINEERING AND CONSTRUCTION CONTRACT (NEC 4) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.
- 1.4. TENDER DOCUMENTS RECEIVED AFTER THE CLOSING TIME AND DATE WILL NOT BE ACCEPTED UNDER ANY CIRCUMSTANCES.

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)?	☐ YES ☐ NO
3.2. DOES THE ENTITY HAVE A BRANCH IN THE RSA?	☐ YES ☐ NO
3.3. DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA?	☐ YES ☐ NO
3.4. DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?	☐ YES ☐ NO
3.5. IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION?	☐ YES ☐ 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.



TENDER COVER PAGE

NOTE: HARD COPY TENDER DOCUMENTS ARE AVAILABLE AT A COST OF R350.00 PER SET. DOCUMENTS DOWNLOADED FROM THE E-TENDER PORTAL IS AT NO COST BUT MUST COMPLY WITH SUBMISSION REQUIREMENTS.

WITHOUT LIMITATION, JOHANNESBURG WATER TAKES NO RESPONSIBILITY FOR ANY DELAYS IN ANY COURIER OR POSTAL SYSTEM OR ANY LOGISTICAL DELAYS WITHIN THE PREMISES OF JOHANNESBURG WATER. JOHANNESBURG WATER LIKEWISE TAKES NO RESPONSIBILITY FOR OFFERS DELIVERED TO A LOCATION OTHER THAN THE TENDER BOX AS PER THE TENDER SUBMISSION DETAILS STATED IN THE TENDER. PROOF OF POSTING OR OF COURIER DELIVERY WILL NOT BE TAKEN BY JOHANNESBURG WATER AS PROOF OF DELIVERY. TENDER SUBMISSION DOCUMENTS MUST BE IN THE BOX BEFORE TENDER CLOSURE.

The current Johannesburg Water Supply Chain policy is applicable which is available on the JW website www.johannesburgwater.co.za

THE TENDERER IS ENCOURAGED TO SIGN THE TENDER SUBMISSION REGISTER WHEN SUBMITTING THEIR TENDERS.

**PLEASE ENSURE YOU SUBMIT 1 x ORIGINAL TENDER HARD DOCUMENT
(1X Original Tender document and 1X Electronic copy in memory stick/USB).**

Any documents required that are not submitted in the tender box at the deadline will be considered late.

The tenderer accepts that Johannesburg Water will not take responsibility for the misplacement or premature opening of the tender if the outer package is not sealed and marked as stated.

NB: NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE.

NAME OF CONTACT PERSON:

SIGNATURE OF BIDDER:

CAPACITY UNDER WHICH THIS BID IS SIGNED:

DATE:



TENDER NOTICE AND INVITATION TO TENDER



1. TENDER NOTICE AND INVITATION TO TENDER

Johannesburg Water (SOC) Ltd invites the tenderer for the following:

CONTRACT NO. JW14358 Construction of Woodmead inlet bulk water pipeline

The tender document will be available in the form of a download from the Johannesburg Water website (www.johannesburgwater.co.za/supply_chain/tenders) starting from 05 AUGUST 2024.

The Employer is **Johannesburg Water (SOC) Ltd**

All tenders and supporting documents must be submitted in a sealed envelope and be placed in the Tender box on the ground floor of the Johannesburg Water by no later than 10:30 am on 11 SEPTEMBER 2024.

Address is as follows:

**TURBINE HALL,
65 NTEMI PILISO STREET,
NEWTOWN,
JOHANNESBURG,
2001**

Johannesburg Water (SOC) Ltd is not obliged to accept the lowest or any tender and reserves to appoint:

- a) in whole or in part.
- b) to more than one tenderer.
- c) to the highest points scoring bidder.
- d) to the lowest acceptable tender or highest acceptable tender in terms of the point scoring system.
- e) to a bidder not scoring the highest points (based on objective grounds in terms of section 2 (1) (f) of the PPPFA) (where applicable).
- f) not to consider any bid with justifiable reasons.

A valid and binding contract with the successful tender/s will be concluded once Johannesburg Water has awarded the contract. Johannesburg Water (SOC) Ltd will issue an appointment letter to the successful tenderer.



Contract: JW14358
CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE



Volume 1 Tender and Contract
Section T1 Tender and Contract

Johannesburg Water SOC Ltd



CONTRACT NO: JW14358

CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE

VOLUME 1 TENDER AND CONTRACT

Prepared by
PMU
PO Box 61542
Marshalltown
2107

V1.0
August 2023

Employer:		Contractor:	
Witness:		Witness:	



Contract No JW14358
CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE

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The Tenderer is to indicate in the “Submitted (Yes/No)” column in the below table that they have completed the required section of the tender document. Completion of this checklist will assist the Tenderer in ensuring that they have attended to all the required items for submission with this tender. Additionally, it is an absolute requirement that tenderers comply with National Treasury’s CSD registration as well as SARS tax compliance requirements for contract award – refer T2.2.2. The below will form part of the tender document, the tenderers are therefore encouraged to submit the returnable and or documentation with their tender offer to avoid elimination especially with regards to what is stated in the Required for Tender Evaluation column or not obtaining points for Specific Goals. Tenderers are encouraged to ensure that their Tax status remains Tax Compliant on CSD throughout the process to avoid delaying the process or being eliminated at award stage. For infrastructure related projects. Tenderer must have a CIDB Active Status at the requested CIDB requirement at evaluation stage to avoid disqualification.

All documentation listed in the Checklist below shall form part of the Contract.

Table 1

Ref	Description of Returnable/s or Documentation that will form Part of Contract and must therefore to be Completed and / or Submitted by the Tenderer	Required for Tender Evaluation	Required for Tender Award	Required After Tender Award	Submitted (Yes/No)
	Tender Cover:				
	Name of Tender	•			
	Contact Person	•			
	Telephone Number	•			
	Central Supplier Database Registration	•	•		
	CIDB Registration Number	•			
	COIDA Registration Number			•	
	Tax SARS PIN No.	•	•		
	MAAA No. for Tax Compliant Status		•		
	Mandatory Documents at Particular Stage:				
	CIDB grading of 8CE or higher. Active Status at the required CIDB grading or higher at the time of Evaluation.	•			
	Mandatory Tender Briefing Meeting	•			
	Complete and sign the Form of Offer	•			
	Administrative Documentation:				
	MBD 1 - Invitation to Bid - Completed and signed	•	•		
T2.2.4	MBD 4 - Declaration of interest - Completed and signed	•	•		
	MBD 5 - Declaration for procurement above R10 Million (all applicable taxes included) Completed and signed.	•	•		
	MBD 6.1 - Preference Points Schedule – Specific Goals and Price Points - Completed and signed.	•			
T2.1	Signed Certificate of Authority to Sign	•			

Employer:		Contractor:	
Witness:		Witness:	



**Contract No JW14358
CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE**

**Volume 1 Tender and Contract
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Ref	Description of Returnable/s or Documentation that will form Part of Contract and must therefore to be Completed and / or Submitted by the Tenderer	Required for Tender Evaluation	Required for Tender Award	Required After Tender Award	Submitted (Yes/No)
	Acknowledgement of Project Tender Drawings	•	•		
	Acknowledgement of SHE Specification & Annexures	•	•		
T2.2.4	MBD 8 - Bidder's past supply chain management practices – Completed and signed.	•	•		
T2.2.4	MBD 9 - Certificate of Independent Bid Determination – Completed and signed.	•	•		
	Municipal Rates and Taxes for the Company - Current municipal rates for the company not older than 90 days (if leasing/renting, submitted proof such as lease agreement where premises are rented), OR Confirmation that suitable arrangements are in place for arrear municipal obligations with your local municipality OR Current municipal rates which is not older than 90 days or valid lease agreement with affidavit from owner of property in cases stated in Proof of Good Standing with Regards to Municipal Accounts document in the Tender.	•	•		
	Municipal Rates and Taxes - Current municipal rates for the directors of the entity not older than 90 days (if leasing/renting, submitted proof such of lease agreement where premises are rented), OR Confirmation that suitable arrangements are in place for arrear municipal obligations with your local municipality OR Current municipal rates which is not older than 90 days or valid lease agreement with affidavit from owner of property in cases stated in Proof of Good Standing with Regards to Municipal Accounts document in the Tender.	•	•		
	3-year financial statements (audited where applicable)	•	•		
	Any qualifications. If "Yes", reference to such qualification/s must be indicated on a cover letter. Please be aware that	•			

Employer:		Contractor:	
Witness:		Witness:	



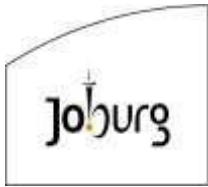
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Ref	Description of Returnable/s or Documentation that will form Part of Contract and must therefore to be Completed and / or Submitted by the Tenderer	Required for Tender Evaluation	Required for Tender Award	Required After Tender Award	Submitted (Yes/No)
	qualification on the tender document may result in your tender being eliminated as the qualification may impede on the ability to evaluate like with like.				
4.	Functionality Documentation:				
	Documentary Evidence Criteria 1 – (Contactable Reference Letters)	•			
	Documentary Evidence Criteria 2 – (Contactable Reference Letters)	•			
	Documentary Evidence Criteria 3 – (CV)	•			
	Documentary Evidence Criteria 4 – (CV)	•			
	Documentary Evidence Criteria 5 – CV)	•			
	Documentary Evidence Criteria 6 – ISO certification or Quality Control Plan for Company				
	Documentary Evidence Criteria 7 – (Page/pages of specific Method)	•			
5.	Specific Goals:				
	Business located within the boundaries of COJ Municipality	•			
	Business owned by 51% or more-Women	•			
	Business owned by black people - 51%or more	•			
6.	Scope of Work				
	Scope of Work and or Specifications	•			
	Alterations authenticated – Refer to Conditions of Tender	•			
8.	Terms and Conditions:				
	New Engineering Contract	•			
	Special Conditions	•			
	Tender Data	•			
9.	Other Documents				
	Form of Acceptance (Do not complete will only be completed after award)			•	
	Third Liability Insurance			•	
	Insurance of Works			•	
	Common Law Liability Insurance			•	
	Insurance of Construction Plant and Equipment			•	
	Valid Registration with Compensation for Occupation Injuries and Diseases Act			•	
	Performance Guarantee – where applicable for industrial related services			•	

Employer:		Contractor:	
Witness:		Witness:	



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Ref	Description of Returnable/s or Documentation that will form Part of Contract and must therefore to be Completed and / or Submitted by the Tenderer	Required for Tender Evaluation	Required for Tender Award	Required After Tender Award	Submitted (Yes/No)
	Bank Details Form			.	

Tenderers will be notified of any omitted, outstanding, missing and or incomplete administrative documents and will be offered a period of 3 days to complete or submit those pages i.e., Municipal Bidding Documents (MBD), authority to sign and other administrative documents that require completion and signatures. These exclude documentation on functionality, price, points for specific goals and MBD6.2 Local Production and Content.

Tenders that are received contrary to the above requirements will be disqualified after three (3) days period has lapsed.

If locality is a specific goal in MBD6.1 – the requested documentation may not be used to allocate points for specific goals.

Signature: _____ Date _____

Employer:		Contractor:	
Witness:		Witness:	



Johannesburg Water (SOC) Ltd



CONTRACT NO. JW14358

**CONSTRUCTION OF WOODMEAD INLET BULK
WATER PIPELINE**

VOLUME 1

TENDERING PROCEDURES

Employer:		Contractor:	
Witness:		Witness:	



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T1.1 TENDER DATA

T1.1.1 Conditions of Tender

The conditions of tender are the Standard Conditions of Tender as contained in Annex C of the CIDB Standard for Uniformity in Construction Procurement (August 2019). (See www.cidb.org.za).

The Standard Conditions of Tender make several references to the Tender Data for details that apply specifically to this tender. The Tender Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the Standard Conditions of Tender.

Each item of data given below is cross-referenced to the clause in the Standard Conditions of Tender to which it mainly applies.

T1.1.2 Tender Data

The clause numbers in the Tender Data refer to the corresponding clause numbers in the Conditions of Tender.

The additional Conditions of Tender are:

Clause number	Tender Data
C.1.1	The Employer is, Johannesburg Water (SOC) Limited
C.1.2	The tender documents issued by the Employer comprise: Volume 1A Tender Part 1: Tendering Procedures T1.1 Tender Notice and Invitation to Tender T1.2 Tender Data Tender Part 2: Returnable Documents T2.1 List of Returnable Documents T2.2 Returnable Schedules, including the Enterprise Declaration Affidavit which may be bound in a separate volume. Volume 1B Contract Part 1: Agreement and Contract Data C1.1 Form of Offer and Acceptance C1.2 Contract Data C1.3 Forms of Securities Contract Part 2: Pricing Data C2.1 Pricing Instructions C2.2 Bill of Quantities/Schedule of Rates Contract Part 3: Scope of Work C3.1 Scope of Work C3.2 Particular Specifications

Employer:		Contractor:	
Witness:		Witness:	



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Clause number	Tender Data
	Contract Part 4: Site Information C4 Site Information Volume 2 V2.1 Occupational Health, Safety and Environmental Specification and Environmental Management Plan V2.2 JW AC Mitigation and Cathodic Protection Specification V2.3 JW RPU Coating Solvent Free Lining Specification V2.4 Vegetation Management & Maintenance Procedure Volume 3 Tender Drawings Volume 4 V4.1 Factual Geotechnical Report V4.2 Traffic Management Plan V4.3 Traffic Impact Assessment V4.4 Pipeline GRP Scan Report V4.5 Report Eskom guideline on the electrical coordination of pipelines and power lines
C.1.4	The Employer's representative is: The Employer's representative is: Contact Person: Sijabuliso Tshuma Telephone: 011 688 1570 E-mail address: sijabuliso.tshuma@jwater.co.za The SCM representative is Contact Person: Gcina Ndela Telephone: 011 688 1796 E-mail address: nthabiseng.more@jwater.co.za

Employer:		Contractor:	
Witness:		Witness:	



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Clause number	Tender Data
C.2.1	Eligibility criteria and requirements CIDB registration and grading: 1) Only tenderers who are registered with the CIDB and were capable of being so prior to the evaluation of submissions, in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered for an 8CE class of construction work, are eligible to submit tenders. Tenders must have an Active status at the required CIDB grading at time of tender evaluation for the bidder to meet the eligibility criteria and requirement. 2) Joint ventures are eligible to submit tenders provided that: i) Every member of the joint venture is registered with the CIDB; and ii) The combined contractor grading designation calculated in accordance with the CIDB Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for an 8CE class of construction work. Failure to meet to Eligibility criteria and requirements will result in disqualification.
C.2.7	Tenderers should forward their contact details to the contact persons as stated on the Tender Cover Page and Invitation to Tender so that they will be sent any communication pertaining to this tender.
C.2.8	Replace the contents of the clause with the following: “Request clarification of the tender documents, if necessary, by notifying the Employer’s Officials indicated on the Tender Notice and Invitation to Tender in writing at least seven (7) working days before the closing time stated in the foregoing notice.
C.2.9	Add the following to the clause: “Accept that the submission of a Tender shall be construed as an acknowledgement by the Tenderer that they are satisfied with the insurance cover, the Employer will affect under the contract.”
C.2.10.5	Add the following to the clause: “If no offer is made for an item, a line must be drawn through the space in pen. All prices and details must be legible / readable to ensure the tender will be considered for adjudication.”

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Witness:		Witness:	



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Clause number	Tender Data
C.2.11	The evaluation on price alteration will be conducted as follows: Where the tender award strategy is to evaluate and award per item or category, the following must apply: • If there is an alteration in the rate but no alteration on the total for the item or category, the bidder will not be disqualified. • If there is an alteration on the total for the item/s without authentication, bidders will only be disqualified for alteration per item or category. Where the tender award strategy is to evaluate and award total bid offer, the following must apply: • If there is an alteration on the rate, total for the line item, sub-total/ sum brought/carried forward for the section but no alteration on the total bid offer, the bidder will not be disqualified. • If there is an alteration on the total bid offer on "Form of Offer" then the amount in words must be considered or vice-versa. • If there is an unauthenticated alteration on the total bid offer and the amount in words is not authenticated, the bidders will be disqualified for the entire tender. Where the tender pricing schedule or bill of quantities is requesting rates/price from bidder/s without providing a total, the following will apply: • (i) If there is an unauthenticated alteration on the unit rate/price the bidder must be disqualified. Please note: Corrections may not be made using correction fluid, correction tape or the like.
C.2.12.1	Replace Contents Alternative offers will not be permitted.
C.2.12.2	Failure to complete and sign the form of offer in full will result in the elimination of the tender.
C.2.13.3	Each tender offer shall be submitted as an original. Tenderers are also requested to submit a soft copy in a USB (Tenderers who do not submit a soft copy will not be disqualified)
C.2.13.5	The Employer's address for delivery of tender offers and identification details to be shown on the Tenderer's offer package are: Location of tender box: Ground Floor Entrance Physical address: Johannesburg Water (SOC) Ltd Turbine Hall 65 Ntomi Piliso Street Newtown Johannesburg 2001

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Witness:		Witness:	



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Clause number	Tender Data
	Identification details: Tender reference number, Title of Tender and the closing date and time of the tender, <i>as well as the Tenderer's name, their Authorised Representative's name, postal address and telephonic contact numbers.</i>
C.2.13.6 & C.3.5	A two-envelope procedure will not be followed.
C.2.15.1	The closing time for submission of tender offers is as stated in the Tender Notice and Invitation to Tender.
C.2.16	The tender offer validity period is 150 days.
C.2.16.1	Add the following to the clause: "If the tender validity expires on a Saturday, Sunday or public holiday, the Tender Offer shall remain valid and open for acceptance until the closure of business on the following working day."
C.2.19	The Tenderer must provide access during working hours to his premises for inspections on request.
C.2.23	The Tenderer is required to submit with his tender: 1) Valid SARS Compliance status Pin for Tenders issued by the South African Revenue Services. 2) Proof of CSD registration i.e. MA xxxxxxxx number 3) A Certificate of Contractor Registration issued by the CIDB. 4) Where the tendered amount inclusive of VAT exceeds R 10 million: i. Audited annual financial statement for 3 years, or for the period since establishment if established during the last 3 years, if required by law to prepare annual financial statements for auditing. ii. If the bidder is not required by law to prepare financial statements, then the bidder is required to submit their unaudited financial statements prepared by an independent accounting professional. 5) Proof that the Tenderer and directors of the Tenderer are not in arrears for more than 90 days with municipal rates and taxes and municipal service charges, the latest municipal account is to be attached, or a signed copy of the valid lease agreement if the Tenderer or director of the Tenderer is currently leasing premises and not responsible for paying municipal accounts. i. Should the municipal statement that was submitted with the tender document before tender closing date and time be in arrears for more than 90 days at time of award, the tenderer will be requested to submit the latest municipal statement which shows

Employer:		Contractor:	
Witness:		Witness:	



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	that the Tenderer is not in arrears for more than 90 days. If the statement at that time is in arrears for more than 90 days, the Tenderer must submit before the stipulated deadline, the written proof of an approved arrangement with the municipality. ii. The proof may be a copy of the agreement or an updated municipal statement which reflects the arrangement. iii. Should this tender be considered for award of the contract, based on proof of submission and should proof of such submission be found to be invalid, erroneous or inaccurate, the tenderer will no longer be considered for the award of the contract. iv. Statement must not be older than 90 days from the closing date of this tender. Attach latest municipal account statement behind this page. v. In cases where the director of the tenderer resides with their spouse, parent, partner or sibling the owner of the property that confirm where the director of the tenderer resides must submit an affidavit stating such and explaining the relationship. This would happen in the case where the submitted municipal statement or lease agreement is not in the name of the director of the tenderer. Point (i) will be applicable. vi. In cases where the business address of the tenderer is also the official residence of the director of the tenderer, the director of the tenderer must submit an affidavit stating such. Proof that the municipal statement is not in arrears for more than 90 days or a valid lease agreement must be submitted. Point (i) will be applicable. 6) Particulars of any contracts awarded to the tenderer 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. 7) A statement indicating whether any portion of the goods or services are expected to be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality or municipal entity is expected to be transferred out of the Republic. 8) 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.
C.2.24	Add the following new clause: Canvassing and obtaining of additional information by Tenderers Accept that: 1. No Tenderer shall make any attempt either directly or indirectly to canvass any of the Employers officials or the Employer's agent in respect of his tender, after the opening of the tenders but prior to the Employer arriving at a decision thereon. 2. No Tenderer shall make any attempt to obtain particulars of any relevant information, other than that disclosed at the opening of tenders.
C.2.25	Add the following new clause:

Employer:		Contractor:	
Witness:		Witness:	



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	Prohibitions on awards to persons in service of the state Accept that the Employer is prohibited to award a tender to a person - a) Who is in the service of the state; or b) If that person is not a natural person, of which any director, manager, principal shareholder or stakeholder is a person in the service of the state; or c) A person who is an advisor or consultant contracted with the municipality or municipal entity. “In the service of the state” means to be - i) a member of:- • any municipal council; • any provincial legislature; or • the National Assembly or the National Council of Provinces; • the board of directors of any municipal entity; ii) an official of any municipality or municipal entity; iii) an employee of any national or provincial department; iv) provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999); v) a member of the accounting authority of any national or provincial public entity; or vi) an employee of Parliament or a provincial legislature.” To give effect to the above, the questionnaire for the declaration of interests in the tender of persons in service of state in Section T2.1 must be completed.
C.2.26	Add the following new clause: Awards to close family members of persons in the service of the state “Accept that the notes to the Employer’s annual financial statements must disclose particulars of any award of more than R 2 000 to a person who is a spouse, child or parent of a person in the service of the state (defined in clause C.2.25), or has been in the service of the state in the previous twelve months, including: a) The name of that person; b) The capacity in which that person is in the service of the state; and c) The amount of the award. To give effect to the above, the questionnaire for the declaration of interests in the tender of persons in service of state in part T2 – Returnable Documents must be completed in full and signed.
C.2.27	Add the following new clause: Tax Compliance In the case of a Joint Venture/Consortium the tax Compliance status Pin must be submitted for each member of the Joint Venture/Consortium.”

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Witness:		Witness:	



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C.2.28	Add the following new clause: • Tenderers will be notified of any omitted, outstanding, missing and or incomplete administrative documents and will be offered a period of 3 days to complete or submit those pages i.e., Municipal Bidding Documents (MBD), authority to sign and other administrative documents that require completion and signatures. These exclude documentation on functionality, price, points for specific goals and MBD6.2 Local Production and Content. • Tenders that are received contrary to the above requirements will be disqualified after three (3) days period has lapsed. • In cases where locality is a specific goal and the Tenderer did not submit the required documentation, the Tenderer upon submitting the municipal statement, lease agreement or letter from ward councilor confirming business address as per above, may not be eligible for points under specific goals if such documentation was not submitted with the tender document.
C.3.2	Replace the contents of the clause with the following: 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 seven (7) 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 collected tender documents.
C.3.4.2	Tenders will be opened in public soon after closing time and recording of received documents but not later than 11:00 at the tender office located at Turbine Hall, 65 Ntemi Piliso, Newtown, 2001, Ground Floor. Tenderers' names and total prices, where practical will be, read out.

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Witness:		Witness:	



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Clause number	Tender Data
C 3.9	Replace Existing Clause Arithmetic Errors 3.9.1 Construction related tenders JW undertakes to check the highest scoring bid for arithmetical errors and correcting them as follows: 3.9.1.1 JW shall check for arithmetic errors using the following sequence: - Check the amount in words against the amount in figures on the Form of Offer, - Check the Form of Offer against the Summary Schedule Total, - Check the Section Sub-Totals per section against the Summary Total for summation errors, - Check the Section Sub-Totals in the Summary Schedule against Section Sub-Totals in the Bill of Quantities. - Check the Section Sub-Totals against the Item Totals for summation errors. - Check the Item Totals against the product of the Item Rate and the Quantity Provided. 3.9.1.2 If a bill of quantities or price schedule applies JW will request the bidder to correct the arithmetic errors as follows: - In respect of the Form of Offer, where there is a discrepancy between the amounts in figures and the amount in words, the amount in words shall govern. The bidder must be requested to adjust the amount in figures to correspond with the amount in words. 3.9.2 JW will notify the tenderer of all errors or omissions that are identified in the tender offer and either request the tenderer to confirm the offer as tendered or JW will accept the corrected total of prices. Where the tenderer elects to confirm the tender offer as tendered, correct the errors as follows: - 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. - 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 requested to revise selected item prices (and their rates if bills of quantities apply) to achieve the tendered total of the prices.

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Witness:		Witness:	



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	3.9.3 Clarification session(s) shall be held with Tenderer where there is pricing discrepancies, errors are highlighted and identified corrections are explained. 3.9.3.1 Tenderer is afforded an opportunity to provide clarification, accept or reject identified corrections in writing. i. In the event that the Tenderer accepts identified corrections, JW will proceed with evaluation. ii. In the event that the Tenderer rejects the identified correction(s), JW must review the Tenderer's motivation and risks associated with the proposed change. This is not an opportunity for Tenderers to change the bid offer. A bidder that does not agree to the above will be disqualified. 3.9.3.2 Risk related to the Arithmetic Corrections shall be assessed. Where risks are identified, tenderers shall provide JW with any other material or information that has a bearing on the tender offer, the tenderer's commercial position (including joint venture agreements), quotations preferencing arrangements or samples of materials considered necessary by JW for the purpose of a full and fair risk assessment. 3.9.3.3 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 JW request, or fails to attend any meeting in which it has been formally invited to clarify any issue, the tender offer will be regarded as non-responsive.
C.3.11	Replace Contents with Returnable Schedule MBD 6.1 for evaluation criteria

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Witness:		Witness:	



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Clause number	Tender Data		
C.1.1	<u>Mandatory Requirements</u>		
	NO.	DEFINITELY NON -NEGOTIABLE CRITERIA	YES
	Criteria 1	CIDB grading 8CE or higher or Proof of registration with CIDB – (state in the tender document that Active Registration status will be required at evaluation).	Active Status at the required CIDB grading or higher at the time of Evaluation
	Criteria 2	Mandatory Tender Briefing Meeting	Yes
	Criteria 3	Form of Offer Completed and Signed	Yes
Tenderers who FAIL to meet the mandatory criteria or requirements of tender will result in disqualification.			

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Witness:		Witness:	



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Clause number	Tender Data				
	<u>Administrative Requirements</u>				
	Description			Complied	
	Reference	Description	Requirement	Yes	No
	Certificate of Authority	Certificate of Authority or Board Resolution granting authority to sign.	Completed and signed certificate of authority to sign or signed board resolution		
	MBD 1	Invitation to Bid Form	Complete and submit complete and signed MBD 1 Form.		
	CSD	Central Supplier Database Registration	Provide proof of CSD registration.		
	MBD 4	Declaration of Interest	Complete and submit complete and signed MBD 4 Form.		
	MBD 5	Declaration of Procurement Above R10m (All Applicable Taxes Included)	Complete and submit signed MBD 5 Form.		
	T2.3.2	Acknowledgement of Project Tender Drawings	Complete and submit signed T2.3.2 Form.		
	T2.3.1	Acknowledgement of SHE Specification & Annexures	Complete and submit signed T2.3.1 Form.		
	MBD 6.1	Preference Points Claim in Terms of The Preferential Procurement Regulations 2022	Complete and submit complete and signed MBD 6.1 Form.		

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Witness:		Witness:	



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Clause number	Tender Data				
	MBD 8	Declaration of Bidder's Past Supply Chain Management Practices	Complete and submit complete and signed MBD 8 Form.		
	MBD 9.	Certificate of Independent Bid Determination	Complete and submit complete and signed MBD 9 Form.		
	Annexure – Proof of Specific Goals - Ref: 4.4	Valid BBBEE Certificate or certified copy thereof or a valid sworn affidavit	Submit applicable documentation with the tender submission		
	Annexure T2.2.4	Municipal statement of account for Director/s (not older than three (03) months from the closing date of tender or a valid lease agreement at time of tender closure).	Submit applicable documentation with the tender submission		
	Annexure T2.2.4	Municipal statement of account for Company (not older than three (03) months from the closing date of tender or a valid lease agreement at time of tender closure).	Submit applicable documentation with the tender submission		

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Witness:		Witness:	



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Clause number	Tender Data						
	Functionality Requirements						
	CRITERIA NO #	CRITERIA	EVIDENCE	SUB-CRITERIA/CLAUSE		MAX SCORE	SCORE
1.		Tenderer's (Company) experience in field welded steel pipelines projects Tenderer has completed field welded steel pipeline projects with a minimum diameter of 600 mm inclusive of cathodic protection, with valve chambers, and a minimum value of R25 million per project.	Tenderer to provide reference letters and completion certificates as per the format provided in section T2.1.7, on the Client's letterhead, with all the required information. Note: The attached contactable reference letter must be completed by the referee/previous client of the tenderer and included in the tender submission. Alternatively, the Clients letterhead may be used provided it complies with the functionality requirements. A separate form must be completed for each reference as a requirement in the evaluation criteria. The information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting in participating in any future government tenders.	NUMBER OF PROJECTS INVOLVING FIELD WELDED STEEL PIPELINE OF DIAMETER ≥ 600mm INCLUSIVE OF CATHODIC PROTECTION, VALVE CHAMBERS AND OF MINIMUM VALUE R25 MILLION PER PROJECT	0 Completed Projects	20	0
					1 - 2 Completed Projects		10
					3 - 4 completed projects		14
					More than 4 completed projects		20
		Employer:		Contractor:			
		Witness:		Witness:			



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Clause number	Tender Data						
	CRITERIA NO #	CRITERIA	EVIDENCE	SUB-CRITERIA/CLAUSE		MAX SCORE	SCORE
	2.	Tenderer's (Company) experience in pipe jacking of field welded steel pipelines.	Tenderer to provide reference letters and completion certificates as per the format provided in section T2.1.7, on the Client's letterhead, with all the required information. The letter to include the evidence described in the preceding paragraph. Note: The Tenderer contactable reference letter must be completed by the referee/previous client of the tenderer and included in the tender submission. Alternatively, the Clients letterhead may be used provided it complies with the functionality requirements. A separate form must be completed for each reference as a requirement in the evaluation criteria. The information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting in participating in any future government tenders.	NUMBER OF PROJECTS INVOLVING PIPE JACKING FOR A FIELD WELDED STEEL PIPELINE OF DIAMETER ≥ 600 mm AND OF MINIMUM PROJECT VALUE R25 MILLION	0 completed projects	10	0
		Tenderer has completed pipe jacking of a field welded steel pipeline project/s with a minimum diameter of 600 mm and of minimum project value of R25 million.			1 - 2 Completed Projects		7
		More than 2 completed projects			10		

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Witness:		Witness:	



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Clause number	Tender Data						
	CRITERIA NO #	CRITERIA	EVIDENCE	SUB-CRITERIA/CLAUSE		MAX SCORE	SCORE
	3.	Contract Manager's experience Contract Manager's experience as a Contract Manager involving field welded steel pipeline of diameter greater or equal to 600mm and of minimum value R25 million per project Only Contracts Managers with minimum qualifications of Bachelors Degree (B-Tech/ B Eng/ BSc Civil Eng/ Quantity Surveying/ Construction Management) and Professional Registration, (Pr. Eng. / Pr Tech Eng./ Pr QS / PrCPM / PrCM)) will be considered for evaluation.	Tenderer to provide CV of Contract Manager in the format provided on T.2.1.9 Note: Tenderers are required to make use of CV template provided on T2.1.9 however, Tenderers may provide their own CVs but information provided should contain information required for functionality. Note: Certified Copies of qualifications and valid registrations are to accompany the CVs.	NUMBER OF PROJECTS INVOLVING FIELD WELDED STEEL PIPELINE OF DIAMETER GREATER OR EQUAL TO 600mm COMPLETED IN THE CAPACITY OF CONTRACT MANAGER AND OF MINIMUM VALUE R25 MILLION PER PROJECT	0 completed projects 1 - 2 completed projects More than 2 completed projects	20	0 14 20

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Witness:		Witness:	



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Clause number	Tender Data						
	CRITERIA NO #	CRITERIA	EVIDENCE	SUB-CRITERIA/CLAUSE		MAX SCORE	SCORE
	4.	Site Manager/Agent experience Site Manager/Agent's experience as a Site Manager/Agent involving field welded steel pipeline projects of diameter greater or equal to 600 mm inclusive of cathodic protection, with valve chambers, and a minimum value of R25 million per project. Only Site Managers/Agents with minimum qualifications of BTech in Civil Engineering will be considered for evaluation. AND Registered as a Candidate Engineering Technologist/Candidate Construction Project Manager/Candidate Construction Manager or Higher	Tenderer to provide CV of Site Agent in the format provided on T.2.1.9 Note: Tenderers are required to make use of CV template provided on T2.1.9 however, Tenderers may provide their own CVs but information provided should contain information required for functionality. Note: Certified Copies of qualifications and valid registrations are to accompany the CVs.	NUMBER OF PROJECTS INVOLVING FIELD WELDED STEEL PIPELINE OF DIAMETER GREATER OR EQUAL TO 600mm INCLUSIVE OF CATHODIC PROTECTION COMPLETED IN THE CAPACITY OF SITE MANAGER/AGENT AND OF MINIMUM VALUE R25 MILLION PER PROJECT	0 completed projects	20	0
					1 completed projects		10
					2 - 3 completed projects		14
					More than 3 completed projects		20

Employer:		Contractor:	
Witness:		Witness:	



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Clause number	Tender Data						
	CRITERIA NO #	CRITERIA	EVIDENCE	SUB-CRITERIA/CLAUSE		MAX SCORE	SCORE
	5.	Safety Officer's experience	Tenderer to provide CV of Safety Officer in the format provided on T.2.1.9 Note: Tenderers are required to make use of CV template provided on T2.1.9 however, Tenderers may provide their own CVs but information provided should contain information required for functionality. Note: Certified Copies of qualifications and valid registrations are to accompany the CVs	NUMBER OF CIVIL/STRUCTURAL ENGINEERING PROJECTS COMPLETED AS SAFETY OFFICER WITH A MINIMUM VALUE OF R25 MILLION PER PROJECT IN THE CAPACITY OF SAFETY OFFICER	0 completed projects	10	0
		Safety Officer's experience as a Safety Officer involving civil/structural engineering projects with minimum value R25 million per project			1-2 completed projects		5
		Only Safety Officers with minimum qualifications of			3-4 completed projects		7
		SAMTRAC/ SHEOMTRAC/ SHEMTRAC/ MESHTRAC / NEBOSH / Safety Officers Course and other courses at NQF Level 5			More than 4 completed projects		10
		AND					
		Registration with SACPCMP will be considered for evaluation.					

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Witness:		Witness:	



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Clause number	Tender Data						
	CRITERIA NO #	CRITERIA	EVIDENCE	SUB-CRITERIA/CLAUSE		MAX SCORE	SCORE
	6.	Tenderer to provide evidence of Company's approved Quality Control Plan Standard Procedures	Tenderer to provide their company's Quality Control Plan Standard Procedures approved by the company's relevant designated person OR ISO 9001 certification	COMPANY'S APPROVED (BY INTERNAL RESPONSIBLE PERSON) QUALITY CONTROL PLAN STANDARD PROCEDURES	No submission of approved (by Internal responsible person) Quality Control Plan Standard Procedures or ISO 9001 certification	10	0
				OR	Company has approved (by Internal responsible person) Quality Control Plan Standard Procedures		7
				ISO CERTIFICATION 9001	Company has ISO 9001 certification		10

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Witness:		Witness:	



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Clause number	Tender Data						
	CRITERIA NO #	CRITERIA	EVIDENCE	SUB-CRITERIA/CLAUSE		MAX SCORE	SCORE
	7.	With respect to Criteria 2 Tenderer's to provide evidence of approved Method Statement of pipe jacking for a field welded steel pipeline of diameter greater or equal to 600 mm	Tenderer to provide approved Method Statement of pipe jacking for a field welded steel pipeline of diameter greater or equal to 600 mm signed off by the respective Engineer OR Employer's Representative	APPROVED METHOD STATEMENT OF PIPE JACKING FOR A FIELD WELDED STEEL PIPELINE OF DIAMETER GREATER OR EQUAL TO 600 MM SIGNED OFF BY THE RESPECTIVE ENGINEER OR EMPLOYER'S REPRESENTATIVE	No approved Method Statement submitted	10	0
					Only 1 Approved/Signed off (by Engineer) Method Statement submitted		7
					More than 1 Approved/Signed off (by Engineer) Method Statement submitted		10
					MINIMUM QUALIFYING SCORE	70%	
					TOTAL	100%	

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Witness:		Witness:	



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Clause number	Tender Data
	NOTE 1: Foreign qualifications MUST be accompanied by a SAQA verification certificate. Failure to submit SAQA verification certificate will lead to that qualification not being considered for allocation of points for that criterion. NOTE 2: For Professional registrations, JW will verify the validity of the registration on the issuing bodies or institution's website. If the verification is confirmed, the bidder meets the criteria. This will only be applicable for the recommended bidder. NOTE 3: The time of registration of Contract Manager, Site Manager and Safety Officer will not impact post qualification number of projects. NOTE 4: The information provided by bidders will be verified and if found to be false, punitive measures will be affected. ECSA: Engineering Council of South Africa SACPCMP: South African Council for the Project and Construction Management Professions SAMTRAC: Safety Management Training Course NEBOSH: National Examination Board in Occupational Safety and Health SHEOMTRAC: Safety Health Environmental Occupational Management Training Course SHEMTRAC: Safety Health Environmental Management Training Course MESHTRAC: Management Environmental Safety Health Training Course

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Clause Number	Tender Data												
	4. STAGE FOR PRICE AND PREFERENCE POINTS EVALUATION: 4.1. Pricing The following aspects will be considered in the financial offer: - Costing for all items as described in the Pricing Schedule and applicable Strategies Review of financial offer and discrepancies between total and calculations. - Identify any parameters that may have a bearing on the financial offer, e.g., contract period, price escalations or adjustments required and life cycle costs. - The 90/10 preference point system will be applicable in this tender. Whereby 90 points will be allocated to price and 10 points will be allocated to the set specific goals per category as outlined on the pricing schedule. The bidder scoring the highest in terms of price and specific goal will be recommended for that specific category. 4.2. Award and Allocation Strategy: <table border="1"> <tr> <td>AWARD STRATEGY</td><td>The tender will be awarded to the highest scoring bidder in terms of price and specific goals</td></tr> <tr> <td>ALLOCATION STRATEGY</td><td>The tender will be allocated to the highest scoring bidder in terms of price and specific goals</td></tr> </table> 4.3. The maximum preference points for this bid are allocated as follows: <table border="1"> <tr> <th></th><th>POINTS</th></tr> <tr> <td>PRICE</td><td>90</td></tr> <tr> <td>SPECIFIC GOALS</td><td>10</td></tr> <tr> <td>Total points for Price and SPECIFIC GOALS</td><td>100</td></tr> </table> SPECIFIC GOALS	AWARD STRATEGY	The tender will be awarded to the highest scoring bidder in terms of price and specific goals	ALLOCATION STRATEGY	The tender will be allocated to the highest scoring bidder in terms of price and specific goals		POINTS	PRICE	90	SPECIFIC GOALS	10	Total points for Price and SPECIFIC GOALS	100
AWARD STRATEGY	The tender will be awarded to the highest scoring bidder in terms of price and specific goals												
ALLOCATION STRATEGY	The tender will be allocated to the highest scoring bidder in terms of price and specific goals												
	POINTS												
PRICE	90												
SPECIFIC GOALS	10												
Total points for Price and SPECIFIC GOALS	100												

Employer:		Contractor:	
Witness:		Witness:	



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Clause Number	Tender Data
	In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations 2022, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1 below as may be supported by proof/ documentation stated in the conditions of this tender. Specific goals may include contracting with persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of race, gender or disability. Race: I. Ownership by black people II. Black Designated Group: - Ownership by black people that are unemployed - Ownership by black people who are youth - Ownership by black people living in rural or underdeveloped areas or townships - Ownership by black people with disabilities - Ownership by black people who are military veterans - Cooperative owned by black people Gender: III. Persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of gender are women. Ownership by persons that are classified as female or women according to the Department of Home Affairs of South African. Disability: IV. Persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of disability are disabled persons. Reconstruction and Development Programme (RDP) objectives as published in Government Gazette No. 16085 dated 23 November 1994 i.e., Local Manufacture: I. Promotion of procurement of locally manufactured goods in South Africa to promote job creation in light of the high unemployment rate in South Africa which has a greater impact previously disadvantaged individuals and black youth. Locality:

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Witness:		Witness:	



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Clause Number	Tender Data
	I. Promotion of procurement from local business in the geographical areas that JW operate in. This is also directed at creating employment in the areas JW operate in. The BSC may allocate points as follows: • Promotion of enterprises located in the Gauteng Province • Promotion of enterprises located in a specific region within COJ (the 7 regions. A to G) • Promotion of enterprises located in the City of Johannesburg municipality • Promotion of enterprises located rural or underdeveloped areas or townships. QSE I. Promotion of procurement from QSE's that are black owned. EME: I. Promotion of procurement from EME's that are black own. SUB-CONTRACTING: Promotion of a company previously owned by a Historically Disadvantaged Individuals (HDI). Consider sub-contract only in cases where there are no company which can meet any of the specific goals. Check if the portion of the work cannot be subcontracted in terms of specific goals. One goal may be chosen, or a combination of goals may be decided upon including a sub-goal i.e., owned by black people that are disabled etc., JOINT VENTURE, CONSORTIUM OR EQUIVALENT: For Joint Venture Agreements, Consortiums or equivalent, the agreement must show percentages of ownership and work to be completed by each party. This agreement must form part of the tender submission. To determine the Joint Venture, Consortium or equivalent score for specific goals, JW will look at the consolidated BBBEE certificate to determine the points for specific goals that will be awarded to the tenderer. If a consolidated BBBEE certificate is not submitted, the parties to the joint venture, consortium or equivalent must submit their individual BBBEE certificates issued by a SANAS accredited verification agency or the documents listed below on 4.6 and the joint venture, consortium or equivalent agreement in order for JW to determine the proportional points for specific goals. Documentation to be provided: • JV, Consortium, or equivalent agreement • Consolidated BBBEE certificate issued by an SANAS accredited verification agency. Certificate must be valid Table 1:

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Witness:		Witness:	



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Clause Number	Tender Data		
	The specific goals allocated points in terms of this tender	Number of points allocated (90/10 system)	Number of points claimed (90/10 system) (To be completed by the tenderer)
	Businesses located within the boundaries of COJ municipality.	4	
	Business owned by 51% or more-Women.	3	
	Business owned by black people - 51%or more	3	
	Total	10	
4.4. The following verification documents must be submitted with the tender document:			
SPECIFIC GOALS – ANY ONE OR A COMBINATION OF ANY		MEANS OF VERIFICATION THAT MAY BE SELECTED OR A COMBINATION THEREOF	
Business owned by 51% or more-Women		Valid BBBEE Certificate issued by SANAS accredited verification agency or DTI/CIPC BBBEE Certificate for Exempted Micro Enterprises or Affidavit sworn under oath, OR CIPC registration document showing percentage of ownership and share certificate.	

Employer:		Contractor:	
Witness:		Witness:	



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Clause Number	Tender Data																															
	Businesses located within the boundaries of COJ municipality	Proof of municipal account / valid lease agreement, letter from the Ward Council confirming the business address.																														
	Business owned by black people -51% or more	Valid BBBEE Certificate issued by SANAS accredited verification agency or DTI/CIPC BBBEE Certificate for Exempted Micro Enterprises or Affidavit sworn under oath, OR CIPC registration document showing percentage of ownership and share certificate.																														
Note: The joint venture, consortium, or equivalent agreement in order for JW to determine the proportional points for specific goals Example, If there are two parties in a Joint Venture with a 50:50 ownership of the Joint Venture and one party is located within the boundaries of COJ and one is located in Tshwane, if one of the goals is locality and has total points of 4, the JV will only be entitled the proportional points of 2. 4.5. The following are the requirements for the Sworn Affidavit in terms of the BBBEE Sector Codes of Good Practice: <table border="1"> <thead> <tr> <th>Affidavit Prescribed Formats</th><th>Category</th><th>Financial Threshold</th></tr> </thead> <tbody> <tr> <td colspan="3">Generic Enterprises</td></tr> <tr> <td></td><td>BO QSE</td><td>Between R10m and R50m</td></tr> <tr> <td></td><td>BO EME</td><td>Less than R10m</td></tr> <tr> <td colspan="3">Sector Specific Enterprises</td></tr> <tr> <td></td><td>BO QSE</td><td>Between R10m and R50m</td></tr> <tr> <td></td><td>BO EME</td><td>Less than R10m</td></tr> <tr> <td colspan="3">Construction Sector Code</td></tr> <tr> <td></td><td>EME Contractor</td><td>Less than R3m</td></tr> <tr> <td></td><td>BO EME BEP</td><td>Less than R1.8m</td></tr> </tbody> </table>			Affidavit Prescribed Formats	Category	Financial Threshold	Generic Enterprises				BO QSE	Between R10m and R50m		BO EME	Less than R10m	Sector Specific Enterprises				BO QSE	Between R10m and R50m		BO EME	Less than R10m	Construction Sector Code				EME Contractor	Less than R3m		BO EME BEP	Less than R1.8m
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Employer:		Contractor:	
Witness:		Witness:	



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Clause Number	Tender Data	
	Financial Sector Code	
		BO QSE Between R10m and R50m
		BO EME Less than R10m
	Information Communication Technology Sector Code (ICT)	
		BO QSE Between R10m and R50m
		BO EME Less than R10m
	Marketing, Advertising & Communication Sector Code (MAC)	
	> Public Relations	BO QSE Between R5m and R10m
	> Marketing, Advertising & Communications	BO EME Less than R5m
	Property Sector Code	
	> Service-based	BO QSE Between R5m and R10m
		EME Less than R5m
	> Agency-based	BO QSE Between R2.5m and R35m
	> Asset-based	EME Less than R2.5m
		BO QSE Between R80m and R400m
	Tourism Sector Code	
		BO QSE Between R5m and R45m
		BO EME Less than R5m
	Specialised Enterprises	
		BO QSE Between R10m and R50m
		BO EME Less than R10m
	4.6. Requirements for a valid BBBEE Certificate a) Copy of a certified valid BBBEE certificate (Only Valid BBBEE certificate must be accredited by SANAS) or valid Sworn Affidavit issued by the DTIC or the CIPC or in a similar format complying with commissioner of oath Act. b) Bidders who do NOT qualify as EME's and QSE's as outlined in 4.5, must submit B-BBEE verification certificates that are issued by an Agency accredited by SANAS. c) Bidders who fail to submit a certified copy of their valid B-BBEE certificate or valid sworn affidavit or valid DTI / CIPC B-BBEE certificate will score zero points for specific goals.	

Employer:		Contractor:	
Witness:		Witness:	



Contract: JW14358
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Clause Number	Tender Data
	Valid Sworn Affidavits or certified copies of B-BBEE Certificate must comply with the requirements outlined in the Justices of the Peace and Commissioners of Oaths Act, no 16 of 1963 and its Regulations promulgated in Government Notice GNR 1258 of 21 July 1972 Justices of the Peace and Commissioners of Oaths Act, No. 16 of 1963. i.e. (i) The deponent shall sign the declaration in the presence of the commissioner of oaths (COA). (ii) Below the deponent's signature the COA shall certify that the deponent has acknowledged that he knows and understands the contents of the declaration and the COA shall state the manner, place, and date of taking the declaration. (iii) The COA shall sign the declaration and print his full name and business address below his signature; and state his designation and the area for which he holds his appointment, or the office held by him if he holds his appointment ex officio. (iv) Copy of certified copies will not be accepted. N.B. A tenderer failing to submit proof of specific goals claimed as per 4.4 will not be disqualified but will be allocated zero points for specific goals and will be allocated points for pricing. ADJUDICATION USING A POINT SYSTEM (a) The bidder obtaining the highest number of total points will be awarded the contract. (b) Preference points shall be calculated after prices have been brought to a comparative basis taking into account all factors of non-firm prices and all unconditional discounts;. (c) Points scored must be rounded off to the nearest 2 decimal places. (d) In the event that two or more bids have scored equal total points, the successful bid must be the one scoring the highest number of points for specific goals. (e) However, when functionality is part of the evaluation process and two or more bids have scored equal points including equal preference points for specific goals, the successful bid must be the one scoring the highest score for functionality. (f) Should two or more bids be equal in all respects, the award shall be decided by the drawing of lots. POINTS AWARDED FOR PRICE THE 90/10 PREFERENCE POINT SYSTEMS A maximum of 90 points is allocated for price on the following basis: 90/10 $P_s = 90 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right)$ Where

Employer:		Contractor:	
Witness:		Witness:	



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Clause Number	Tender Data
	Ps = Points scored for comparative price of bid under consideration Pt = Comparative price of bid under consideration Pmin = Comparative price of lowest acceptable bid
	Add to the existing clause: Tender offers will only be accepted if: a) the tenderer submits a valid SARS tax Compliance status Pin for tenders issued by the South African Revenue Services or has made arrangements to meet outstanding tax obligations; b) Proof of CSD registration ie MA xxxxx number; c) the tenderer submits a letter of intent from an approved insurer undertaking to provide the Performance Guarantee to the format included in Part T2.2.22 of this procurement document d) the tenderer is registered with the Construction Industry Development Board in an appropriate contractor grading designation; e) the tenderer or any of its directors/shareholders is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector; f) the tenderer has not: i) abused the Employer's Supply Chain Management System; or ii) failed to perform on any previous contract and has been given a written notice to this effect; g) the tenderer has completed the Compulsory Enterprise Questionnaire and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interests of the Employer or potentially compromise the tender process and persons in the employ of the state are permitted to submit tenders or participate in the contract; h) the tenderer is registered and in good standing with the compensation fund or with a licensed compensation insurer; i) the Employer is reasonably satisfied that the tenderer has in terms of the Construction Regulations, 2014, issued in terms of the Occupational Health and Safety Act, 1993, the necessary competencies and resources to carry out the work safely; and j) the tenderer: i) has sufficiently substantiated his experience in this type work; ii) has the required and experienced key personnel; and iii) Owns the primary equipment to effectively and efficiently execute the work.
C.3.17	The number of paper copies of the signed contract to be provided by the Employer is one.
	There are no additional conditions of tender.

--- END OF PART ---

Employer:		Contractor:	
Witness:		Witness:	



Johannesburg Water (SOC) Ltd



CONTRACT NO. JW14358

**CONSTRUCTION OF WOODMEAD INLET BULK
WATER PIPELINE**

VOLUME 1

**RETURNABLE DOCUMENTS
AND
SCHEDULES**



CIDB Advert.msg

Employer:		Contractor:	
Witness:		Witness:	



T2.1 LIST OF RETURNABLE DOCUMENTS

The tenderer must complete the following returnable documents:

<u>Document</u>	<u>Page</u>
1. Returnable Schedules required for tender evaluation purposes	
T2.1.1 Record of addenda to tender documents	RD.5
T2.1.2 Certificate of Authority	RD. 6
T2.1.3 Compulsory Enterprise Questionnaire	RD.11
T2.1.4 Preferential Procurement	RD 13
MBD 6.1 Preference points claim form in terms of the preferential procurement regulations	RD.13
MBD 4 Declaration of any potential conflict of interest	RD.20
MBD 8 Declaration of bidder's past Supply Chain manage- ment practices	RD.22
MBD 5 Declaration for Procurement above R10 Million (VAT Included)	RD.24
MBD 9 Certificate of independent bid determination	RD.27
T2.1.5 Proposed qualifications	RD.29
T2.1.6 Schedule of the Tenderer's experience	RD.30
T2.1.7 Contactable reference template	RD.31
T2.1.8 Schedule of key personnel	RD.37
T2.1.9 Curriculum vitae of key personnel	RD.38

T2.2 LIST OF RETURNABLE DOCUMENTS

<u>Document</u>	<u>Page</u>
2. Other documents required only for tender evaluation purposes	
T2.2.1 Certificate of Contractor Registration issued by the Construction In- dustry Development Board	
T2.2.2 SARS Tax Compliance Status Pin and	RD.36
Proof of CSD registration i.e. MA xxxxxxxxxxxx number	RD.37

Employer:		Contractor:	
Witness:		Witness:	



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T2.3 LIST OF RETURNABLE SCHEDULES

<u>Document</u>	<u>Page</u>
4. Other documents that will be incorporated into the contract	
T2.3.1 Returnable Annexure A – SHE Acknowledgment Form	RD.38
T2.3.2 Returnable Annexure B: Acknowledgement of Tender Drawings	RD.44

NOTE: The Tenderer is required to complete each and every schedule listed above to the best of his ability as the evaluation of tenders and the eventual contract will be based on the information provided by the tenderer.

Employer:		Contractor:	
Witness:		Witness:	



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T2.1 LIST OF RETURNABLE DOCUMENTS

<u>Document</u>	<u>Page</u>
1. Returnable Schedules required only for tender evaluation purposes	
T2.1.1 Record of addenda to tender documents	RD.5
T2.1.2 Certificate of authority	RD.6
T2.1.3 Compulsory Enterprise Questionnaire	RD.11
T2.1.4 Preferential Procurement	RD.13
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T2.1.8 Schedule of key personnel	RD.37
T2.1.9 Curriculum vitae of key personnel	RD.38

Employer:		Contractor:	
Witness:		Witness:	



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T2.1.1 Record of Addenda to Tender Documents

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

	Date	Title or Details
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

Attach additional pages if more space is required.

Signed

Date

Name

Position

Tenderer

Employer:		Contractor:	
Witness:		Witness:	



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T2.1.2 Certificate of Authority

Indicate the status of the Tenderer by ticking the appropriate box hereunder. The Tenderer must complete the certificate set out below for the relevant category.

(I) COMPANY	(II) CLOSE CORPO- RATION	(III) PARTNERSHIP	(IV) JOINT VENTURE	(V) SOLE PROPRIE- TOR

i. Certificate For Company

I, ..., chairperson of the Board of Directors of, hereby confirm that by resolution of the Board (copy attached) taken on, Mr/Ms, acting in the capacity of, was authorized to sign all documents in connection with the tender for Contract No. JW14358 and any contract resulting from it on behalf of the company.

Chairman:

As Witnesses: 1.....

2.....

Date:

Employer:		Contractor:	
Witness:		Witness:	



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ii. Certificate For Close Corporation

We, the undersigned, being the key members in the business trading as
..... hereby authorize Mr/Ms, acting in the capacity of
....., to sign all documents in connection with the
tender and any contract resulting from it on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

Note : This certificate is to be completed and signed by all of the key members upon whom rests the direction of the affairs of the Close Corporation as a whole.

Employer:		Contractor:	
Witness:		Witness:	



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iii. Certificate For Partnership

We, the undersigned, being the key partners in the business trading as,

....., **hereby authorize Mr/Ms**,

acting in the capacity of..... , to sign all documents in connection

with the tender and any contract resulting from it on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

Note : This certificate is to be completed and signed by all of the key partners upon whom rests the direction of the affairs of the Partnership as a whole.

Employer:		Contractor:	
Witness:		Witness:	



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iv. Certificate For Joint Venture

This Returnable Schedule is to be completed by joint ventures.

We, the undersigned, are submitting this tender offer in Joint Venture and hereby authorise Mr/Ms..... , authorised signatory of the company , 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.

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

Note : This certificate is to be completed and signed by all of the key partners upon whom rests the direction of the affairs of the Joint Venture as a whole.

Employer:		Contractor:	
Witness:		Witness:	



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v. Certificate *For Sole Proprietor*

I, ..., hereby confirm that I am the sole owner of the Business
trading as

Signature of Sole owner:

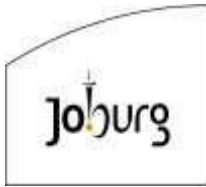
As Witnesses:

1.....

2.

Date:

Employer:		Contractor:	
Witness:		Witness:	



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T2.1.3 Compulsory Enterprise Questionnaire

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

Section 1: Name of enterprise:

Section 2: VAT registration number, if any:

Section 3: CIDB registration number, if any:

Section 4: Particulars of sole proprietors and partners in partnerships

Name*	Identity number*	Personal income tax number*

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

Section 5: Particulars of companies and close corporations

Company registration number

Close corporation number

Proof of CSD registration ie MA xxxxxxxxx number.

SARS Tax Compliance status Pin number

Section 6: Record in the service of the state

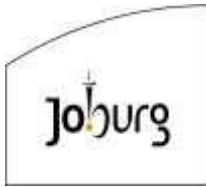
Indicate by marking the relevant boxes with a cross, if any sole proprietor, partner in a partnership or director, manager, principal shareholder or stakeholder in a company or close corporation is currently or has been within the last 12 months in the service of any of the following:

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

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

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

*insert separate page if necessary



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

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

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

Name of spouse, child or parent	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Cur- rent	Within last 12 months

*insert separate page if necessary

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

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

Signed _____

Date _____

Name _____

Position _____

Enterprise name _____



T2.1.4 Preferential Procurement

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

This preference form must form part of all tenders invited. It contains general information and serves as a claim form for preference points for specific goals.

NB: BEFORE COMPLETING THIS FORM, TENDERERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF THE TENDER AND PREFERENTIAL PROCUREMENT REGULATIONS, 2022

1. GENERAL CONDITIONS

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

- the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

1.2 The applicable preference point system for this tender is the 90/10 preference point system.

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

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

The maximum points for this tender are allocated as follows:

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

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

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

2. DEFINITIONS

- a) **“tender”** means a written offer in the form determined by an organ of state in



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

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1 POINTS AWARDED FOR PRICE

a) THE 90/10 PREFERENCE POINT SYSTEMS

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

90/10

$$Ps = 90 \left(1 - \frac{Pt - Pmin}{Pmin} \right)$$

Where

Ps = Points scored for price of tender under consideration

Pt = Price of tender under consideration

Pmin = Price of lowest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

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



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

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

The specific goals allocated points in terms of this tender	Number of points allocated (90/10 system)	Number of points claimed (90/10 system) (To be completed by the tenderer)
Businesses located within the boundaries of COJ municipality	4	
Business owned by black people -51%or more	3	
Business owned by 51% or more-Women	3	
Total	10	

5. DECLARATION WITH REGARD TO COMPANY/FIRM

5.1 Name of company/firm.....

5.2 Company registration number:

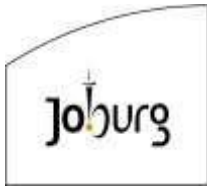
5.3 TYPE OF COMPANY/ FIRM

- ☐ Partnership/Joint Venture / Consortium
- ☐ One-person business/sole propriety
- ☐ Close corporation
- ☐ Public Company
- ☐ Personal Liability Company
- ☐ (Pty) Limited
- ☐ Non-Profit Company
- ☐ State Owned Company

[TICK APPLICABLE BOX]

5.4 I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/ firm for the preference(s) shown and I acknowledge that:

- i) The information furnished is true and correct;
- ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
- iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;



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- iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –
- (a) disqualify the person from the tendering process;
 - (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
 - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
 - (d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and
 - (e) forward the matter for criminal prosecution, if deemed necessary.

SIGNATURE(S) OF TENDERER

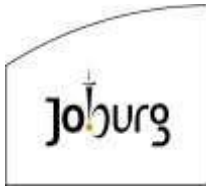
SURNAME AND NAME:

DATE:

ADDRESS:

.....

.....



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5.5 SUB-CONTRACTING

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

(Tick applicable box)

YES		NO	

5.5.2 If yes, indicate:

- i) What percentage of the contract will be subcontracted _____ (minimum of 11%)
 ii) The name of the sub-contractor(s):

- iii) The black shareholders of the sub-contractor(s):

- iv) Whether the sub-contractor(s) is an EME or QSE

(Tick applicable box)

YES		NO	

- v) Specify, by ticking the appropriate box, if subcontracting with an enterprise in terms of Preferential Procurement Regulations, 2022:

Designated Group: An EME or QSE which is at last 51% owned by:	EME √	QSE √
Black people		
Black people who are youth		
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		



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5.6 DECLARATION WITH REGARD TO COMPANY/FIRM

5.6.1 Name of company/firm:

5.6.2 VAT number registration number:

5.6.3 Company registration number:

5.7 TYPE OF COMPANY/ FIRM

- ☐ Partnership/Joint Venture / Consortium
 - ☐ One person business/sole propriety
 - ☐ Close corporation
 - ☐ Company
 - ☐ (Pty) Limited
- [TICK APPLICABLE BOX]'

5.8 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

.....
.....
.....
.....

5.9 COMPANY CLASSIFICATION

- ☐ Manufacturer
 - ☐ Supplier
 - ☐ Professional service provider
 - ☐ Other service providers, e.g. transporter, etc.
- [TICK APPLICABLE BOX]

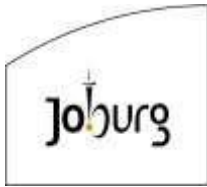
5.10 MUNICIPAL INFORMATION

Municipality where business is situated:
Registered Account Number:.....
Stand Number:

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

5.12 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 Specific Goals in MBD 6.1 qualifies the company/ firm for the preference(s) shown and I / we acknowledge that:

- v) The information furnished is true and correct;
- vi) In the event of a contract being awarded as a result of points claimed as shown in MBD 6.1, the contractor is required to furnish documentary proof as requested in the Tender Data to the satisfaction of the purchaser that the claims are correct;
- vii) If the specific goals points have been claimed or obtained on a fraudulent



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basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –

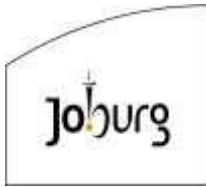
- (a) Disqualify the person from the bidding process;
- (b) Recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
- (c) Cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
- (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.

WITNESSES

- 1.
- 2.

.....
SIGNATURE(S) OF BIDDERS(S)

DATE:
ADDRESS
.....
.....



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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.
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, trustee, shareholder²):.....
- 3.4 Company Registration Number:
- 3.5 Tax Reference Number:.....
- 3.6 VAT Registration Number:
- 3.7 The names of all directors / trustees / shareholders members, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below.
- 3.8 Are you presently in the service of the state? **YES / NO**
 - 3.8.1 If yes, furnish particulars.

¹MSCM 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) a 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 Have you been in the service of the state for the past twelve months? YES / NO
 - 3.9.1 If yes, furnish particulars.....
- 3.10 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
 - 3.10.1 If yes, furnish particulars.....



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3.11 Are you, aware of any relationship (family, friend, other) between any other 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

3.11.1 If yes, furnish particulars.....
.....

3.12 Are any of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state? YES / NO

3.12.1 If yes, furnish particulars.....
.....

3.13 Are any spouse, child or parent of the company's directors trustees, managers, principle shareholders or stakeholders in service of the state? YES / NO

3.13.1 If yes, furnish particulars.....
.....

3.14 Do you or any of the directors, trustees, managers, principle 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

3.14.1 If yes, furnish particulars:.....
.....

4. Full details of directors / trustees / members / shareholders.

Full Name	Identity Number	State Employee Number

.....
Signature

.....
Date

.....
Capacity

.....
Name of Bidder



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MBD 8

DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

- 1 The bid of any bidder may be disregarded if that bidder, or any of its directors have-
 - a. abused the institution's supply chain management system;
 - b. committed fraud or any other improper conduct in relation to such system; or
 - c. failed to perform on any previous contract.

- 2 In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

Item	Question	Yes	No
4.1	Is the bidder or any of its directors listed on the National Treasury's database as companies or persons prohibited from doing business with the public sector? (Companies or persons who are listed on this database were informed in writing of this restriction by the National Treasury after the <i>audi alteram partem</i> rule was applied).	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)? 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.	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 outside of the Republic of South Africa) for fraud or corruption during the past five years?	Yes ☐	No ☐
4.3.1	If so, furnish particulars:		
4.4	Was any contract between the bidder and any organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes ☐	No ☐
4.4.1	If so, furnish particulars:		



CERTIFICATION

I, THE UNDERSIGNED (FULL NAME)

**CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION
FORM IS 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

.....

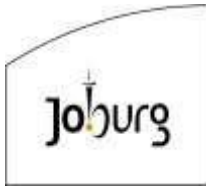
Date

.....

Position

.....

Name of Bidder



MBD 5

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** If the bidder is not required by law to prepare annual financial statements for auditing, they shall be required to furnish their Annual Financial Statements -
 - i. for the past three years , or
 - ii. since their establishment if established during the past three years
 - 2.1** 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**
 - 2.2** 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.
 - 2.3** 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.....
.....
...



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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

.....
Position

.....
Name of Bidder



MBD 9

CERTIFICATE OF INDEPENDENT BID DETERMINATION

1. This Municipal Bidding Document (MBD) must form part of all bids¹ 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)². Collusive bidding is a *pe 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:
 - a. take all reasonable steps to prevent such abuse;
 - b. 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
 - c. 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 (MBD9) must be completed and submitted with the bid:

¹ Includes price quotations, advertised competitive bids, limited bids and proposals.

² 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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MBD 9

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

(Bid Number and Description) in response to the invitation for the bid made by:

(Name of Municipality / Municipal Entity) do hereby make the following statements that I certify to be true and complete in every respect:

I certify, on behalf of

_____ that:
(Name of Bidder)

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 affiliated with the bidder, who:
 - (a) has been requested to submit a bid in response to this bid invitation;
 - (b) could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and
 - (c) 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 consortium³ 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:
 - (a) prices;

³ Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.



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-
- (b) geographical area where product or service will be rendered (market allocation)
(c) methods, factors or formulas used to calculate prices;
(d) the intention or decision to submit or not to submit, a bid;
(e) the submission of a bid which does not meet the specifications and conditions of the bid; or
(f) 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

.....
Date

.....
Position

.....
Name of Bidder



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T2.1.5 Proposed Amendments and Qualifications

The Tenderer should record any deviations or qualifications he may wish to make to the tender documents in this Returnable Schedule. Alternatively, a tenderer may state such qualifications in a covering letter to his tender and reference such letter in this schedule.

The Tenderer's attention is drawn to clause C.3.8 of the Standard Conditions of Tender referenced in the Tender Data regarding the employer's handling of material qualifications.

Page	Clause or item	Proposal

Signed..... Date

Name..... Position

Tenderer



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T2.1.6 Schedule of the Tenderer's Experience

EMPLOYER: CONTACT PERSON AND TELEPHONE NUMBER	EMPLOYER'S AGENT OR REPRESENTATIVE: CONTACT PERSON AND TELEPHONE NUMBER	NATURE OF WORK	VALUE OF WORK (inclusive of VAT)	DATE COMPLETED OR EXPECTED TO BE COMPLETED

Signed _____ Date _____

Name _____ Position _____

<i>Tenderer</i>	



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T 2.1.7 CONTACTABLE REFERENCE

To Johannesburg Water (SOC) Ltd

CRITERIA 1 – (Steel pipeline)

I, the undersigned being duly authorised to do so, hereby furnish a reference to Johannesburg Water relative to tender Contract No. **JW14358** for the **CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE**.

Name of Tenderer:

Description of Services provided including pipe material, jointing method, type of road crossing, size of pipe and ancillary works (AC mitigation)

.

.....
.....
.....

Project dates: from..... to.....

Contract value (incl VAT)

Name of authorized person:

Signature Date

Telephone/Mobile:

.....

Email:

Completed on behalf (Name of Client)

.....

NB: This document must be completed by the referee and included in the tender submission. Alternatively, the client's letterhead may be used for this purpose provided it complies with the functional criteria requirements. A separate form must be completed for each reference as required in the evaluation criteria. Information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting and restriction from participating in any future government tender.



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T 2.1.7 CONTACTABLE REFERENCE

To Johannesburg Water (SOC) Ltd

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Name of Tenderer:

Description of Services provided including pipe material, jointing method, type of road crossing, size of pipe and ancillary works (AC mitigation)

.

.....
.....
.....

Project dates: from..... to.....

Contract value (incl VAT)

Name of authorized person:

Signature Date

Telephone/Mobile:

.....

Email:

Completed on behalf (Name of Client)

.....

NB: This document must be completed by the referee and included in the tender submission. Alternatively, the client's letterhead may be used for this purpose provided it complies with the functional criteria requirements. A separate form must be completed for each reference as required in the evaluation criteria. Information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting and restriction from participating in any future government tender.



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.....
.....
.....
.....

Project dates: from..... to.....

Contract value (incl VAT)

Name of authorized person:

Signature Date

Telephone/Mobile:

.....

Email:

Completed on behalf (Name of Client)

.....

NB: This document must be completed by the referee and included in the tender submission. Alternatively, the client's letterhead may be used for this purpose provided it complies with the functional criteria requirements. A separate form must be completed for each reference as required in the evaluation criteria. Information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting and restriction from participating in any future government tender.



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To Johannesburg Water (SOC) Ltd

CRITERIA 1 – (Steel pipeline)

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Name of Tenderer:

Description of Services provided including pipe material, jointing method, type of road crossing, size of pipe and ancillary works (AC mitigation)

.

.....
.....
.....

Project dates: from..... to.....

Contract value (incl VAT)

Name of authorized person:

Signature Date

Telephone/Mobile:

.....

Email:

Completed on behalf (Name of Client)

.....

NB: This document must be completed by the referee and included in the tender submission. Alternatively, the client's letterhead may be used for this purpose provided it complies with the functional criteria requirements. A separate form must be completed for each reference as required in the evaluation criteria. Information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting and restriction from participating in any future government tender.



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To Johannesburg Water (SOC) Ltd

CRITERIA 2 – (Steel pipeline)

I, the undersigned being duly authorised to do so, hereby furnish a reference to Johannesburg Water relative to tender Contract No. **JW14358** for the **CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE**.

Name of Tenderer:

Description of Services provided including pipe material, jointing method, type of road crossing, size of pipe and ancillary works (AC mitigation)

.

.....
.....
.....

Project dates: from..... to.....

Contract value (incl VAT)

Name of authorized person:

Signature Date

Telephone/Mobile:

.....

Email:

Completed on behalf (Name of Client)

.....

NB: This document must be completed by the referee and included in the tender submission. Alternatively, the client's letterhead may be used for this purpose provided it complies with the functional criteria requirements. A separate form must be completed for each reference as required in the evaluation criteria. Information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting and restriction from participating in any future government tender.



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To Johannesburg Water (SOC) Ltd

CRITERIA 2 – (Steel pipeline)

I, the undersigned being duly authorised to do so, hereby furnish a reference to Johannesburg Water relative to tender Contract No. **JW14358** for the **CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE**.

Name of Tenderer:

Description of Services provided including pipe material, jointing method, type of road crossing, size of pipe and ancillary works (AC mitigation)

.

.....
.....
.....

Project dates: from..... to.....

Contract value (incl VAT)

Name of authorized person:

Signature Date

Telephone/Mobile:

.....

Email:

Completed on behalf (Name of Client)

.....

NB: This document must be completed by the referee and included in the tender submission. Alternatively, the client's letterhead may be used for this purpose provided it complies with the functional criteria requirements. A separate form must be completed for each reference as required in the evaluation criteria. Information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting and restriction from participating in any future government tenders



Schedule of Key Personnel

In terms of the Project Specification and the Conditions of Tender, unskilled workers may only be brought in from outside the local community if such personnel are not available locally.

The Tenderer shall list below the personnel which they intend to utilize on the Works, including key personnel which may have to be brought in from outside if not available locally.

CATEGORY OF EMPLOYEE	NUMBER OF PERSONS					
	KEY PERSONNEL, PART OF THE TENDERER'S ORGANISATION		KEY PERSONNEL TO BE IMPORTED IF NOT AVAILABLE LOCALLY		UNSKILLED PERSONNEL TO BE RE- CRUITED FROM LOCAL COMMUNITY	
	HDI	NON-HDI	HDI	NON-HDI	HDI	NON-HDI
Site Agent, Contracts Manager						
Foremen, Quality Control and Safety Personnel						
Technicians, Surveyors, etc.						
Artisans and other Skilled workers						
Plant Operators						
Unskilled Workers						
Others:						

SIGNATURE:.....

DATE:

(of person authorized to sign on behalf of the Tenderer)

T2.1.9 Curriculum Vitae of Key Personnel

Provide separate forms for each position listed in Key Personnel Forms:

Proposed role in the project	

1. Surname	
2. First Name	
3. Date and place of birth	
4. Nationality	
5. Membership of Professional Bodies and Professional Registration	

6. Education

Institution (Date from – Date to)	Degree(s) or Diploma(s) obtained

7. Post Graduate / Diploma Experience

Company / Organisation	(Date from – Date to)	Years of Employment	Position

8. Key Experience Relevant to Project

[illegible]



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Project Name and Locality	
Project Dates and Value	
Project Position (e.g. Project Manager, Engineer, etc.)	
Description of Scope and Duties	

Project Name and Locality	
Project Dates and Value	
Project Position (e.g. Project Manager, Engineer, etc.)	
Description of Scope and duties	

Project Name and Locality	
Project Position (e.g. Project Manager, Engineer, etc.)	
Description of Scope and duties	

Project Name and Locality	
Project Dates and Value	
Project Position (e.g. Project Manager, Engineer, etc.)	
Description of Scope and duties	

Project Name and Locality	
Project Dates and Value	
Project Position (e.g. Project Manager, Engineer, etc.)	



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Description of Scope and duties	

I,....., hereby declare that I am aware of the inclusion of my Curriculum Vita in the proposed project team and make myself available for this project.

Signature :

Date :



T2.2.1 Contractor's Certificate of Registration With CIDB

NB: The Tenderer shall attach hereto the Contractor's Certificate of Registration with CIDB OR provide the CIDB registration number that JW can use to verify CIDB requirements for this tender. Failure to submit the certificate or CIDB registration number with the tender document will lead to the conclusion that the Tenderer is not registered with the CIDB and therefore not eligible to tender.

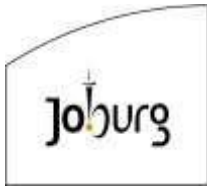
Tenderers who have made application to CIDB for registration and are capable of being so registered prior to the evaluation of submissions must attach a notification from CIDB that their application is being considered.

CIDB status to be active at the required CIDB grading at time of evaluation to avoid disqualification.

SIGNATURE:
.....

DATE:

(of person authorized to sign on behalf of the Tenderer)



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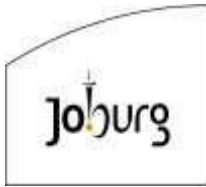
T2.2.2 SARS Tax Compliance Status Pin and Proof of CSD registration

The Tenderer must attach hereto a copy SARS Tax Compliance Status Pin and Proof of CSD registration i.e. MA xxxxxxxxxxx number.

SIGNATURE:
.....

DATE:

(of person authorized to sign on behalf of the Tenderer)



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T2.3.1 Returnable Annexure A: Acknowledgement of SHE Specification & Annexures

DECLARATION BY CONTRACTOR

I, the undersigned, and representing the tenderer as indicated hereby acknowledge that I have obtained copies of the following listed documentation and confirm that I fully understand the contents thereof and confirm compliance thereto in the event of being successful:

- OHS Specification (Volume 2)
- Annexure 1: Baseline Risk Assessment
- Annexure 2: Medical Screening Policy
- Annexure 3: Sign off form
- Annexure 4: Environmental Management Plan

We furthermore commit to:

- Comply with all applicable SHE related legal and other requirements.
- Inform all staff of their role in managing environmental impacts and safety hazards on site.

Signed at on this Day of 20.....

Name of tenderer	
Name of Authorized person	
Authorized Signature*	



Contract JW14358
CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE
Volume 1 Tender and Contract
Section T2 Returnable Documents



T2.3.2 JW 6.5 Returnable Annexure B: Acknowledgement of Tender Drawings

DECLARATION BY CONTRACTOR

I, the undersigned, and representing the tenderer as indicated hereby acknowledge that I have obtained copies of the following listed documentation and confirm that I fully understand the contents thereof and confirm compliance thereto in the event of being successful:

The drawings that are issued for **TENDER PURPOSES** are those noted below:

DRAWING NUMBER	DESCRIPTION	REV
	GENERAL	
JW14358-16941-T-001-S01-00-TMS	COVER PAGE	D
JW14358-16941-T-002-S01-00-TMS	LIST OF DRAWINGS	B
JW14358-16941-T-003-S01-00-TMS	PROCESS FLOW DIAGRAM	C
JW14358-16941-T-004-S01-00-TMS	GENERAL NOTES	B
	LAYOUT AND LONG SECTIONS	
JW14358-16941-T-010-S01-00-TMS	LAYOUT PLAN	B
JW14358-16941-T-011-S01 -00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND SETTING OUT SHEET 1 OF 6	B
JW14358-16941-T-011-S02-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND SETTING OUT SHEET 2 OF 6	B
JW14358-16941-T-011-S03-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND SETTING OUT SHEET 3 OF 6	B
JW14358-16941-T-011-S04-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND SETTING OUT SHEET 4 OF 6	B
JW14358-16941-T-011-S05-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND SETTING OUT SHEET 5 OF 6	B
JW14358-16941-T-011-S06-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND SETTING OUT SHEET 6 OF 6	B
JW14358-16941-T-011-S07-00-TMS	DN 600 BYPASS PIPELINE LAYOUT AND SETTING OUT	B



Contract JW14358
CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE
Volume 1 Tender and Contract
Section T2 Returnable Documents



DRAWING NUMBER	DESCRIPTION	REV
JW14358-16941-T-011-S08-00-TMS	DN 200 PIPELINE LAYOUT AND SETTING OUT	B
JW14358-16941-T-011-S09-00-TMS	DN 800 PIPELINE LAYOUT AND SETTING OUT	B
JW14358-16941-T-012-S01-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND LONGSECTION SHEET 1 OF 10	C
JW14358-16941-T-012-S02-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND LONGSECTION SHEET 2 OF 10	C
JW14358-16941-T-012-S03-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND LONGSECTION SHEET 3 OF 10	C
JW14358-16941-T-012-S04-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND LONGSECTION SHEET 4 OF 10	C
JW14358-16941-T-012-S05-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND LONGSECTION SHEET 5 OF 10	C
JW14358-16941-T-012-S06-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND LONGSECTION SHEET 6 OF 10	C
JW14358-16941-T-012-S07-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND LONGSECTION SHEET 7 OF 10	C
JW14358-16941-T-012-S08-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND LONGSECTION SHEET 8 OF 10	C
JW14358-16941-T-012-S09-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND LONGSECTION SHEET 9 OF 10	C
JW14358-16941-T-012-S10-00-TMS	DN 600 STEEL MAIN PIPELINE LAYOUT AND LONGSECTION SHEET 10 OF 10	C
JW14358-16941-T-012-S11-00-TMS	DN 600 BYPASS PIPELINE LAYOUT AND LONGSECTION SHEET 1 OF 1	D
JW14358-16941-T-012-S12-00-TMS	DN 200 PIPELINE LAYOUT AND LONGSECTION SHEET 1 OF 2	D
JW14358-16941-T-012-S13-00-TMS	DN 200 PIPELINE LAYOUT AND LONGSECTION SHEET 2 OF 2	D
JW14358-16941-T-012-S14-00-TMS	DN 800 PIPELINE LAYOUT AND LONGSECTION SHEET 1 OF 1	C
	CHAMBER DETAILS	
JW14358-16941-T-013-S03-00-TMS	DN 600 AIR VALVE CHAMBER TYPE 1 SHEET 1 OF 2	D



Contract JW14358
CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE
Volume 1 Tender and Contract
Section T2 Returnable Documents



DRAWING NUMBER	DESCRIPTION	REV
JW14358-16941-T-013-S04-00-TMS	DN 600 AIR VALVE CHAMBER TYPE 1 SHEET 2 OF 2	D
JW14358-16941-T-013-S05-00-TMS	DN 200 AIR VALVE CHAMBER TYPE 2 SHEET 1 OF 2	D
JW14358-16941-T-013-S06-00-TMS	DN 200 AIR VALVE CHAMBER TYPE 2 SHEET 2 OF 2	D
JW14358-16941-T-013-S07-00-TMS	DN 600 AIR VALVE CHAMBER TYPE 2 SHEET 1 OF 2	C
JW14358-16941-T-013-S08-00-TMS	DN 600 AIR VALVE CHAMBER TYPE 2 SHEET 2 OF 2	C
JW14358-16941-T-013-S09-00-TMS	DN 600 AIR VALVE CHAMBER TYPE 3 SHEET 1 OF 2	C
JW14358-16941-T-013-S10-00-TMS	DN 600 AIR VALVE CHAMBER TYPE 3 SHEET 2 OF 2	C
JW14358-16941-T-013-S11-00-TMS	DN 200 SCOUR VALVE CHAMBER TYPE 1 SHEET 1 OF 1	B
JW14358-16941-T-013-S12-00-TMS	DN 600 AIR VALVE CHAMBER TYPE 4 SHEET 1 OF 2	A
JW14358-16941-T-013-S13-00-TMS	DN 600 AIR VALVE CHAMBER TYPE 4 SHEET 2 OF 2	A
JW14358-16941-T-013-S14-00-TMS	DN 600 SCOUR VALVE CHAMBER 1 SHEET 1 OF 2	B
JW14358-16941-T-013-S15-00-TMS	DN 600 SCOUR VALVE CHAMBER 1 SHEET 2 OF 2	B
JW14358-16941-T-013-S16-00-TMS	DN 600 SCOUR VALVE CHAMBER 2 SHEET 1 OF 1	B
JW14358-16941-T-013-S17-00-TMS	DN 200 NON-RETURN VALVE CHAMBER 1 SHEET 1 OF 2	B
JW14358-16941-T-013-S18-00-TMS	DN 200 NON-RETURN VALVE CHAMBER 1 SHEET 2 OF 2	B
JW14358-16941-T-013-S20-00-TMS	DN 600 PRESSURE REDUCING VALVE CHAMBER 1 SHEET 1 OF 2	D
JW14358-16941-T-013-S21-00-TMS	DN 600 PRESSURE REDUCING VALVE CHAMBER 1 SHEET 2 OF 2	D
JW14358-16941-T-013-S23-00-TMS	DN 200 FLOW METER AND SCOUR VALVE CHAMBER SHEET 1 OF 2	C



Contract JW14358
CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE
Volume 1 Tender and Contract
Section T2 Returnable Documents



DRAWING NUMBER	DESCRIPTION	REV
JW14358-16941-T-013-S24-00-TMS	DN 200 FLOW METER AND SCOUR VALVE CHAMBER SHEET 2 OF 2	C
JW14358-16941-T-013-S26-00-TMS	DN 600 TIE-IN CHAMBER 2 SHEET 1 OF 2	B
JW14358-16941-T-013-S27-00-TMS	DN 600 TIE-IN CHAMBER 2 SHEET 2 OF 2	B
JW14358-16941-T-013-S30-00-TMS	DN 800 TO DN 525 TIE-IN CHAMBER SHEET 1 OF 2	C
JW14358-16941-T-013-S31-00-TMS	DN 800 TO DN 525 TIE-IN CHAMBER SHEET 2 OF 2	C
JW14358-16941-T-013-S32-00-TMS	DN 600 TO DN 1500 TIE-IN CHAMBER SHEET 1 OF 2	C
JW14358-16941-T-013-S33-00-TMS	DN 600 TO DN 1500 TIE-IN CHAMBER SHEET 2 OF 2	C
JW14358-16941-T-013-S35-00-TMS	DN 400 TIE-IN CHAMBER SHEET 1 OF 2	A
JW14358-16941-T-013-S36-00-TMS	DN 400 TIE-IN CHAMBER SHEET 2 OF 2	A
JW14358-16941-T-013-S38-00-TMS	WELLING CHAMBER TYPE 1 – SHEET 1 OF 1	A
JW14358-16941-T-013-S39-00-TMS	WELLING CHAMBER TYPE 2 – SHEET 1 OF 1	A
JW14358-16941-T-013-S41-00-TMS	DN 350 PIPELINE TEMPORARY ISOLATING VALVE BOX DETAIL	B
JW14358-16941-T-013-S42-00-TMS	DN 600 BYPASS PRESSURE REDUCING VALVE CHAMBER 2 SHEET 1 OF 2	D
JW14358-16941-T-013-S43-00-TMS	DN 600 BYPASS PRESSURE REDUCING VALVE CHAMBER SHEET 2 OF 2	D
JW14358-16941-T-013-S45-00-TMS	EXISTING BUTTERFLY VALVE CHAMBER 1 UPGRADE SHEET 1 OF 2	B
JW14358-16941-T-013-S46-00-TMS	EXISTING BUTTERFLY VALVE CHAMBER 1 UPGRADE SHEET 2 OF 2	B
JW14358-16941-T-013-S47-00-TMS	EXISTING BUTTERFLY VALVE CHAMBER 2 UPGRADE	A
JW14358-16941-T-013-S49-00-TMS	EXISTING DN 150 PRV CHAMBER UPGRADE SHEET 1 OF 2	B
JW14358-16941-T-013-S50-00-TMS	EXISTING DN 150 PRV CHAMBER UPGRADE SHEET 2 OF 2	B



Contract JW14358
CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE
Volume 1 Tender and Contract
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DRAWING NUMBER	DESCRIPTION	REV
JW14358-16941-T-013-S51-00-TMS	DN 1200 TO DN 800 TIE-IN CHAMBER SHEET 1 OF 2	C
JW14358-16941-T-013-S52-00-TMS	DN 1200 TO DN 80 TIE-IN CHAMBER SHEET 2 OF 2	C
JW14358-16941-T-013-S53-00-TMS	DN 800 ISOLATION, SCOUR AND FUTURE TIE-IN CHAMBER SHEET 1 OF 2	C
JW14358-16941-T-013-S54-00-TMS	DN 800 ISOLATION, SCOUR AND FUTURE TIE-IN CHAMBER SHEET 2 OF 2	C
	ROAD AND BRIDGE CROSSING DETAILS	
JW14358-16941-T-014-S09-00-TMS	DN 600 ABOVE GROUND CONCRETE PIPE TUNNEL	B
JW14358-16941-T-014-S10-00-TMS	M1 BRIDGE CROSSING DETAIL - SHEET 1 OF 2	B
JW14358-16941-T-014-S11-00-TMS	M1 BRIDGE CROSSING DETAIL - SHEET 2 OF 2	B
	SETTING OUT DETAILS	
JW14358-16941-T-016-S01-00-TMS	DN 600 STEEL MAIN PIPELINE CHAMBER SETTING OUT SHEET 1 OF 8	C
JW14358-16941-T-016-S02-00-TMS	DN 600 STEEL MAIN PIPELINE CHAMBER SETTING OUT SHEET 2 OF 8	C
JW14358-16941-T-016-S03-00-TMS	DN 600 STEEL MAIN PIPELINE CHAMBER SETTING OUT SHEET 3 OF 8	C
JW14358-16941-T-016-S04-00-TMS	DN 600 STEEL MAIN PIPELINE CHAMBER SETTING OUT SHEET 4 OF 8	C
JW14358-16941-T-016-S05-00-TMS	DN 600 STEEL MAIN PIPELINE CHAMBER SETTING OUT SHEET 5 OF 8	C
JW14358-16941-T-016-S06-00-TMS	DN 600 STEEL MAIN PIPELINE CHAMBER SETTING OUT SHEET 6 OF 8	C
JW14358-16941-T-016-S07-00-TMS	DN 600 STEEL MAIN PIPELINE CHAMBER SETTING OUT SHEET 7 OF 8	C
JW14358-16941-T-016-S08-00-TMS	DN 600 STEEL MAIN PIPELINE CHAMBER SETTING OUT SHEET 8 OF 8	C
JW14358-16941-T-016-S09-00-TMS	DN 600 BYPASS PIPELINE VALVE CHAMBER SETTING OUT SHEET 1 OF 1	D
JW14358-16941-T-016-S10-00-TMS	DN 200 PIPELINE CHAMBER SETTING OUT SHEET 1 OF 3	C



Contract JW14358
CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE
Volume 1 Tender and Contract
Section T2 Returnable Documents



DRAWING NUMBER	DESCRIPTION	REV
JW14358-16941-T-016-S11-00-TMS	DN 200 PIPELINE CHAMBER SETTING OUT SHEET 2 OF 3	C
JW14358-16941-T-016-S12-00-TMS	DN 200 PIPELINE CHAMBER SETTING OUT SHEET 3 OF 3	C
JW14358-16941-T-016-S13-00-TMS	DN 800 PIPELINE CHAMBER SETTING OUT SHEET 1 OF 2	B
JW14358-16941-T-016-S14-00-TMS	DN 800 PIPELINE CHAMBER SETTING OUT SHEET 2 OF 2	B
	STANDARD DETAILS	
JW14358-16941-T-017-S01-00-TMS	STANDARD DETAILS - CONSTRUCTION NAME BOARD SHEET 1 OF 2	A
JW14358-16941-T-017-S02-00-TMS	STANDARD DETAILS - CONSTRUCTION NAME BOARD SHEET 2 OF 2	A
JW14358-16941-T-017-S03-00-TMS	STANDARD DETAILS - THRUST BLOCK DETAIL	A
JW14358-16941-T-017-S05-00-TMS	STANDARD DETAILS - PIPE BEDDING DETAIL	A
JW14358-16941-T-017-S07-00-TMS	STANDARD DETAILS - SERVICE MARKERS	A
JW14358-16941-T-017-S09-00-TMS	STANDARD DETAILS - CHAMBER DETAILS	C
JW14358-16941-T-017-S10-00-TMS	STANDARD DETAILS - PIPE SUPPORT DETAILS	A
JW14358-16941-T-017-S15-00-TMS	STANDARD DETAILS - CONSTRUCTION LAYOUT AND DETAILS	A
	CATHODIC PROTECTION	
JW14358-16941-T-018-S02-00-TMS	CATHODIC PROTECTION MONITORING STATION AND TRU/NDU ENCLOSURES	A
JW14358-16941-T-018-S03-00-TMS	CATHODIC PROTECTION GRADIENT CONTROL MAT FOR VALVE CHAMBERS	A
	EXISTING TREE SERVITUDE	
JW14358-16941-T-015-S01-00	DN 600 MAIN EXISTING TREES SERVITUDE SHEET 1 OF 2	A
JW14358-16941-T-015-S02-00	DN 600 MAIN EXISTING TREES SERVITUDE SHEET 2 OF 2	A
JW14358-16941-T-015-S03-00	DN 200 MAIN EXISTING TREES SERVITUDE SHEET 1 OF 1	A



Contract JW14358
CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE
Volume 1 Tender and Contract
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Signed at on this Day of 20.....

Name of tenderer	
Name of Authorized person	
Authorized Signature*	

Johannesburg Water SOC Ltd



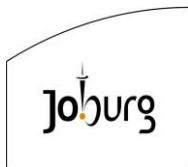
CONTRACT JW14358

CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE

VOLUME 1

PART 1: AGREEMENT AND CONTRACT DATA

Client:		Contractor:	
Witness:		Witness:	



NEC4 Engineering & Construction Contract (ECC4)

Between Johannesburg Water SOC Ltd

Reg No. 2000/029271/30 (the *Client*)

and _____

Reg No. _____ (the *Contractor*)

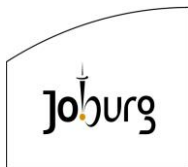
for Contract No. JW14358: CONSTRUCTION OF WOODMEAD
INLET BULK WATER PIPELINE (the *works*)

Contents:	Page No
Part 0 Agreements & Contract Data	C.1
C1.1.1 Form of offer	C.1
C1.1.2 Form of acceptance	C.2
C1.2 Contract data	C.5
C1.3 Forms of securities	C.25
C1.3.1 Form of Guarantee	
C1.3.2 Blasting Indemnity	
C1.3.3 Health and Safety Contract Between Client and Contractor In Terms of Section 37(2) Of The Occupational Health and Safety Act No 85 Of 1993	
C1.3.4 Health and Safety Contract General Information	
Part C2 Pricing Data	
C 2.1 Pricing Instructions	
C 2.2 Bill of quantities	
Part C3 Scope	
Part C4 Site Information	

Contract No: JW14358

Prepared By: Johannesburg Water SCO

Client:		Contractor:	
Witness:		Witness:	



FORM OF OFFER (ACCEPTANCE & AGREEMENT)

FORM OF OFFER

OFFER

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

Contract No. JW14358: CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE

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

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

Option B	The offered total of the Prices exclusive of VAT is	R
	Value Added Tax @ 15% is	R
	The offered total of the Prices inclusive of VAT is ¹	R
	(in words)	

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

Signature(s)

Name(s)

Capacity

**For the
tenderer:**

Name &
signature of
witness

(Insert name and address of organisation)

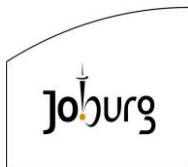
Date

(Insert name)

Date

(Insert signature)

Client:		Contractor:	
Witness:		Witness:	



FORM OF ACCEPTANCE

By signing this part of this Form of Offer and Acceptance, the Client identified below accepts the tenderer's Offer. In consideration thereof, the Client 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 Client and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

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

The terms of the contract, are contained in:

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

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

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

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

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

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

Signature(s)

Name(s)

Capacity

for the *Client*

(Insert name and address of organisation)

Date

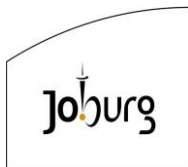
Name &
signature of
witness

(Insert name)

Date

(Insert signature)

Client:		Contractor:	
Witness:		Witness:	



Schedule of Deviations to be completed by the Client prior to contract award

Note:

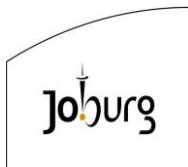
1. The extent of deviations from the tender documents issued by the Client prior to the tender closing date is limited to those permitted in terms of the Conditions of Tender.
2. A tenderer's covering letter must not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid be the subject of agreement reached during the process of Offer and Acceptance, *the outcome of such agreement shall be recorded here and the final draft of the contract documents shall be revised to incorporate the effect of it. Insert particulars in the schedule below.*
3. Any changes or additions to the tender documents arising from the above arrangements and recorded here shall also be incorporated into the final draft of the Contract.

No.	Subject	Details
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

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

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

Client:		Contractor:	
Witness:		Witness:	



For the Contractor (Tenderer)

For the Client (Client)

Signature(s)

.....

Name(s)

.....

Capacity

.....

On behalf of:

.....

.....
(Name and address of organisation)

.....
(Name and address of organisation)

Name and signature of
witness

.....
(Insert name)

.....
(Insert name)

.....
(Insert signature)

.....
(Insert signature)

Date

.....

Client:		Contractor:	
Witness:		Witness:	

CONTRACT DATA

Part 1: Data provided by the Client

The Contract Data (including variations and additions) shall amplify, modify, or supersede, the NEC4 June 2017 Option B: Priced Contract with Bill of Quantities to the extent specified below, and shall take precedence and shall govern.

Each item of data given below is cross-referenced to the clause in the NEC4 June 2017 Option B: Priced Contract with Bill of Quantities to which it mainly applies.

1 General

11.1 The *conditions of contract* are the core clauses and the clauses for the following main Option, the Option for resolving and avoiding disputes and secondary Options of the NEC4 Engineering and Construction Contract, June 2017 with amendments January 2019.

Main Option	B: Priced contract with bill of quantities
Option for resolving and avoiding disputes	W1: Dispute resolution procedure
Secondary Options	X1: Price adjustment for inflation X7: Delay damages X11: Termination by Client X13: Performance bond X16: Retention X18: Limitation of liability Z: Additional conditions of contract

11.2(15) The *works* are **CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE**

10.1 The *Client* is

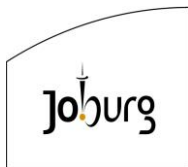
Name	Johannesburg Water (SOC) Limited represented by Mr. William Chitsa
Address for communications	Turbine Hall, Ntemi Piliso Street, Newtown, Johannesburg
Address for electronic communications	william.chitsa@jwater.co.za

10.1 The *Project Manager* is

Name	Nyeleti Consulting (Pty) Ltd represented by Mr. Abe Thela
Address for communications	PO Box 1965 Alberton 1450
Address for electronic communications	athela@nyeleti.co.za

10.1 The *Supervisor* is

Client:		Contractor:	
Witness:		Witness:	

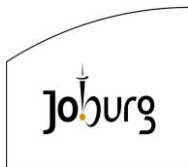


	Name	Nyeleti Consulting (Pty) Ltd represented by (TBA)	
	Address for communications	PO Box 1965 Alberton 1450	
	Address for electronic communications	TBA	
11.2(16)	The Scope is in	Part C3: Scope of work and all documents and drawings to which it refers	
11.2(18)	The Site Information is in	Part C4: Site Information and all documents and drawings to which it refers	
11.2(17)	The <i>boundaries of the site</i> are	as per Part C4 Site information	
13.1	The <i>language of this contract</i> is	English	
12.2	The <i>law of the contract</i> is the law of	the Republic of South Africa	
13.3	The <i>period for reply</i> is • The period for reply for • The <i>period for reply</i> for	14 Days	except that
		Payment certificates	is as per Clause 51.1
		Final assessment	is as per Clause 53.1
15.2	The following matters will be included in the Early Warning Register		
	• Unforeseen ground conditions / Geotechnical problems • Unknown existing services and / or underground structures		
15.2	Early warning meetings are to be held at intervals no longer than	2 weeks	

3 Time

31.2	The <i>starting date</i> is		TBA
30.1	The <i>access date</i> is:	When the following documentation required is in place but not later than 28 days after the contract date: • Approved Health and Safety Plan and File (Clause PS 7) • Approval of the Environmental File • First programme (Clause PS 5.1.3) • Traffic Control Plan (PS 4.2.2) • Construction Method Statement (PS 5.1.3) • Guarantee from Bank or Insurance Company • Insurance of Construction Machinery Plant • Insurance of Motor Vehicle Liability • COID Letter of Good Standing	

Client:		Contractor:	
Witness:		Witness:	



		- Signed Notification to the Department of Labour - Construction Permit where applicable - Subcontracting plan - Labour resource plan
32.2	The <i>Contractor</i> submits revised programmes at intervals no longer than	1 month
11.2(2) & 11.2(3)	The <i>completion date</i> for the whole of the <i>works</i> is	19 months after access date, excluding Saturdays, Sundays and South African public holidays, and the South African construction industry's annual shutdown.
35.1	Taking over the <i>works</i> before the Completion Date	The <i>Client</i> is willing to take over the <i>works</i> before the Completion Date.
31.1	The period after the Contract Date within which the <i>Contractor</i> is to submit a first programme for acceptance is	21 days

4 Quality management

40.2	The period after the Contract Date within which the <i>Contractor</i> is to submit a quality policy statement and quality plan is		21 days
43.1	The period between Completion of the whole of the <i>works</i> and the <i>defects date</i> is		52 weeks
44.2	The <i>defect correction period</i> is	21 days	except that
	The <i>defect correction period</i> for	Safety, Health & Environment related items is	48 hours

5 Payment

51.1	The <i>currency of the contract</i> is the	South African rand
50.1	The <i>assessment interval</i> is	Monthly and it ends and starts at 12h00 on the 20 th day of each successive month

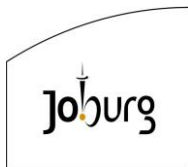
Delete this clause: The *Client* shall not pay interest.

The <i>interest rate</i> is	0	% per annum above the
prime lending rate of the <i>Contractor's</i>		Bank

51.2	The period within which payments are made is	On or before the last day of the month following the assessment date

6 Compensation events

Client:		Contractor:	
Witness:		Witness:	



60.1(13) The place where weather is to be recorded is **Contractor's site establishment area**

60.1(13) The *weather measurements* to be recorded for each calendar month are

- the cumulative rainfall (mm)
- the number of days with rainfall more than 10 mm

The *weather measurements* are supplied by

South African Weather Service 012 367 6000 or info4@weathersa.co.za

60.1(13) The *weather data* are the records of past *weather measurements* for each calendar month

which were recorded at

Johannesburg Botanical Gardens

and which are available from:

the South African Weather Bureau and included in Annexure A to this Contract Data provided by the *Client*. Also see Clause PS 5.9 of the Scope.

63.12 The value engineering percentage is 50%, unless another percentage is stated here, in which case it is

0 %

63.15 The *method of measurement* is

Defined cost plus fee

7 Title

There is no reference to Contract Data in this section of the core clauses and terms in italics used in this section are identified elsewhere in this Contract Data.

8 Liabilities and insurance

80.1 These are additional *Client's* liabilities

None

83.3 Insurance Table row 3 The minimum amount of cover for insurance against loss of or damage to property (except the *works*, Plant, Materials and Equipment) and liability for bodily injury to or death of a person (not an employee of the *Contractor*) arising from or in connection with the *Contractor* Providing the Works for any one event is:

R 10 million in respect of all claims arising from any one occurrence or series of occurrences consequent on or attributable to one source or original cause.

83.3 Insurance Table row 4 The minimum amount of cover for insurance against death of or bodily injury to employees of the *Contractor* arising out of and in the course of their employment in connection with the contract for any one event is:

Client:		Contractor:	
Witness:		Witness:	

as prescribed by the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993 and the *Contractor's* common law liability for people falling outside the scope of the Act with the limit of cover of not less than R10 million.

83.2

The *Contractor* provides these additional insurances:

1. Motor Vehicle Liability Insurance comprising (as a minimum) "Balance of Third Party" Risks including Passenger and Unauthorised Passenger Liability indemnity with a minimum indemnity limit of R 5 000 000.
2. Insurance of Construction Machinery Plant.

9 Termination

There is no reference to Contract Data in this section of the core clauses and terms in italics used in this section are identified elsewhere in this Contract Data.

Resolving and avoiding disputes

W1.4(1)	The <i>tribunal</i> is	Arbitration
W1.4(5)	The <i>arbitration procedure</i> is	the latest edition of Rules for the Conduct of Arbitrations published by The Association of Arbitrators (Southern Africa) or its successor body.
	The place where arbitration is to be held is	South Africa

The person or organisation who will choose an arbitrator if the Parties cannot agree a choice or if the *arbitration procedure* does not state who selects an arbitrator, is

the Chairman for the time being or his nominee of the Association of Arbitrators (Southern Africa) or its successor body.

W1.1(1) The *Senior Representatives* of the *Client* are

Name (1)	Mr Enoc Mudau
Address for communications	Turbine Hall, Ntemi Piliso Street, Newtown, Johannesburg
Address for electronic communications	enoc.mudau@jwater.co.za
Name (2)	Mr Joseph Mokoala
Address for communications	Turbine Hall, Ntemi Piliso Street, Newtown, Johannesburg
Address for electronic communications	joseph.mokoala@jwater.co.za
W1.2 The <i>Adjudicator</i> is (Name)	the person selected from the ICE-SA Division (or its successor body) of the South African Institution of Civil Engineering Panel of Adjudicators by the

Client:		Contractor:	
Witness:		Witness:	

Address for communications

Address for electronic communications

The *Adjudicator nominating body* is:

Party intending to refer a dispute to him.
(see www.ice-sa.org.za)

the Chairman of ICE-SA a joint Division of the South African Institution of Civil Engineering and the South African Institution of Civil Engineers. (See www.ice-sa.org.za) or its successor body.

X1: Price adjustment for inflation

X1.1(c)

The effect of changes in prices or law on the amounts due shall be adjusted on the following basis:

- No price adjustment over the first 12-month period of the Contract.
- On the 12-month anniversary date of the signing of the agreement the rates shall be adjusted by twelve-month year on year CPI index (as published in the monthly bulletin PO141.1 of statistics South Africa) ruling on the 12-month anniversary date of the signing of the Agreement and fixed at this value for the following 12-month period. Subsequent 12-month periods shall be dealt with on a similar basis.

The proportions used to calculate the Price Adjustment Factor are:

a = 0.35	linked to the index for	Lo - Labour
b = 0.25	linked to the index for	Po - Equipment
c = 0.30	linked to the index for	Mo - Materials
d = 0.1	linked to the index for	Fo - Fuel
x = 0.1	non-adjustable	"X" Fixed portion
Geographical area	Gauteng	
The <i>base date</i> for indices is	1 calendar month prior to the Tender closing date.	
These indices are	available from Statistics South Africa. https://www.statssa.gov.za/	

- 'L' is the 'Labour Index' and shall be the price index for 'Consumer Price Index' for the Gauteng Province as published in the Statistical News Release, P0141, Table A "Consumer Price Index: Main indices" of Statistics South Africa.
- 'P' is the 'Construction Equipment' and shall be the Producer Price Index applicable to Plant and Equipment (Total) as published in the Statistical Release P0151.1, Table 4 of Statistics South Africa.
- 'M' is the 'Materials Index' and shall be the Producer Price Index applicable to Civil Engineering Material (Total) as published in the Statistical Release P0151.1, Table 6 of Statistics South Africa.

Client:		Contractor:	
Witness:		Witness:	

(d) 'F' is the 'Fuel Index' and shall be the Producer Price Index for Final manufactured goods - Coal and Petroleum Products - Diesel as published in the Statistical News Release P0142.1, Table 1 of Statistics South Africa."

X7: Delay damages

X7.1	Delay damages for Completion of the whole of the <i>works</i> are	An amount equal to the daily rate for the Project Manager and Supervisor to provide additional contract administration and site supervision respectively, or R15 000 (Fifteen thousand Rand) per day, whichever is the greater.	per day

X13: Performance bond

X13.1	The amount of the performance bond is	10% of contract price (excl. VAT)

X16: Retention

X16.1	The <i>retention free amount</i> is	R0.00
X16.1	The <i>retention percentage</i> is	10% of the Contract Sum.

X16.3 Retention bond is **not allowed** by the Client.

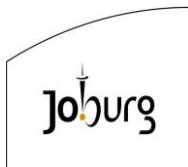
X18: Limitation of liability

X18.2	The <i>Contractor's</i> liability to the <i>Client</i> for indirect or consequential loss is limited to:	Nil
X18.3	For any one event, the <i>Contractor's</i> liability to the <i>Client</i> for loss of or damage to the <i>Client's</i> property is limited to:	the Contract Sum
X18.4	The <i>Contractor's</i> liability for Defects due to his design which are not listed on the Defects Certificate is limited to	the Contract Sum
X18.5	The <i>Contractor's</i> total liability to the <i>Client</i> for all matters arising under or in connection with this contract, other than excluded matters, is limited to:	the Contract Sum
X18.6	The <i>end of liability date</i> is	5 years after Completion of the whole of the <i>works</i>

Z: Additional conditions of contract

The *additional conditions of contract* are:

Client:		Contractor:	
Witness:		Witness:	



Amendments to core clauses:

Z1 Identified and defined terms

Add core clause 11.2 (21)

Where reference is made to **Client** in the contract documents (Tender Procedures, Returnable Documents, Agreement and Contract Data, Pricing Data, Scope of Work, Site Information, and Drawings) it shall mean the same as **Client**.

Where reference is made to Engineer or Client's Agent in the contract documents (Tender Procedures, Returnable Documents, Agreement and Contract Data, Pricing Data, Scope of Work, Site Information, and Drawings) it shall mean the same as *Project Manager*.

Where reference is made to Engineer Representative in the contract documents (Tender Procedures, Returnable Documents, Agreement and Contract Data, Pricing Data, Scope of Work, Site Information, and Drawings) it shall mean the same as *Supervisor*.

Add core clause 11.2 (22)

A Week is

- 7 Calendar days

Z2 Corrupt Practices

Delete clause 18 and replace with:

Each Party warrants that it and its Affiliates and/or Subcontractor have not made, offered, or authorized and will not make, offer, or authorize with respect to the matters which are the subject of this Contract, any payment, gift, promise or other advantage, whether directly or through any other person or entity, to or for the use or benefit of any public official (i.e., any person holding a legislative, administrative or judicial office, including any person employed by or acting on behalf of a public agency, a public enterprise or a public international organization) or any political party or political party official or candidate for office, where such payment, gift, promise or advantage would violate

- a) the applicable laws of South Africa;
- b) the laws of the country of incorporation of such Party or such Party's ultimate parent company and of the principal place of business of such ultimate parent company; or

Each Party shall defend, indemnify and hold the other Party or Parties harmless by way of a continuing indemnity from and against any and all actions, applications, claims, damages, losses, penalties, costs and expenses arising from or related to, any breach by such first Party of such above mentioned warranty. Such indemnity obligation shall survive termination or expiration of this Agreement.

Each Party agrees to (i) maintain adequate internal controls; (ii) properly record and report all transactions; and (iii) comply with the laws applicable to it. Each Party must rely on the other Parties' system of internal controls, and on the adequacy of full disclosure of the facts, and of financial and other data regarding the operations undertaken under this contract. No Party is in any way authorized to take any action on behalf of another Party that would result in an inadequate or inaccurate recording and reporting of assets, liabilities, or any other transaction, or which would put such Party in violation of its obligations under the laws applicable to the operations under this contract.

No Party shall make any facilitation payments to government officials in the execution of its obligations under this contract. Breach of this clause by the

Client:		Contractor:	
Witness:		Witness:	

Contractor will entitle the *Client* to termination in terms of Section 9, clause 91.8 and recover from the *Contractor* the amount of any loss incurred as a result of such termination.

Z3 People

Add clause 24.3

In the event that the *Contractor* wishes to replace a *key person* as referred to in clause 24.1, the *Contractor* gives the *Client* four (4) weeks' notice of such proposed replacement, giving details of the name, relevant qualifications and experience of a person proposed as a replacement and any other details which are necessary to demonstrate that such replacement meet the minimum criteria will be considered for the position. The *Contractor* is not required to give the aforesaid notice in case the replacement was caused by circumstances outside its control, including but not limited to death, immediate dismissal or sudden resignation of a *key person*.

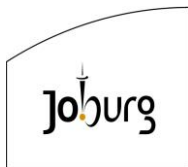
Key Person	Minimum Qualifications	Experience
Contract Manager's	Bachelors Degree (B-Tech/ B Eng/ BSc Civil Eng/ Quantity Surveying/ Construction Management) and Professional Registration, (Pr. Eng. / Pr Tech Eng./ Pr QS / PrCPM / PrCM)	Minimum 1 field welded steel pipeline project of a minimum 600 mm diameter with Cathodic Protection completed as Contracts Manager and of minimum project value R25 million
Site Agent's	BTech in Civil Engineering	Minimum 2 field welded steel pipeline projects of a minimum 600 mm diameter with Cathodic Protection completed in the capacity of site manager (agent) and of minimum project value R25 million
Safety Officer's	National Diploma (Safety /Environmental Management/Environmental Science) / SAMTRAC/ SHEOMTRAC/ SHEMTRAC/ MESHTRAC / NEBOSH / Safety Officers Course and Registration with SACPCMP	Minimum 3 civil/structural engineering projects completed as safety officer with a minimum project value of R25 million in the capacity of safety officer

Add the following clause 24.4

If the *Client* consents to the replacement of a *key person*, such replacement person commences the work of that *key person* in relation to the *works* at least two (2) weeks prior to the *key person* leaving in order to facilitate an appropriate handover of work. The *Contractor* shall be liable for the cost of such replacement *key person* during this two (2) week period.

Add the following clause 24.5

Client:		Contractor:	
Witness:		Witness:	



If the *Contractor* replaces a key person without complying with this clause and without the consent of the *Client*, the *Client* may withhold the sum of money applicable to that *key person* as set out in the Contract Data when assessing the amount due in accordance with clause 50, until the replacement person has completed the handover period described in clause 24.4. Interest shall not accrue on the sum of money withheld by the *Client*.

Z4 Payment

Add clause 51.6:

Payment advance for Plant and Materials on site is allowed for Plant and Materials not yet built into the Works. The amount payable is 80% of the value of Plant and Materials. Proof of ownership, surety and session of ownership documentation must be submitted to the *Client* prior to payment.

Z5 Correcting Defects

Add to clause 44.2:

Except that the *Client* may correct a Defect after takeover if there is a threat to safety which justifies immediate action to correct the Defect. The *Project Manager* assesses the cost incurred by the *Client* in correcting the Defect and the *Contractor* pays the amount assessed.

Z6 Notifying compensation events

Delete the last paragraph of Clause 61.3 and replace with:

If the *Contractor* does not notify a compensation event within four weeks of becoming aware that the event has happened, it is not entitled to a change in the Prices, the Completion Date, or a Key Date unless the event arises from *the Project Manager* or the *Supervisor* giving an instruction or notification, issuing a certificate, or changing an earlier decision.

Z7 Performance Bonds

Amendments to secondary option clauses:

The Performance Guarantee under X13 above shall be irrevocable, on-demand performance guarantee, to be issued exactly in the form of the Pro Forma documents provided for this purpose under C1.3 (Forms of Securities), in favour of the *Client* by a financial institution reasonably acceptable to the *Client*.

Client:		Contractor:	
Witness:		Witness:	

Additional clauses:

Z8 Penalties

1. Failure to report

- a) The *Client* shall levy a penalty on *Contractor*, should the latter fail to provide reporting as required in the Scope in clause PS 6.10 with regard to content and frequency, whilst as per the Pricing Data section no payment for work completed shall be processed.
- b) The penalty value shall be R15,000.00 per report per occasion; and
- c) If the *Contractor* fails to complete the latter more than three incidents and should the *Client* or his duly authorised representative find that the *Contractor* is hindering his (the *Client's*) deliverables to senior management, he shall reserve the right to:
 - i) perform the Works internally or through another *Contractor*; and
 - ii) deduct additional costs incurred by the *Client* from monies owed to the *Contractor*. Additional costs incurred by the *Client* shall include all claims from Contract affected parties, claims such as but not be limited to claims from customers, any costs associated with the loss of water, and all costs associated with the procurement of an alternative *Contractor*.
 - iii) terminate the Contract;

No liability in terms of this clause shall be attached to the *Contractor* if he can prove to the satisfaction of the *Client* that the nature of the failure is due to fire, war, riot, strikes, act of God, lockout, accident or other unforeseen occurrences or circumstances beyond the *Contractor's* control, provided, however, that in all cases the *Contractor* has notified the *Client* in writing within 24 hours of it first coming to his notice, that delivery shall be delayed or become impossible for the above-mentioned reasons.

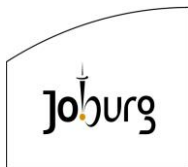
2. Failure to pay any labour or SMME

- a) The *Client* shall levy a penalty on *Contractor*, should the latter fail to provide payment to any labourer or SMME as required in the specification highlighted in the Scope and specified in the appointment agreements with the *Contractor* and the labourer or SMME.
- b) The penalty value shall be R 50,000.00 per incident per occasion; and
- c) If the *Contractor* fails to complete the aforementioned more than three incidents and should the *Client* or his duly authorised representative find that the *Contractor* is hindering his (the *Client's*) deliverables to JW Senior Management, he shall reserve the right to:
 - i) perform the Works internally or through another contractor; and
 - ii) deduct additional costs incurred by the *Client* from monies owed to the *Contractor*. Additional costs incurred by the *Client* shall include all claims from Contract affected parties, claims such as but not be limited to claims from customers, any costs associated with the loss of water, and all costs associated with the procurement of an alternative *Contractor*.
 - iii) terminate the Contract.

No liability in terms of this clause shall be attached to the *Contractor* if he can prove to the satisfaction of the *Client* that the nature of the failure is due to fire, war, riot, strikes, act of God, lockout, accident or other unforeseen occurrences or circumstances beyond the *Contractor's* control, provided, however, that in all cases the *Contractor* has notified the *Client* in writing within 24 hours of it first coming to his notice, that delivery shall be delayed or become impossible for the above-mentioned reasons.

3. Failure to meet target participation by local SMME

Client:		Contractor:	
Witness:		Witness:	



If the *Contractor* fails to achieve the monetary value of 30% of the project value targeted to SMME target set by the *Client* for contract participation by local SMME Contractors in terms of clause PS3.2 and PSA 8.9 of the *Scope of works*, the *Contractor* shall be liable to the *Client* for a sum calculated in accordance with the Contract Data and the aforementioned Scope as a penalty for such underachievement.

The *penalty* for failing to achieve the monetary value of the target set by the *Client* for contract participation by Targeted Enterprises and local SMME Contractors in terms of clause PS3.2 of the Scope, is 50% of the monetary value by which the achieved monetary value falls short of the target monetary value.

4. Penalties payable

If penalties are payable, they will be deducted prior to the addition of (VAT) but after the calculation of retention.

5. Penalties irreversible

The *Contractor* shall note that all penalties once imposed shall be non-recoverable or reversible, even if the default is remedied.

Z9 Source of instructions

The *Contractor* shall neither seek nor accept instructions from any authority external to the *Project Manager* in connection with the performance of his services under this Contract. The *Contractor* shall refrain from any action which may adversely affect the *Client* and shall fulfil his commitments with fullest regard for the interest of the *Client*. The *Contractor* may only take and comply with *Client's* Health and Safety representative or Environmental representative on matters regarding Health & Safety as well as Environmental.

Z10 Confidential nature of documents

All maps, drawings, photographs, mosaics, plans, reports, recommendations, estimates, documents and all other data compiled by or received by the *Contractor* under the Contract shall be the property of the *Client*, shall be treated as confidential and shall be delivered only to the *Project Manager* or his duly authorized representative on completion of the Works; their contents shall not be made known by the *Contractor* to any person other than the personnel of the *Contractor* performing services under this Contract without the prior written consent of the *Client*.

Z11 Date falling on public holiday or weekend

Where under the terms of the Contract any act is to be done or any period is to expire upon a certain day and that day or that period fall on a day of rest or recognized holiday or weekend, the Contract shall have effect as if the act were to be done or the period to expire upon the working day following such day.

Z12 Taxes

Definitions

Client:		Contractor:	
Witness:		Witness:	

The Customs Duties - means any tariff or tax on the importation or exportation of goods or services.

The Sales Tax - means any tax imposed by any government, provincial, municipal, local, taxing or other authority on transactions such as the sale of goods and the performance of services, including importation, commonly referred to, for example, as value added tax, goods and services tax or general sales tax or any other similar taxes.

The Taxes - means any and all taxes, duties, wharfage, fees or charges in connection with the activities of the *Contractor* hereunder imposed by any government, provincial, municipal, local, taxing or other authority, including income tax, capital gains tax, taxes in relation to employment or payroll (including social security contributions and taxes on employment income), taxes in relation to imports, duties, levies, stamp duties, charges, assessments and payments in the nature of taxes, but excludes Customs Duties, Sales Tax and withholding tax.

Z13 Compensation events

Delete clause 60.1(13) and replace with:

Abnormal rainfall or wet conditions occur to the extent that the algebraic sum of all monthly total values of V for the period under consideration has a positive value. The value of V is calculated each month with the formula:

$$V = (Nw - Nn) + ((Rw - Rn)/X)$$

Where

V	Extension of time in calendar days in respect of the calendar month under consideration.
Nw	Actual number of days during the calendar month on which a rainfall of Y mm or more has been recorded.
Nn	Average number of days, as derived from existing rainfall records, on which a rainfall of Y mm or more has been recorded for the calendar month.
Rw	Actual rainfall in mm recorded for the calendar month under consideration.
Rn	Average rainfall in mm for the calendar month as derived from existing rainfall records.
X	20 mm
Y	10 mm/24 hour day

Monthly values for Nn and Rn are given in Annexure A.

Z14 Subcontracting

1. Contractors Tendered rates

The Contractor shall ensure that rates that are tendered (during Tender Stage) for work items that are likely to be Subcontracted, are market related rates. Provision is made in the Bill of Quantities (BoQ) for the Contractor to add a mark-up for the sourcing, handling, and management of Subcontractors, SMME's, and the like, for the duration of the Contract.

2. Subcontractors Tendered rates

Client:		Contractor:	
Witness:		Witness:	

In the event that a rate supplied by the Contractor for a specific BoQ work item is not sufficient to cover Subcontractor costs/rates for that specific item, the Contractor shall provide a detailed rate breakdown for that specific BoQ item (and each and every subsequent BoQ work item where the rate is not sufficient to cover Subcontractor cost); and shall indicate costs (amongst others) for labour, material, handling, mark-ups, etc. to prove that the rate that was submitted during tender stage was in fact market related; and in balance with other rates that were submitted for work items that will not be undertaken by Subcontractors.

3. Appointment of Subcontractors

a) On or during appointment of Subcontractors, should Subcontractors prove that rates, that have been tendered by the Contractor for BoQ work items that are being subcontracted, are not market related, the Contractor will be liable to cover the cost of the difference, i.e. the difference in rate tendered by the Contractor versus the rate that is being requested by the Subcontractor. This difference in cost will be for the Contractor's account, and no Variation Orders for additional costs will be entertained by the Client. The Contractor bears the full and complete risk for the rates that have been tendered by the Contractor during Tender Stage.

b) Should any delays be experienced during the period of the Contract due to the appointment of subcontractors by the Contractor, work stoppages by subcontractors, industrial action by subcontractors, etc. such delays shall be assigned to the Contractor, and no claims for Extension of Time will be entertained by the Client

Z15 Special Conditions

The successful Tenderer must subcontract a minimum of 30% of the value of this Contract to an entity(s) described below. The value of the Contract for the purposes of this calculation shall be equal to the Contract Price (excluding VAT).

The subcontractor/s chosen for this purpose must be registered on National Treasury's Central Supplier Database (CSD) and must be from one of the following designated groups:

- An EME or QSE which is at least 51% owned by black people;
- An EME or QSE which is at least 51% owned by black people who are youth;
- An EME or QSE which is at least 51% owned by black women;
- An EME or QSE which is at least 51% owned by black people with disabilities;
- An EME or QSE which is 51% owned by black people living in rural or underdeveloped areas or townships;
- A cooperative which is at least 51% owned by black people;
- An EME or QSE which is at least 51% owned by black people who are military veterans;
- an EME or QSE .

1. Subcontractors must be chosen from National Treasury's Central Supplier Database which can be accessed on National Treasury's website.
2. The Contractor shall identify work packages that will be allocated to Subcontractors, so that the minimum requirement of 30% can be met during the implementation of the project, as follows:
 - a. The Contractor shall develop a Subcontracting Plan that sets out the details of the proposed Subcontracting arrangements including, but not limited to, competitive bidding process to be used for the appointment of SMME's, scope of work to be allocated, criteria for the selection of Subcontractor(s), Subcontractor agreements, cost of the work to be Subcontracted, etc.

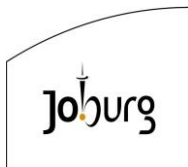
Client:		Contractor:	
Witness:		Witness:	

- b. The Subcontracting Plan shall be developed in consultation with the Ward Councillor and / or Community Liaison Officer, who shall assist the Contractor in identifying SMME's and other skills that may be available in local and surrounding communities.
 - c. The Subcontracting Plan shall be issued to the Project Manager for approval, prior to the engagement of any Subcontractor(s) by the Contractor. The activities, time periods, linkages, etc. associated with the development and approval of the Subcontracting Plan shall be included in the Project Programme, which Programme is subject to the approval of the Project Manager. A period of four weeks will be required for the Project Manager to consult with the Client, prior to approval of the Subcontracting Plan.
 - d. The Contractor shall ensure that rates that are tendered (during Tender Stage) for work items that are likely to be Subcontracted, are market related rates. Provision is made in the Bill of Quantities (BoQ) for the Contractor to add a mark-up for the sourcing, handling, and management of Subcontractors, SMME's, and the like, for the duration of the Contract.
 - e. On or during appointment of Subcontractors, should Subcontractors **prove** that rates, that have been tendered by the Contractor for BoQ work items that are being subcontracted, are not market related, the Contractor will be liable to cover the cost of the difference, i.e. the difference in rate tendered by the Contractor versus the rate that is being requested by the Subcontractor. This difference in cost will be for the Contractor's account, and no Variation Orders for additional costs will be entertained by the Client. The Contractor bears the full and complete risk for the rates that have been tendered by the Contractor during Tender Stage.
 - f. In the event that a rate supplied by the Contractor for a specific BoQ work item is not sufficient to cover Subcontractor costs/rates for that specific item, the Contractor shall provide a detailed rate breakdown for that specific BoQ item (and each and every subsequent BoQ work item where the rate is not sufficient to cover Subcontractor cost); and shall indicate costs (amongst others) for labour, material, handling, mark-ups, etc. to prove that the rate that was submitted during tender stage was in fact market related; and in balance with other rates that were submitted for work items that will not be undertaken by Subcontractors.
 - g. Should any delays be experienced during the period of the Contract due to the appointment of subcontractors by the Contractor, work stoppages by subcontractors, industrial action by subcontractors, etc. such delays shall be assigned to the Contractor, and no claims for Extension of Time will be entertained by the Client.
 - h. The Contractor will be liable to pay a penalty if the Subcontracting target of 30% has not been met by the end of the Contract. The Client will deduct this penalty amount through the Payment Certificate process. The Client will have full discretion as to when the penalty will be applied (i.e. the month in which the penalty amount will be deducted). In calculating the total amount that has been (will be) paid to SMME's, all amounts that have been reimbursed to SMME's will be taken into account including P&G's, amounts for actual work done, etc.
 - i. The penalty amount described above shall be equal to 50% (fifty percent) of the difference between the target Subcontract amount (i.e. 30% of the Contract Price) and the actual amount that has been spent on Subcontractors/SMME's by the end of the Contract.
3. A Subcontracting agreement between the Main Contractor and the Subcontractor shall be submitted to JW upon appointment and must include the following minimum information:
 - a. Name of Subcontractor and BBBEE status
 - b. Subcontractor *domicilium* and registered address of business, as well as status of compliance with all applicable legal requirements.

Client:		Contractor:	
Witness:		Witness:	

- c. Area and location of project
 - d. Scope of Work issued to the Subcontractor
 - e. Value of the Work issued including P&G's (this information must be submitted in a format that is readily auditable).
 - f. Assistance provided/to be provided to the Subcontractor by the Contractor, e.g. acquisition of materials, machinery, tools, etc.
 - g. A Skills Transfer Plan which will indicate, amongst others, the proposed skills that will be transferred to the Subcontractor, individuals that will be identified for skills transfer, the amount that will be spent by the Contractor on skills transfer, evidence that will be produced by the Contractor (such as training certificates, training registers, etc.), etc.
 - h. A specific provision that enables the Contractor to pay the Subcontractor's suppliers, labour (skilled, local, etc.) or any other service provider of the Subcontractor, should the Subcontractor fail to do so. This provision shall include (but not be limited to) the following conditions/proviso's:
 - o Invoices that are due for payment from suppliers and the like must be invoices that have been approved for payment and be based on work or services that have actually been completed or delivered. Payments that are due to labour will be based on approved timesheets.
 - o The Contractor is to ensure that any invoice presented for payment is indeed an approved invoice, and that the necessary work or services have been delivered or completed. The approved invoice shall be settled (paid) by the Contractor (on behalf of the Subcontractor) by the due date for payment.
 - o The Contractor will be entitled to deduct payments made to any third party, on behalf of the Subcontractor, from subsequent payments that may become due to the Subcontractor.
 - o The Contractor will be entitled to bill the Subcontractor a mark-up on the payments made on behalf of the sub-contractor. The mark-up shall not be more than 10% (ten percent) of the amount actually paid (i.e. the amount (excluding VAT) reflected on the invoice that has been settled). The mark-up amount shall be deducted from subsequent payments that may become due to the Subcontractor.
 - o Proof of any such payments made on behalf of the Subcontractor shall be issued to the Project Manager, on request, with all necessary supporting information that the Project Manager may request
 - o Payments made on behalf of the Subcontractor are not subject to the Contractor first being paid by the Client. Therefore, the Contractor shall pay approved invoices, on behalf of the Subcontractor, irrespective of whether the Contractor has first been paid by the Client. The Contractor will be entitled to levy interest on all payments that have been made in this regard, in accordance with the necessary interest payment provisions contained in the General and Special Conditions of Contract.
4. The successful Contractor shall submit periodic SMME/Subcontractor reports to the Project Manager as follows:
- i. Status of progress against the Subcontracting Plan (described above), to the approval of the Project Manager
 - j. Subcontractor *domicilium* and registered address of business, as well as ongoing status of compliance with all applicable legal requirements.
 - k. Name of Subcontractor and BBBEE status
 - l. Area and location of project
 - m. Scope of work issued to the Subcontractor
 - n. Value of the work issued (this information must be submitted in a format that is readily auditable)

Client:		Contractor:	
Witness:		Witness:	



- o. Monthly payments made to the subcontractor (this information must be submitted in a format that is readily auditable)
 - p. Assistance provided to the Subcontractor e.g. advance payments, acquisition of materials, machinery, tools, etc.
 - q. Performance of the Subcontractor, with evidence to support this performance assessment.
5. Upon completion of the project, the Contractor is required to provide a final report to JW on skills transferred to / acquired by the Subcontractor(s) engaged on the Project, description and value of work performed, as well as their overall performance.

The Contractor shall also indicate whether the experience gained by the Subcontractor is sufficient to assist the Subcontractor to improve their CIDB grading, with full details of supporting information.

Client:		Contractor:	
Witness:		Witness:	

C1.2.1.1 Annexure A:

Weather data obtained from SA Weather Bureau for Johannesburg Botanical Gardens.

The value of V is calculated using the following formula

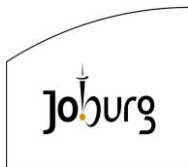
$$V = (Nw - Nn) + ((Rw - Rn)/X)$$

If the algebraic sum of all monthly totals for the period under consideration has a positive value, then the Contractor may notify a compensation event.

STATISTICAL INFORMATION: JOHANNESBURG BOTANICAL GARDENS: 1993-2022		
Month	Nn = Actual number of days during the calendar months in which a rainfall of more than Y-mm has been received	Rn Average monthly rainfall
January	4.5	129.7
February	3.2	105.5
March	2.7	95.7
April	0.9	29.7
May	0.5	18.2
June	0.0	4.7
July	0.1	2.7
August	0.1	4.4
September	0.3	11.9
October	2.0	68.4
November	3.1	86.7
December	4.2	117.7
Year Totals	21.6	675.4

Only the algebraic sum of all monthly totals for V for the period under consideration is taken into account in assessing the compensation event.

Client:		Contractor:	
Witness:		Witness:	



C1.2.2 Part two - Data provided by the Contractor

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

1 General

11.2(13) The Contractor is

Name

Address for communications

Address for electronic
communications

11.2(10) & 52.1

The *fee percentage* is (Upper limit 15%)

%

11.2(20) & 16.3

The *working areas* are the Site and

24.1

The *key persons* (Corresponding to cv's
submitted) are:

Name (Contracts Manager)

Job

Responsibilities

Qualifications

Experience

Name (Site Agent)

Job

Responsibilities

Qualifications

Experience

Name (Safety Officer)

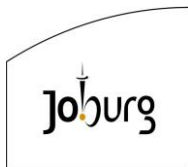
Job

Responsibilities

Qualifications

Experience

Client:		Contractor:	
Witness:		Witness:	



Name (Environmental Officer)

Job

Responsibilities

Qualifications

Experience

11.2(8)

The following matters will be included in the Early Warning Register:

3 Time

31.1

The programme identified in Contract Data is

To be submitted within 21 days of the Contract Date

5 Payment

11.2(22)

The *bill of quantities* is in

Volume 1, Part 2, C2.2 Bill of Quantities

The tendered total of the Prices is

W1.1(1)

The *Senior Representatives* of the Contractor are

Name

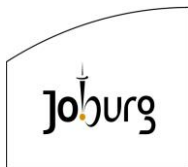
Address for communications

Address for electronic communications

Name (2)

Address for communications

Client:		Contractor:	
Witness:		Witness:	



Address for electronic
communications

Client:		Contractor:	
Witness:		Witness:	

Data for Short Schedule of Cost Components

11.2(28) and SSCC 11 The people rates are (Daywork rates as per item 1.05.01 of the Bill of Quantities):

Category of person	unit	rate
Foreman	hours	
Welder	hours	
Skilled labour	hours	
Semi-skilled labour	hours	
Unskilled labour	hours	

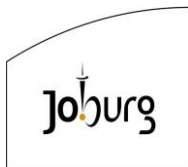
SSCC 22 The rates for other Equipment are (Daywork rates as per item 1.05.02 of the Bill of Quantities):

Equipment	rate
Excavator (20 t)	
Excavator (30 t)	
Loader (0,5 m ³ bucket)	
Tipper truck (10 m ³)	
Walk-behind vibrating roller	
Welding Machine	
Water truck (5 000ℓ)	
Water pump (4 inch)	
Truck Crane (8 t)	
Crane (10 t)	
Crane (20 t)	

SSCC 61 The rates for Defined Cost of manufacture and fabrication outside the Working Areas by the Contractor are:

Category of person	rate
Foreman	
Welder	
Skilled labour	
Semi-skilled labour	
Unskilled labour	

Client:		Contractor:	
Witness:		Witness:	

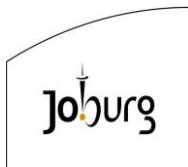


SSCC 71 The rates for Defined Cost of design outside the Working Areas are:

Category of person	rate
Senior Design Engineer	
Senior Design Technologist Engineer	
Technician	
Draughtsman	

SSCC 72 The categories of design people whose travelling expenses to and from the Working Area are included in the Defined Cost:

Client:		Contractor:	
Witness:		Witness:	



C1.3 FORMS AND SECURITIES

FORMS FOR COMPLETION BY THE CONTRACTOR

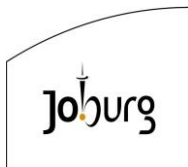
THE FOLLOWING FORMS ARE TO BE COMPLETED BY THE CONTRACTOR AFTER THE TENDER HAS BEEN AWARDED TO THE SUCCESSFUL TENDERER

- a) Form of Guarantee
- b) Blasting Indemnity
- c) Agreement in terms of the Occupational Health and Safety Act
- d) Occupational Health And Safety Indemnity Undertaking

The forms will be completed by the Contractor who will be instructed to do so in the Form of Acceptance. The completed forms will become part of the Contract.

The Form of Guarantee is a pro forma document. The Contractor will provide an original document, from a financial institution, with the same text within the time stated in the Contract Data. Only a Bank or approved Insurance Company or Guarantee Corporation is acceptable as Guarantor.

Client:		Contractor:	
Witness:		Witness:	



• **C1.3.1 Form of Guarantee**

**TO BE PRINTED ON THE OFFICIAL LETTERHEAD OF THE GUARANTOR.
PERFORMANCE GUARANTEE**

WHEREAS Johannesburg Water (SOC) Ltd (hereinafter referred to as “the Client” or “beneficiary”) entered into a Contract with

(hereinafter called “the Contractor”)

on the ____ day of _____ 20__ for

(Project Description)

at _____

AND WHEREAS it is provided by such Contract that the Contractor shall provide the Client with security by way of a guarantee for the due and faithful fulfilment of such Contract by the Contractor;

AND WHEREAS

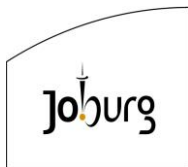
has/have at the request of the Contractor, agreed to such guarantee;

NOW THEREFORE WE,

Do hereby guarantee and bind ourselves jointly and severally as Guarantor and Co-principal Debtors to the Client under renunciation of the benefits of division and excussion for the due and faithful performance by the Contractor of all the terms and conditions of the said Contract, subject to the following conditions:

1. The Client shall, without reference and/or notice to us, have complete liberty of action to act in any manner authorised and/or contemplated by the terms of the said Contract, and/or to agree to any modifications, variations, alterations, directions or extensions of the Completion Date of the Works under the said Contract, and that its rights under this guarantee shall in no way be prejudiced nor our liability hereunder be affected by reason of any steps which the Client may take under such Contract, or of any modification, variation, alteration of the Completion Date which the Client may make, give, concede or agree to under the said Contract
2. This guarantee shall be limited to the payment of a sum of money.
3. The Client shall be entitled, without reference to us, to release any guarantee held by it, and to give time to or compound or make any other arrangement with the Contractor.

Client:		Contractor:	
Witness:		Witness:	



4. This guarantee shall remain in force and effect until the issue of the Certificate of Completion in terms of the Contract, unless we are advised in writing by the Client before the issue of the said Certificate of his intention to institute claims, and the particulars thereof, in which event this guarantee shall remain in full force and effect until all such claims have been paid or liquidated
5. Our total liability hereunder shall not exceed the sum of _____
_____(R_____
6. The guarantor reserves the right to withdraw from this guarantee by depositing the Guaranteed Sum with the beneficiary, whereupon the Guarantor's liability hereunder shall cease.
7. We hereby choose our address for the serving of all notices for all purposes arising here from as

IN WITNESS WHEREOF this guarantee has been executed by us at

_____ on this _____ day of _____ 20_____

As witnesses

1. _____

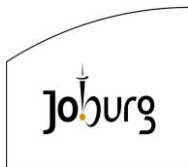
Signature

2. _____

Duly authorised to
sign on behalf of

Address

Client:		Contractor:	
Witness:		Witness:	



• **C1.3.2 Blasting Indemnity**

Given by

*Company Registration No.

Address

a *Company incorporated with limited liability according to the company laws of the Republic of South Africa, *Partnership, *Close Corporation, *Public Company (hereinafter called the Contractor), represented herein by

in his capacity as the Contractor's

duly authorised hereto by a resolution
of the Contractor dated

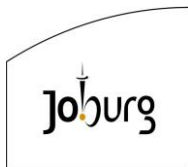
a certified copy of which resolution is
attached to this Indemnity.

WHEREAS the Contractor has entered into a Contract with the Johannesburg Water (SOC) Ltd (hereinafter called the Client) for,

and the Company requires this Indemnity from the Contractor

NOW THEREFORE THIS DEED WITNESSETH that the Contractor does hereby indemnify and hold harmless the Company in respect of all loss or damage that may be incurred or sustained by the Client by reason of or in any way arising out of or caused by blasting operations that may be carried out by the Contractor in connection with the aforementioned Contract and also in respect of all claims that may be made against the Client in consequence of such blasting operations, by reason of or in any way arising out of any accidents or damage to persons, life or property or any other cause whatsoever, and also in respect of all legal or other expenses that may be incurred by the Client in examining, resisting or settling any such claims; for the due performance of which the Contractor binds itself according to law.

Client:		Contractor:	
Witness:		Witness:	



THUS DONE AND SIGNED for and on behalf of the Contractor at

_____ on the _____ day of _____ 20 _____

in the presence of the subscribing witnesses.

As witnesses

1. _____

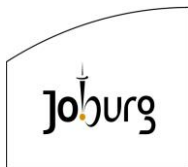
2. _____

Signature

Duly authorised to
sign on behalf of

Address

Client:		Contractor:	
Witness:		Witness:	



• **C1.3.3 Health and Safety Contract Between Client and Contractor In Terms of Section 37(2) Of The Occupational Health and Safety Act No 85 Of 1993**

Written agreement between Johannesburg Water ((Proprietary) Limited (hereinafter referred to as “the Client) and _____ (hereinafter referred to as “the mandatory”) as envisaged by Section 37(2) of the Occupational Health and Safety Act, No. 85, of 1993 as amended.

I

_____ representing

_____ (mandatory) do hereby acknowledge that

_____ (mandatory) is an Client in its own right and shall be regarded as the Client for purposes of the contract work specified in the body of the principal agreement with duties as prescribed in the Occupational Health and Safety Act, No. 85 of 1993 as amended so as to ensure that all work will be performed or machinery and plant used in accordance with the provisions of the said Act. I furthermore agree to comply with the requirements of the Client as contained in the Occupational Health and Safety Specification included with the principal agreement and to liaise with the Client should I, for whatever reason, be unable to perform in terms of this agreement.

Signed this _____ day of _____ at _____

Signature on behalf of mandatory _____

Signature on behalf of Client _____

Compensation Fund Registration No. of mandatory _____

Good Standing Certificate : ☐ yes ☐ no (tick one box)

Client:		Contractor:	
Witness:		Witness:	

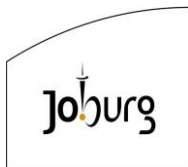
• **C1.3.4 Health and Safety Contract: General Information**

1. The Occupational Health and Safety Act comprises Sections 1 to 50 and all un-repealed regulations promulgated in terms of the former Machinery and Occupational Safety Act No 6 of 1983 as amended, as well as other regulations which may be promulgated in terms of the OHS Act.
2. 'Mandatar'y' is defined as including an agent, a contractor or a subcontractor for work, but without derogating from his status in his own right as a Client or user of plant and machinery
3. Section 37 of the Occupational Health and Safety Act potentially punishes Clients (principals) for the unlawful acts or omissions of mandataries (contractors) save where a written agreement between the parties has been concluded containing arrangements and procedures to ensure compliance with the said Act by the mandatar'y.
4. All documents attached or referred to in the above agreement form an integral part of the agreement.
5. To perform in terms of this agreement mandataries must be familiar with the relevant provisions of the Act.
6. Mandatar'ies who utilise the services of their own mandataries (subcontractors) are advised to conclude a similar written agreement.
7. Be advised that this agreement places the onus on the mandatar'y to contact the Client in the event of inability to perform as per this agreement. The Client, however, reserves the right to unilaterally take any steps as may be necessary to enforce this agreement.
8. The contractor shall be responsible for the full and proper implementation of the terms and provisions of the Act and its regulations in the area in which the work is to be undertaken by the Contractor.
9. The Contractor shall be responsible for the well-being, in relation to health and safety, of all persons coming upon or into such area in accordance with that legislation, including the implementation of any directives issued by management of the Client in this respect.
10. The work to be done is _____
11. The area in which the work is to be conducted is _____
12. The Contractor shall familiarise himself with such area and all risks existing thereon and undertakes to report to the representative of the Client any hazard or risk to health and safety which arises during the contract work in the area concerned and over which the Contractor may have no control. All necessary and appropriate safety / health equipment shall be issued by the Contractor to all persons working on or coming into the area.

• **C1.3.4.1 Occupational Health and Safety Indemnity Undertaking**

I, the undersigned _____
in my capacity as _____
of the firm _____

Client:		Contractor:	
Witness:		Witness:	



1. Hereby undertake to ensure that I/my firm and/or employees and/or subcontractors and/or his employees -
 - 1.1 comply strictly with the provisions of the Occupational Health and Safety Act of 1993 (as amended) and/or the regulations promulgated in terms thereof, with specific reference to section 37(2) of the said act, as well as any relevant legislation, in the course of the performance/execution of any service and/or work in, to or on any of the Client's buildings, construction sites and/or premises;
 - 1.2 ensure that consultants and/or visitors comply with any instructions and measures relating to occupational health and safety, as prescribed by the Client; and
 - 1.3 comply strictly with the statutorily prescribed work systems, operational equipment, machinery and occupational health and safety conditions;
2. And as an independent Client and contractor, hereby indemnify, in terms of the above undertakings, the Client -
 - 2.1 in respect of any costs that I/my firm and/or employees and/or subcontractors and their employees may incur of necessity in compliance with the above undertakings; and
 - 2.2 against any claims that may be instituted against the Client and/or any liability that the Client may incur, whether instituted and/or caused by me/my firm's employees, agents, consultants, subcontractors and/or their employees and visitors or the Client's clients or neighbours in respect of any incidents related to my/my firm's activities and as a result of which the occupational health and safety of the persons involved have been detrimentally affected; and
 - 2.3 against similar claims that I, managers or directors of my firm may have against the Client and any damages for which I, managers or directors of my firm hold the Client liable.
3. My firm's compensation commissioner number is _____ and I confirm that my firm and its subcontractors' fees have been paid up and obligations in respect of the compensation commissioner have been complied with and further that I shall furnish proof thereof in writing on request.
4. I hereby confirm that I have the authority to sign this indemnity undertaking and that the Client is not obliged to confirm such confirmation.

Signed at _____ This _____ day of _____

Signature

Capacity

As witnesses:

1

2

Client:		Contractor:	
Witness:		Witness:	

Johannesburg Water SOC Ltd



CONTRACT JW14358

**CONSTRUCTION OF WOODMEAD INLET BULK
WATER PIPELINE**

VOLUME 1

PART 2: PRICING DATA



Contract: JW14358
CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE
Volume 1 Tender and Contract
Section C2 Pricing Data



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C2.2.....BILL OF QUANTITIES.....	12

Employer:		Contractor:	
Witness:		Witness:	



C2 PRICING DATA

C2.1 PRICING INSTRUCTIONS

C2.1.1 GENERAL PREAMBLE TO THE BILL OF QUANTITIES

- a) **The Contract is to be constructed using labour intensive methods. In exceptional cases where the use of plant is required, the Contractor must motivate and obtain written permission before the work is undertaken with plant. Payment will not be made for unauthorized use of plant to carry out work.**
- b) All items in the Bill of Quantities, except where otherwise specified in Clause 8 of a Standardised Specification or in the Project Specification, shall be measured and shall cover operations as recommended in the standard system of measurement of civil engineering quantities, published under the title "Civil Engineering Quantities", by the South African Institution of Civil Engineering.
- c) The basis and principles of measurement and payment are described in this section (Pricing Instructions) and Clause 8 of each of the Standardised Specifications for Civil Engineering Construction. The applicable SANS 1200 Standardised Specifications are listed in the Scope of Work, Portion 1: Project Specification. Variations and amendments to the Standardised Specifications are contained in the Scope of Work, Portion 2: Variations and Additions to the Standardised Specifications.
- d) Descriptions in the Bill of Quantities are abbreviated and comply generally with those in the Standardised Specifications. Clause 8 of each Standardised Specification, read together with the relevant clauses of the Scope of Work, set out what ancillary or associated activities are included in the rates for the operations specified. Should any requirements of the measurement and payment clause of the applicable Standardised Specification or the Scope of Work, conflict with the terms of the Bill of Quantities, the requirements of the Standardised Specification or Scope of Work, as applicable, shall prevail.
- e) The clauses in a specification in which further information regarding the Schedule item may be found are listed in the "Payment Refers" column in the Schedule. The reference clauses indicated are not necessarily the only sources of information in respect of listed items. Further information and specifications may be found elsewhere in the Contract Documents. Standardised Specifications are identified by the letter or letters which follow SANS in the SANS 1200 series of specifications, e.g. G for SANS 1200G. For SANS 2001 Part CC1, the specifications are identified by the prefix CC1.
- f) Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.
- g) The quantities set out in the Bill of Quantities are the estimated quantities of the Contract Works, but the Contractor shall be required to undertake whatever quantities may be directed by the Employer's Agent from time to time. The Contract Price for the completed Works shall be computed from the actual quantities of work done, valued at the relevant unit rates and/or prices.
- h) The rates and/or prices to be inserted in the Bill of Quantities are to be the full inclusive prices for the work described under the several items. Such rates and/or prices shall cover all costs and expenses that may be required in and for the execution of the work described, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the documents, as well as overhead charges and profit. Reasonable charges shall be inserted as these shall be used as a basis for assessment of payment for additional work that may have to be carried out.

Employer:		Contractor:	
Witness:		Witness:	



Contract: JW14358
CONSTRUCTION OF WOODMEAD INLET BULK WATER PIPELINE
Volume 1 Tender and Contract
Section C2 Pricing Data



i) A price or rate is to be entered against each item in the Bill of Quantities, whether the quantities are stated or not. An item against which no price is entered will be considered to be covered by the other prices or rates in the Schedule.

j) The units of measurement described in the Bill of Quantities are metric units. Alternatives used are as follows :

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

k) For the purpose of this Bill of Quantities, where applicable, the following words shall have the meanings hereby assigned to them:

Unit : The unit of measurement for each item of work as defined in the SANS 1200 (Standardized Specifications for Civil Engineering Construction).

Quantity : The number of units of work for each item.

Rate : The agreed payment per unit of measurement.

Amount : The product of the quantity and the agreed rate for an item.

Lump sum : An agreed amount for an item, the extent of which is described in the Bills of Quantities but the quantity of work of which is not measured in any units.

l) Arithmetical errors in the Bill of Quantities shall be corrected in accordance with Clause C.2.11 of the Conditions of Tender. Should there be any discrepancy between rates and/or prices written in the Assessment Schedule and the Bill of Quantities, the latter shall govern.

m) The Bill of Quantities shall be completed by hand in **BLACK INK. BIDDERS MAY ALSO FILL IN THE TENDER ELECTRONICALLY. PRINT AND AFFIX THE BILL OF QUANTITY TO THE TENDER (DO NOT REMOVE THE ORIGINAL/PUBLISHED BOQ)**, IT REMAINS THE BIDDER'S RESPONSIBILITY TO ENSURE IT IS THE SAME AS THE BOQ INCLUDED IN THE ORIGINAL TENDER DOCUMENT.

C2.1.2 SPECIAL PAYMENT CONDITIONS

This clause shall be read in conjunction with the 'Penalties' clause(s). Where the penalty clause shall always receive precedence over this clause, should it be found that duplicative financial corrective measures exist.

C2.1.2.1 Provided previously

The Contractor shall not re-execute works under this Contract where he has successfully executed works for the Employer under a previous contract(s) that comply with the requirements of this Contract. However, where applicable the Contractor shall:

a) clearly state this in his qualifications; and

Employer:		Contractor:	
Witness:		Witness:	



- b) still provide the associated rates and prices in the schedule in the associated line item, but not calculate an associated amount.

The Employer shall at his sole discretion decide to re-execute such works.

C2.1.2.2 Materials and equipment

The Employer shall not provide any works material and equipment, as this shall be provided by the Contractor and deemed to have been included in his provided activity rates or prices.

C2.1.2.3 Security

The Contractor shall be deemed to have included all security related costs in the Provisional and General item rates, including allowing for minimum 60% (high risk areas) of the sites requiring security provision for the Employer and Engineer representative(s).

C2.1.2.4 Permits and wayleaves

All associated costs to obtain permits and wayleaves as required for the execution of the works, where such affect other services, shall be deemed to have been included in the scheduled rates for SANS 1200A or SANS 1200AA or SANS 1200AB where pricing provision for such items have been allowed for in the pricing schedules, alternatively it shall be deemed to be included in the various scheduled activity rates or prices provided by the Contractor.

C2.1.2.5 Confined space

The Contractor shall note that work activities shall be executed within confined spaces and it shall be deemed that allowance has been made in all activity pricing and any applications and requirements by the Department of Labour.

C2.1.2.6 Underground Services Congestion

The contractor shall note that work activities shall be executed in built up areas which are congested with underground services and it shall be deemed that adequate allowance has been made in the all activity pricing to work in a congested area and to handle such services while executing the work.

C2.1.2.7 Failure to submit reports and associated visual media

The Contractor's monthly invoice shall be accompanied by confirmation from the Employer/ Employer's Agent or his duly authorized representative that items listed for payment have been successfully executed and/or delivered as required. Failure to obtain such confirmation from the Employer/ Employer's Agent or his duly authorized representative shall result in non-payment of the Contractor's invoice until the default has been corrected or the deemed incomplete items are excluded from the invoice.

C2.1.2.8 Contract Price Adjustment

The effect of changes in prices or law on the amounts due shall be adjusted on the following basis:

- a) No price adjustment over the first 12-month period of the Contract.

Employer:		Contractor:	
Witness:		Witness:	



- b) On the 12-month anniversary date of the signing of the agreement the rates shall be adjusted by twelve-month year on year CPI index (as published in the monthly bulletin PO141.1 of statistics South Africa) ruling on the 12-month anniversary date of the signing of the contract .

C2.1.2.9 Payment ONLY for works completed

The Contractor shall note that payment shall only be made for Works activities successfully (delivering the end result) executed, complying with the quality requirements and provided to the Engineer or his duly authorised representative. **For example:** No payment shall be made where CCTV surveys could not be successfully completed due to manhole length isolation difficulties, including payment for the unsuccessful isolation.

C2.1.2.10 Preliminary and General

If the Contractor does not fill in the rates for the Preliminary and General items, it will be assumed that the Contractor has made allowance to recover the costs elsewhere in the Bill of Quantities.

NB: It is main Contractor's responsibility to make sure their offered Rates are market- related such that they can in turn pay market-related Rates to subcontractors. Should there be a deficit between main Contractor's rates and Subcontractor tendered or negotiated Rates, the main Contractor will have to cover for such difference.

C2.1.1 Health and safety

The principal Contractor's health and safety plan has to follow the framework as laid out in the HEALTH AND SAFETY SPECIFICATION AND ENVIRONMENTAL MANAGEMENT PLAN, as a minimum.

No payment shall be applicable where equipment is not provided, and services are not rendered in terms of the approved Health and Safety Plan. Additionally, the Contractor shall also be penalised in terms of Clause (30) of the Occupational Health and Safety Act 183 (1993), Construction Regulations (2014).

C2.1.1.1 Compilation of health and safety plan

Unit: Sum

The rate shall include the complete cost for the provision of resources (human and equipment), communication, transportation and travelling, documentation of activities and reporting activities required to compile a Health and Safety Plan as per the Health and Safety Specifications contained in Volume 2, and approval of such plan thereof. Remuneration shall be a lump sum. The compiled plan shall include for all sub-contractor and SMMEs.

C2.1.1.2 Implementation of Health and Safety Plan

Unit: Sum

The rate shall include the complete cost for the provision of resources (human and equipment), communication, transportation and travelling, documentation of activities and reporting activities required to fully comply with the implementation and maintenance of the

Employer:		Contractor:	
Witness:		Witness:	



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Health and Safety Plan. Remuneration shall be on a monthly basis for services rendered, by dividing the total sum tendered by the construction duration. The compiled plan shall include for all sub-contractor and SMMEs.

C2.1.1.3 Safety Officer

Unit: Sum

The rate shall include the wages and salary that is to be paid to the safety officer/s, whose responsibility it is to ensure that all activities required fully comply with the Health and Safety Plan as per the Health and Safety Specifications contained in Volume 2 for the duration of the Contract. The rate shall be on a monthly basis for services rendered, by dividing the total sum tendered by the construction duration.

NOTE: The Contractor shall clearly state the number of Health and Safety officers in the provided space in the Bill of Quantities that he has allowed for in his price. Where no number is provided the Employer shall assume that adequate provision, minimum one (1) per site, has been made to implement the provided Health and Safety Plan successfully.

C2.1.1.4 Provision of OHS Mentorship

Unit: Prov Sum

The contractor shall be reimbursed for providing a mentor registered with the SACPCMP as a PrCHSA.

C2.1.1.5 Internships

Unit: Prov Sum

The contractor shall be reimbursed for providing internships and the sum shall cover the wages and salary that is to be paid to interns.

NOTA BENE: The Employer shall approve a maximum of 1 Health and Safety Officer for the successful implementation of the Health and Safety Plan of this project. The Contractor shall clearly state for this allowance in the space provided in the Bill of Quantities.

C2.1.2 SMME Portion of the Work

A particular portion of the works must be allocated for completion by an appointed SMME.

The Main Contractor shall retain liability and responsibility for the management, scheduling, and quality control of all works performed by the sub-contractor. The Main Contractor will be expected to conduct a competitive process to recommend a Sub-Contractor or Sub-Contractors to Johannesburg Water. Johannesburg Water will evaluate all rates provided by the Sub-Contractor for fairness. Johannesburg Water will either:

- a) Approve the appointment of the Sub-Contractor or Sub-Contractors or
- b) Enter into negotiations with the Main Contractor and sub-Contractor (s) or
- c) Request that the Contractor to recommend a different sub-Contractor.

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Witness:		Witness:	



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- The Contractor shall ensure that the Subcontractor (s) comply with paying all amounts due in respect of his employees and himself in terms of all relevant legislation and regulations including, but not confined to the:
 - Income Tax Act,
 - Compensation for Occupational Injuries and Diseases Act,
 - Unemployment Insurance Act,
 - Basic Conditions of Employment Act
 - Gazetted minimum labour rates according to SAFCEC
- Monitoring of the Quality of Work completed by the Sub-Contractor/SMME
- Skills transfer during the execution of the project
- Compliance with all aspects of the Scope of Work
- Assistance with sourcing of applicable material in line with the technical data sheets

Further a payment item has been included for "Training" – this is related to CETA accredited training which is to be agreed with the Employer during project execution. No amount can be claimed under this item for onsite or on-the-job training, only for accredited training which the SMME receives.

C2.1.2.1 Training

Unit: Prov. Sum

The rate shall include the paying for CETA accredited training for the successful candidates.

C2.1.3 EMP Implementation & Maintenance

Unit: Sum

The rate shall include the complete cost for the provision of resources (human and equipment), communication, transportation and travelling, documentation of activities and reporting activities required to fully comply with the implementation and maintenance of the EMP contained in Volume 2 for the duration of the Contract. Remuneration shall be on a monthly basis for services rendered, by dividing the total sum tendered by the construction duration.

No payment shall be applicable where equipment is not provided and services are not rendered in terms of the approved EMP.

Employer:		Contractor:	
Witness:		Witness:	



C2.1.5 Subcontracting

C2.1.5.1

The Contractor shall ensure that rates that are tendered (during Tender Stage) for work items that are likely to be Subcontracted, are market related rates. Provision is made in the Bill of Quantities (BoQ) for the Contractor to add a mark-up for the sourcing, handling, and management of Subcontractors, SMME's, and the like, for the duration of the Contract.

C2.1.5.2

On or during appointment of Subcontractors, should Subcontractors **prove** that rates, that have been tendered by the Contractor for BoQ work items that are being subcontracted, are not market related, the Contractor will be liable to cover the cost of the difference, i.e. the difference in rate tendered by the Contractor versus the rate that is being requested by the Subcontractor. This difference in cost will be for the Contractor's account, and no Variation Orders for additional costs will be entertained by the Employer. The Contractor bears the full and complete risk for the rates that have been tendered by the Contractor during Tender Stage.

C2.1.5.3

In the event that a rate supplied by the Contractor for a specific BoQ work item is not sufficient to cover Subcontractor costs/rates for that specific item, the Contractor shall provide a detailed rate breakdown for that specific BoQ item (and each and every subsequent BoQ work item where the rate is not sufficient to cover Subcontractor cost); and shall indicate costs (amongst others) for labour, material, handling, mark-ups, etc. to prove that the rate that was submitted during tender stage was in fact market related; and in balance with other rates that were submitted for work items that will not be undertaken by Subcontractors.

C2.1.5.4

Should any delays be experienced during the period of the Contract due to the appointment of subcontractors by the Contractor, work stoppages by subcontractors, industrial action by subcontractors, etc. such delays shall be assigned to the Contractor, and no claims for Extension of Time will be entertained by the Employer

Employer:		Contractor:	
Witness:		Witness:	



C2.1.4 Notes to complete Bill of Quantities

Contractors are to ensure that the Bills are complete before tender submission. This Bill of Quantities forms part of, and must be read in conjunction with the specifications, drawings and must be submitted, duly completed, on the closing date of tenders.

1. The specification and drawings give a complete description of work to be done and materials and equipment to be used. Unless otherwise stated in the Bills of Quantities, the specification and drawings shall have preference and should be read for the full meaning of descriptions of how work is to be done and materials and equipment are to be used.
2. Total tender price as quoted is fixed.
3. No alterations, erasure or additions is to be made in the text of the Bill of Quantities. Should any alterations, erasure or addition be made, it will not be recognised and the original wording of the Bill of quantities will be adhered to.
4. The responsibility for the accuracy of the Bill of Quantities rests with the Employer/Employer's Agent. The Contractor is therefore not responsible for checking the accuracy of quantities during the tender period. It is however the responsibility of the Contractor to estimate, during the tender period, for his own account, the amount of supports, hangers, fixings, bolts, nuts, washers, flanges etc. from the Bill of Quantities, Specifications, Drawings, etc. and to include all costs for such items, in order to comply with the specification.
5. The quantities and descriptions in the Bill of Quantities may not be used for ordering purposes. Equipment shall, in terms of its quality, be as per the Specification.
6. Variations within the scope of work shall be allowed to in order to complete the installation. All such variations shall be measured and its costs shall be calculated in accordance with rates in the Bill of Quantities where applicable and then added/subtracted from the total reflected in the Bill of Quantities. Any variation for which there are no rates in the Bill of Quantities shall be agreed upon before execution. Excessive profit taking on nett costs shall not be allowed.
7. Unless separate tariffs/rates are asked for in the Bill of Quantities, provision and installation of materials and equipment shall be included for in all the rates/tariffs.
8. The tariffs/rates for each item shall provide for manufacturing, transport, delivery, off-loading, store, unpack, hoist position, fit and fix, cut and wastage, bolts and nuts, gaskets, jigs, models, tools, temporary work, return to suppliers, site establishment, allowance, profit and all other responsibilities as a result of the Conditions of Contract.
9. The Contractor shall allow for all wastage and overlapping as the quantities given in the Bill of Quantities are nett quantities
10. All provisional amounts shall be used to the discretion of the Employer/Employer's Agent. Any amount not spent shall be omitted from the Contract.
11. VAT shall be excluded from the rates.

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12. The Employer and/or the Employer's Agent shall not be responsible for any losses due to loss of interest through the VAT system.
13. Contractors shall price the Preliminaries in terms of the Conditions of Contract.
14. Payment of the P & G's shall be in terms of the progress on site and services rendered. The P & G shall be paid proportionately to the percentage progress of works on site as per the accepted programme of works. The P & G will not be paid out based on the time elapsed on a contract (i.e. If a Contractor has completed 30% of the Works and 80% of the contract duration has elapsed, the P & G paid to the Contractor will be 30%).
15. The quantities given in the Bill of Quantities are provisional quantities and cannot be regarded as exact and are subject to measurement on site after completion of the service and adjustments will be made according to the unit rates given in the Bill of Quantities.

C2.1.5 Recommended Labour-Intensive Tasks

C2.1.5.1 Construction Activities

The Contractor is required to recommend labour intensive tasks for large projects as per the Expanded public works program (EPWP) Large projects guidelines issued by The Department of Public Works.

ACTIVITY	TOOLS	TASK
Bush clearing	Axe, saw, rope	Medium dense bush (4 to 7 bushes per 100 m ²) 350 m ² /md Dense bush (10 to 15 bushes per 100 m ²) 200 m ² /md Very dense bush (20 to 30 bushes per 100 m ²) 100 m ² /md
Grass clearing	Slasher, spade, hoe, fork, rake.	Dense grass 85 m ² /md
Stripping ground cover and grubbing out roots, haul to nearby dump and spread	Pick, shovel, fork, rake	Light vegetation, dig to 50 mm deep 150 m ² /md Medium vegetation, dig to 100 mm deep 75 m ² /md
Grubbing out roots to 250 mm deep	Pick, shovel, fork, rake	Heavy vegetation, dig to 150 mm deep 40 m ² /md Dig in soft ground to remove roots 42 m ² /md
Destumping (removal of stumps and large roots)	Pick, shovel, axe	Medium dense bush 60 m ² /md
Removal of bush and tree cuttings	Bush hook, rope, axe, saw	Cut, bundle and load branches, tree trunk pieces, other vegetation 8 m ³ /md
Boulder removal	Crowbar	Daily paid

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Witness:		Witness:	



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ACTIVITY	TOOLS	TASK			
Excavation (measured in place)		Throwing distance: up to 4 m 4 to 6 m			
Loose soil	Shovel	5 to 6 m³/md	4.5 to 5 m³/md		
Sticky soil	Spade, fork, forked hoe	2 to 3 m³/md	1.5 to 2 m³/md		
Firm soil	Pick, shovel, spade, hoe	3 to 4.5 m³/md	2.5 to 4 m³/md		
Hard stony gravel	Pick, shovel, crowbar	1.5 to 2 m³/md	1 to 1.5 m³/md		
Loading (measured loose) into:	Shovel	Loose soil or gravel:			
Wheelbarrow		12 to 15 m³/md			
Trailer		7 to 10 m³/md			
Truck		4 to 6 m³/md			
Wheel-barrow haul (measured loose; haul and unload only)	Wheelbarrow (Note production increases 30% for good haul route and decreases 30% for poor haul route)	Equivalent haul distance = length + 10 (rise + fall)	Production in loose m³/md over average haul route		
		20 m	4.44		
		40	3.16		
		60	2.44		
		80	2.00		
		100	1.70		
		120	1.44		
		140	1.28		
		160	1.15		
		180	1.02		
		200	0.95		
Levelling roadbed (measured loose)	Shovel, spreader	60 m²/md			
Picking loose roadbed (bank m³)	Pick, shovel, fork	40 m²/md			
Spreading loose material (loose m³)	Shovel, spreader, hoe	Soil	12 loose m³/md		
		Gravel	10 loose m³/md		
Watering, mixing, spreading and levelling	Shovel, spreader, hoe, string- lines, water bowser	Sandy soil	4.5 m³/md		
		Gravel	3 m³/md		
		(measured tight after compaction)			
Compaction and re- levelling	Roller, string lines, straightedge, shovel, spreader.	Depends upon chosen roller (see below)			
Compaction by pedestrian- controlled double drum vibro-roller	"Stampede" rollers: R75/50 S R90/55 S	Mass kg 980 1 350	Passes 5 4	Layer 100 mm 100 mm	Output 8 m³/h 13 m³/h (tight)
Loosen material in trench with pneumatic tools	Compressor, pneumatic tools, team of 4 people	Intermediate	19 m³ for team		
		Rock	12 m³ for team		
Screen bedding material	Sieve, shovel	7 m³ loose /md			
Offload flat-bed truck or trailer	Shovel	15 m³ loose /md			
Trench backfill, hand	Shovel, spreader, hand-	Backfill, compact, clean-up and load spoil			

Employer:		Contractor:	
Witness:		Witness:	



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ACTIVITY	TOOLS	TASK
compaction	stamper, watering can	4.5 m ³ /md
Collecting loose stone	Gloves, wheelbarrows	Up to 20 m 2.5 m ³ /md 20 to 50 m 2.0 m ³ /md
Quarrying, prying out cracked rock	Crowbar, gloves, sledgehammer.	Up to 20 m 0.5 to 1 m ³ /md
Rock crushing	New Dawn Engineering hand-turned rock crusher, shovel	0.25 m ³ /md (depends on size of feed-stock and size of product)
Backfill trench and compact	Shovel, watering can, hand stamper	3.0 m ³ /md
Lay kerbing on level base	Shovel, rubber mallet, string-line, trowel, wheelbarrow	Straight 6.5 to 10.0 m/md Curved 2.0 to 5.0 m/md
Stone pitching: Plain stone pitching	Club hammer, gloves, string-line, shovel, wheelbarrow, stiff broom, pliers, short crowbar	10 to 15 m ² /md, 200 mm thick
Grouted stone pitching		6 to 10 m ² /md, 200 mm thick
Wired and grouted stone pitching		3 to 5 m ² /md, 200 mm thick
Block paving: placing bedding sand, laying blocks, compacting, joint filling, clean up	Shovel, screed rails and beam, rubber mallet, plate compactor, bass broom, wheelbarrow, gloves	16 to 20 m ² /md
Stormwater drainage pipes: trimming, bedding, laying, backfilling, compaction	Shovel, rake, boning rods, hand stamper, watering can, rope and ground anchors	450 mm dia concrete: 1.2 m/md (needs team of 10) 600 mm dia concrete: 1.0 m/md (needs team of 10) 450 mm dia plastic: 3.5 m/md (needs team of 5)
Concrete base slab: batch, mix, transport, pour and finish off	Batching boxes, wheelbarrow, shovel, screed beam, wood float	0.8 m ³ /md (needs team of 5)
Stone masonry walls	Wheelbarrow, shovel, trowel, club hammer, string line, spirit level, batching box.	1.0 m ³ /md
Gabion work	Gloves, string-line, shovel, wheelbarrow, pliers, short crowbar	1.5 m ³ /md

ABBREVIATIONS USED

md = man-day

dia = diameter

Source :

Construction Education and Training Authority, Learning Material for Unity Standard 15165: "Use LIC Methods to Construct and Maintain Roads and Stormwater Drainage" 2004.

Employer:		Contractor:	
Witness:		Witness:	



C2.2 BILL OF QUANTITIES

Employer:		Contractor:	
Witness:		Witness:	



Johannesburg Water (SOC) Ltd
JW14358
Construction of Woodmead Inlet Bulk
Water Pipeline
Bill of Quantities

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part A - Section 1: Preliminary and General						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 A	1	GENERAL				
8.3	1.01	Scheduled fixed-charge and value-related items:				
PSA 8.3.1	1.01.01	Contractual Requirements	sum	1		
PSA 8.3.2	1.01.02	Establishment of Facilities on the Site				
PSA 8.3.2.1	1.01.02.01	Facilities for Engineer				
	1.01.02.01.01	a) Furnished offices (2 No.)	sum	1		
	1.01.02.01.02	c) Name Boards (4 No.)	sum	1		
	1.01.02.01.03	d) JW ISD team office (2 No.)	sum	1		
	1.01.02.01.04	e) CLO's office (1 No.)	sum	1		
	1.01.02.01.05	f) Meeting Room (1 No.)	sum	1		
	1.01.02.01.06	g) Latrine Facilities (1 No.)	sum	1		
	1.01.02.01.07	h) Parking (3 No.)	sum	1		
	1.01.02.01.08	i) Communication	sum	1		
	1.01.02.01.09	j) Survey equipment, assistants and material	sum	1		
	1.01.02.01.10	k) Computer facilities	sum	1		
PSA 8.3.2.2	1.01.02.02	Facilities for Contractor				
	1.01.02.02.01	a) Offices and storage sheds	sum	1		
	1.01.02.02.02	b) Workshops	sum	1		
	1.01.02.02.03	e) Ablution and latrine facilities	sum	1		
	1.01.02.02.04	f) Tools and equipment	sum	1		
	1.01.02.02.05	g) Water supplies, electric power and communications	sum	1		
	1.01.02.02.06	h) Dealing with water (See 5.5)	sum	1		
	1.01.02.02.07	i) Access (See 5.8)	sum	1		
	1.01.02.02.08	j) Plant	sum	1		
PSA 8.3.3	1.01.03	Other Fixed charge Obligations	sum	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part A - Section 1: Preliminary and General						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
8.3.4	1.01.04	Removal of Site Establishment	sum	1		
PSA 8.3.5	1.01.05	Additional Contractual Obligations				
PSA 8.3.5.1	1.01.05.01	Notice and warning to consumers	sum	1		
PSA 8.3.5.2	1.01.05.02	Compile Health and Safety Plan	sum	1		
PSA 8.3.5.3	1.01.05.03	EMP Obligations	sum	1		
PSA 8.3.5.4	1.01.05.04	Provision of Photographic Records	sum	1		
8.4	1.02	Scheduled time-related items:				
PSA 8.4.1	1.02.01	Contractual Requirements	sum	1		
PSA 8.4.2	1.02.02	Operation and Maintenance of Facilities on Site, for Duration of Construction, except where otherwise stated				
PSA 8.4.2.1	1.02.02.01	Facilities for Engineers				
	1.02.02.01.01	a) Furnished offices (2 No.)	sum	1		
	1.02.02.01.02	c) Name Boards (2 No.)	sum	1		
	1.02.02.01.03	d) Survey assistants and materials	sum	1		
	1.02.02.01.04	e) JW ISD team office (2 No.)	sum	1		
	1.02.02.01.05	f) CLO's office (1 No.)	sum	1		
	1.02.02.01.06	g) Meeting Room (1 No.)	sum	1		
	1.02.02.01.07	h) Latrine Facilities (1 No.)	sum	1		
	1.02.02.01.08	i) Parking (3 No.)	sum	1		
	1.02.02.01.09	j) Communication	sum	1		
	1.02.02.01.10	k) Computer facilities	sum	1		
PSA 8.4.2.2	1.02.02.02	Facilities for Contractor				
	1.02.02.02.01	a) Offices and storage sheds	sum	1		
	1.02.02.02.02	b) Workshops	sum	1		
	1.02.02.02.03	e) Ablution and latrine facilities	sum	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part A - Section 1: Preliminary and General						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	1.02.02.02.04	f) Tools and equipment	sum	1		
	1.02.02.02.05	g) Water supplies, electric power and communications	sum	1		
	1.02.02.02.06	h) Dealing with water (See 5.5)	sum	1		
	1.02.02.02.07	i) Access to site (See 5.8)	sum	1		
	1.02.02.02.08	j) Plant	sum	1		
PSA 8.4.3	1.02.03	Supervision for duration of construction	sum	1		
PSA 8.4.4	1.02.04	Company and head office overhead costs for duration of the Contract	sum	1		
PSA 8.4.5	1.02.05	Other time-related obligations	sum	1		
PSA 8.4.6	1.02.06	Additional Obligations				
PSA 8.4.6.1	1.02.06.01	Implementation of Health and Safety Plan	sum	1		
PSA 8.4.6.2	1.02.06.02	Full-time OHS Officer	sum	1		
PSA 8.4.6.3	1.02.06.03	Provide protective safety clothing	sum	1		
PSA 8.4.6.4	1.02.06.04	EMP Obligations	sum	1		
PSA 8.4.6.5	1.02.06.05	Full-time Environmental Representative	sum	1		
PSA 8.4.6.6	1.02.06.06	On-site security	sum	1		
PSA 8.4.6.7	1.02.06.07	On-site security at Office Park during electrical fence construction	sum	1		
PSA 8.4.6.8	1.02.06.08	Electrical Safety Officer (ESO)	sum	1		
PSA 8.4.6.9	1.02.06.09	Advertising on the Billboard	P. Sum	1	360 000.00	360 000.00
	1.02.06.09.01	a) Overheads, charges and profit on above	%			
PSA 8.4.6.10	1.02.06.10	Temporary Removal and reinstatement of billboard	P. Sum	1	920 000.00	920 000.00
PSA 8.5	1.03.01	a) Community Liaison Officer (CLO and CSO)	P. Sum	1	400 000.00	400 000.00
	1.03.02	b) Overheads, charges and profit on above	%			
	1.03.03	c) Alteration to existing services by authorities	P. Sum	1	1 000 000.00	1 000 000.00
	1.03.04	d) Overheads, charges and profit on above	%			
	1.03.05	e) Reinstatement of asphalt by JRA	P. Sum	1	8 000 000.00	8 000 000.00
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part A - Section 1: Preliminary and General						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	1.03.06	f) Overheads, charges and profit on above	%			
	1.03.07	g) Training	P. Sum	1	400 000.00	400 000.00
	1.03.08	h) Overheads, charges and profit on above	%			
	1.03.09	i) Temporary protection of services	P. Sum	1	400 000.00	400 000.00
	1.03.10	j) Overheads, charges and profit on above	%			
	1.03.11	k) Relocation of endangered plant species	P. Sum	1	150 000.00	150 000.00
	1.03.12	l) Overheads, charges and profit on above	%			
	1.03.13	m) Provision of OHS Mentorship	P. Sum	1	80 000.00	80 000.00
	1.03.14	n) Overheads, charges and profit on above	%			
	1.03.15	o) Internships	P. Sum	1	960 000.00	960 000.00
	1.03.16	p) Overheads, charges and profit on above	%			
	1.03.17	q) Social Consultant	P. Sum	1	600 000.00	600 000.00
	1.03.18	r) Overheads, charges and profit on above	%			
	1.03.19	s) 10% Preliminary and General Items for SMMEs	P. Sum	1	5 500 000.00	5 500 000.00
PSA 8.6	1.04	Prime Cost Items:				
	1.04.01	a) Additional tests required by the Project Manager	PC Sum	1	200 000.00	200 000.00
	1.04.02	b) Charge required by Contractor on subitem 1.04.01 above	%			
PSA 8.7	1.05	Dayworks				
	1.05.01	Labour				
	1.05.01.01	Foreman	h	40		
	1.05.01.02	Welder	h	40		
	1.05.01.03	Skilled labour	h	80		
	1.05.01.04	Semi-skilled labour	h	80		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part A - Section 1: Preliminary and General						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	1.05.01.05	Unskilled labour	h	160		
	1.05.02	Plant				
	1.05.02.01	Excavator (20 t)	h	40		
	1.05.02.02	Excavator (30 t)	h	40		
	1.05.02.03	Loader (0,5 m³ bucket)	h	40		
	1.05.02.04	Tipper truck (10 m³)	h	40		
	1.05.02.05	Walk-behind vibrating roller	h	40		
	1.05.02.06	Welding Machine	h	40		
	1.05.02.07	Water truck (5 000ℓ)	h	40		
	1.05.02.08	Water pump (4 inch)	h	40		
PSA 8.8	1.06	Temporary works (See 8.1.2.1(d))				
PSA 8.8.4	1.06.01	Existing services (see 5.4)				
	1.06.01.01	a) Supply or hire of Ground Penetrating Radar equipment	Sum	1		
	1.06.01.02	b) Excavation by hand to expose existing services in all types of materials	m³	1500		
PSA 8.8.7	1.06.02	Temporary Plastic Barrier Fence	m	6600		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part A - Section 1: Preliminary and General						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 A		SUMMARY				
		GENERAL				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 1: DN 600 Steel Main Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C	1	SITE CLEARANCE Refer to Drawing: JW14358-16941-T-012-S01-00-TMS				
PSC 8.2.1	1.01	Clear and grub				
	1.01.01	Strips, 3 m wide	m	4200		
8.2.2	1.02	Remove and grub large trees and tree stumps of girth				
	1.02.01	Over 1 m and up to and including 2 m	No.	9		
	1.02.02	Over 2 m and up to and including 3 m	No.	15		
PSC 8.2.5	1.03	Take down existing fences, guardrails and masonry walls				
	1.03.01	a) Guardrails	m	800		
	1.03.02	b) Diamond mesh fencing	m	400		
	1.03.03	c) Steel palisade fencing	m	800		
	1.03.04	d) Clearview fencing	m	400		
	1.03.05	e) 110 mm masonry wall	m	100		
	1.03.06	f) 220 mm masonry wall	m	100		
	1.03.07	g) Masonry columns	m ³	100		
8.2.10	1.04	Remove topsoil to nominal depth of 150 mm and stockpile	m ³	1890		
PSC 8.2.11	1.05	Temporary fencing or hoarding				
	1.05.01	a) 1.8 m High Diamond mesh fencing	m	1000		
PSC 8.2.12	1.06	Removal of man-made surfaces and kerbing				
	1.06.01	a) Road materials with Asphalt ≤ 50mm thick	m ²	325		
	1.06.02	b) Road materials with Asphalt > 50 ≤ 100mm thick	m ²	1125		
	1.06.03	c) Interlocking concrete segmental paving blocks, Class 2.6/40MPa (all colours)	m ²	3820		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 1: DN 600 Steel Main Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSC 8.2.13	1.06.04	d) Concrete paving blocks, Class 2.6/40MPa (various sizes)	m ²	500		
	1.06.05	e) Brick paving	m ²	100		
	1.06.06	f) Unreinforced concrete ≤ 75mm thick	m ²	100		
	1.06.07	g) Reinforced concrete ≤ 75mm thick	m ²	250		
	1.06.08	h) Garden, lawns and grassing	m ²	2550		
	1.06.09	i) All types of Kerbing including channel	m	2550		
	1.07	Backfilling and reinstatement of man-made surfaces re-using removed materials				
	1.07.01	a) Interlocking concrete segmental paving blocks, Class 2.6/40MPa (all colours)	m ²	2000		
	1.07.02	b) Concrete paving blocks, Class 2.6/40MPa (various sizes)	m ²	500		
PSC 8.2.14	1.07.03	c) Brick paving	m ²	100		
	1.07.04	d) Kerbing (all types of kerbing)	m	1500		
	1.08	Take down and re-erect existing fences and guardrails				
	1.08.01	a) Guardrails	m	1200		
PSC 8.2.15	1.08.02	b) Diamond mesh fencing	m	800		
	1.08.03	c) Steel palisade fencing	m	800		
	1.08.04	d) Clearview fencing	m	400		
	1.09	Reinstatement of existing masonry walls, steel fences and guard rails using new materials				
PSC 8.2.15.1	1.09.1	Face brick walls				
	1.09.1.1	a) 110 mm wall	m ²	150		
	1.09.1.2	b) 220 mm wall	m ²	150		
	1.09.1.3	c) Masonry columns	m ³	100		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 1: DN 600 Steel Main Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSC 8.2.15.2	1.09.2	Plastered walls				
	1.09.2.01	a) 110 mm wall	m ²	150		
	1.09.2.02	b) 220 mm wall	m ²	150		
	1.09.2.03	c) Masonry columns	m ³	100		
PSC 8.2.15.3	1.09.3	Steel fences				
	1.09.3.01	a) Diamond mesh fencing	m ²	200		
	1.09.3.02	b) Palisade fencing	m ²	1800		
	1.09.3.03	c) Clearview fencing	m ²	150		
PSC 8.2.16	1.10	Protection of trees	No	20		
PSC 8.2.21	1.11	Temporary removal and reinstatement of electrical infrastructure				
	1.11.01	a) Electrical Poles	No	20		
	1.11.02	b) Street Lights	No	20		
	1.11.03	c) Traffic Signals	No	40		
PSC 8.2.22	1.12	Temporary removal and reinstatement of electrical fencing				
	1.12.01	a) Wall top mounted	m	175		
	1.12.02	b) Free standing (fence height up to 3 meter)	m	500		
	1.12.03	c) Add-On Fence attached to palisade fence (fence height up to 3 meter)	m	500		
PSC 8.2.23	1.13	Temporary electrical fencing				
	1.13.01	a) Wall top mounted	m	500		
	1.13.02	b) Free standing (fence height up to 3 meter)	m	500		
PSC 8.2.24	1.14	Construction of dry stack precast block retaining wall	m ²	60		
Total carried forward to summary						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 1: DN 600 Steel Main Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 DB	2	EARTHWORKS (PIPE TRENCHES)				
		Refer to Drawing: JW14358-16941-T-012-S01-00-TMS				
PSDB 8.3.2	2.01	a) Excavate in all materials, for trenches, backfill compact and dispose of surplus material				
	2.01.01	Pipes of diameter of DN 600 for depths				
	2.01.01.01	Up to 1,0 m	m	100		
	2.01.01.02	Over 1,0 m up to 2,0 m	m	2500		
	2.01.01.03	Over 2,0 m up to 3,0 m	m	2500		
	2.01.01.04	Over 3,0 m up to 4,0 m	m	380		
PSDB 8.3.2	2.02	b) Extra over item 2.01 above for				
	2.02.01	1) Intermediate excavation	m ³	2250		
	2.02.02	2) Hard rock excavation	m ³	2250		
	2.02.03	3) Hand excavation where ordered by the Project Manager				
	2.02.03.01	a) Soft material	m ³	700		
	2.02.03.02	b) Intermediate material	m ³	700		
	2.02.03.03	c) Hard material	m ³	200		
PSDB 8.3.2	2.02.04	4) Backfill stabilized with 5% cement where directed by the Project Manager	m ³	700		
PSDB 8.3.2	2.02.05	5) Soilcrete backfill where directed by the Project Manager	m ³	700		
8.3.2	2.02.06	c) Excavate and dispose of unsuitable material from trench bottom (provisional)	m ³	800		
8.3.3	2.03	Excavation Ancillaries				
8.3.3.1	2.03.01	Make up deficiency in backfill material				
	2.03.01.01	a) from other necessary excavations on site	m ³	600		
Total carried forward						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 1: DN 600 Steel Main Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	2.03.01.02	c) by importation from commercial or off-site sources	m ³	600		
PSDB 8.3.3.3	2.03.02	Compaction in roadways	m ³	850		
PSDB 8.3.4	2.04	Particular Items				
PSDB 8.3.4 (a)	2.04.01	a) Shore trench opposite structure or service	m	1000		
PSDB 8.3.4 (c)	2.04.02	Dealing with groundwater				
	2.04.02.01	(1) Crushed stone (14 mm or 20 mm)	m ³	400		
	2.04.02.02	(2) Nonwoven, needle punched, continuous filament, polyester Geotextile	m ²	3600		
PSDB 8.3.5	2.05	Existing Services that Intersect or Adjoin a Pipe Trench				
PSDB 8.3.5	2.05.01	a) Services that intersect a trench				
	2.05.01.01	Water pipes up to DN 225	No.	20		
	2.05.01.02	Water mains DN 250 up to DN 1500	No.	10		
	2.05.01.03	Sewer pipes up to DN 175	No.	20		
	2.05.01.04	Sewer mains DN 200 up to DN 1500	No.	10		
	2.05.01.05	Stormwater pipes (any size)	No.	40		
	2.05.01.06	Cables (Electrical, data or telephone)	No.	50		
	2.05.01.07	Drainage furrows and channels	No.	20		
PSDB 8.3.5	2.05.02	b) Services that adjoin a trench				
	2.05.02.01	Water pipes up to DN 225	m	500		
	2.05.02.02	Water mains DN 250 up to DN 1500	m	200		
	2.05.02.03	Sewer pipes up to DN 175	m	500		
	2.05.02.04	Sewer mains DN 200 up to DN 1500	m	200		
	2.05.02.05	Stormwater pipes (any size)	m	1000		
	2.05.02.06	Cables (Electrical, data or telephone)	m	1000		
Total carried forward						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 1: DN 600 Steel Main Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSDB 8.3.5 c	2.05.02.07	Drainage furrows and channels	m	200		
	2.06.03	c) Services that require special care				
	2.06.03.01	Crossing underneath power lines up to 11 kV	No.	2		
	2.06.03.02	Crossing underneath power lines up to 300 kV	No.	1		
	2.06.03.03	Crossing underneath telephone lines	No.	20		
	2.06.02.04	Working alongside electricity poles	No.	25		
	2.06.02.05	Working alongside telephone poles	No.	55		
	2.06.02.06	Working alongside traffic signals	No.	100		
PSDB 8.3.6	2.06.02.07	Working alongside street lights	No.	200		
	2.07	Finishing				
PSDB8.3.6.1	2.07.01	Reinstate road surfaces complete with all courses				
	2.07.01.01	a) Gravel on shoulders	m ²	126		
	2.07.01.02	b) Asphalt of thickness 40 mm in parking area	m ²	210		
	2.07.01.03	c) Asphalt of thickness 40 mm in roadway	m ²	420		
	2.07.01.04	d) Re-instatement of unreinforced concrete	m ²	2050		
	2.07.01.05	e) Re-instatement of reinforced concrete	m ³	2050		
	2.07.01.06	f) Re-instatement of bricks, concrete pre-cast units and interlocking concrete segmental paving	m ²	4100		
	2.07.01.07	g) Re-instatement of grouted brick paving, complete	m ²	4100		
	2.07.01.08	h) Re-instatement of gardens, lawns and grassing	m ²	3420		
Total carried forward						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 1: DN 600 Steel Main Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSDB8.3.6.2	2.07.02	Reinstatement of surfacing for walkways				
	2.07.02.01	a) Re-instatement of walkways with unreinforced concrete	m ²	200		
	2.07.02.02	b) Re-instatement of walkways with interlocking concrete segmental paving	m ²	1500		
PSDB8.3.6.3	2.07.03	Reinstatement of kerbs and channels				
		a) Re-instatement of all types of precast kerbing, complete	m	500		
		b) Re-instatement of precast concrete gutter, complete	m	300		
		c) Re-instatement of all types of insitu cast concrete kerbing, complete	m	100		
		d) Re-instatement of all types of insitu cast concrete gutter, complete	m	300		
PSDB 8.3.7	2.08	Accommodation of traffic	sum	1		
Total carried forward to summary						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 1: DN 600 Steel Main Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 L	3	MEDIUM-PRESSURE PIPELINES				
		Refer to Drawing: JW14358-16941-T-012-S01-00-TMS				
PSL 8.2.16	3.01	Supply, Lay and Bed Steel Pipes Complete with Welded Joints				
	3.01.01	DN 600 welded steel; 6 mm wall thickness; API 5L X42 steel pipe, with Rigid Polyurethane Coating (RPU) and Solvent Free Liquid Epoxy lining (SFE); Bedded as per Drg. JW14358-16941-T-017-S05-00-TMS	m	5000		
PSL 8.2.17	3.02	Supply and install Steel Pipes inside Concrete Pipe Jacking Sleeve Complete with Welded Joints				
	3.02.01	DN 600 steel; 6 mm wall thickness; API 5L X42 steel pipe	m	110		
PSL 8.2.18	3.03	Supply and install Steel Pipes inside Concrete Pipe Tunnel at M1 crossing Complete with Flanged Joints				
	3.03.01	DN 600 flanged steel pipe; 6 mm wall thickness; API 5L X42 steel pipe; with Rigid Polyurethane Coating (RPU) and Solvent Free Liquid Epoxy lining (SFE); supplied in lengths of exactly 6000 mm; both ends flanged to SANS 1123 Table 1600/3	m	84		
PSL 8.2.19	3.04	Extra over 3.01 for the Supplying, Laying, Welding or Jointing and Bedding of Steel specials				
	3.04.01	DN 600 steel; 6 mm wall thickness; API 5LX42 steel, long radius bends, with Rigid Polyurethane Coating (RPU) and Solvent Free Liquid Epoxy lining (SFE):				
	3.04.01.01	Item 1: DN 600, 46° up to 90°, 5 segment bend to SANS 719; centre line radius R = 1220 mm, unflanged	No.	8		
	3.04.01.02	Item 2: DN 600, 23° up to 45°, 3 segment bend to SANS 719; centre line radius R = 1220 mm, unflanged	No.	6		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 1: DN 600 Steel Main Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.04.01.03	Item 3: DN 600, 11.25 up to 22.5°, 2 segment bend to SANS 719; centre line radius R = 1220 mm, unflanged	No.	8		
	3.04.01.04	Item 4: DN 600, 90°, Flanged 5 segment bend to SANS 719; centre line radius R = 1220 mm	No.	1		
	3.04.02	Mitres up to 11.25°	No.	46		
	3.04.03	DN 600 loose flanges to SANS 1123 table 1600/3 for welding on site	No.	24		
PSL 8.2.22	3.05	Flushing and sterilising of pipelines				
	3.05.01	DN 600 steel pipe	m	5180		
PSL 8.2.23	3.06	Hydraulic field-testing of pipelines				
	3.06.01	DN 600 steel pipe	m	5180		
PSL 8.2.24	3.07	Pipeline and Valve Markers				
	3.07.01	a) Precast Concrete Marker (drawing JW14358-16941-T-017-S07-00-TMS)	No.	40		
	3.07.02	b) Kerb Marking (drawing JW14358-16941-T-017-S07-00-TMS)	No.	40		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 1: DN 600 Steel Main Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 LB 4	4	BEDDING (PIPES)				
		Refer to Drawing: JW14358-16941-T-012-S01-00-TMS				
PSLB 8.2.1.1	4.01	Provision of bedding from trench excavations without the need for screening or other treatments				
	4.01.01	Selected granular material	m ³	300		
	4.01.02	Selected fill material	m ³	600		
PSLB 8.2.1.2	4.02	Provision of bedding from trench excavations including screening or other treatments				
	4.02.01	Selected granular material	m ³	600		
	4.02.02	Selected fill material	m ³	400		
8.2.2	4.03	Supply only of bedding by importation				
	4.03.01	From other necessary excavations (Provisional)				
	4.03.01.01	Selected granular material	m ³	100		
	4.03.01.02	Selected fill material	m ³	100		
	4.03.02	From commercial sources (Provisional)				
	4.03.02.01	Selected granular material	m ³	3700		
	4.03.02.02	Selected fill material	m ³	400		
8.2.4	4.04	Encasing of pipes in concrete				
	4.04.01	Encasing DN 600 steel pipe				
	4.04.01.01	Class 15 MPa/19 mm	m ³	20		
	4.04.01.02	Class 30 MPa/19 mm	m ³	10		
PSLB 8.2.6	4.05	Extra over items 4.01 and 4.02 for bedding stabilized with 5% cement	m ³	400		
PSLB 8.2.7	4.06	Compaction Testing using a Nuclear Moisture Density Gauge	No.	52		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 1: DN 600 Steel Main Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		SUMMARY				
SANS 1200 C		SITE CLEARANCE				
SANS 1200 DB		EARTHWORKS (PIPE TRENCHES)				
SANS 1200 L		MEDIUM-PRESSURE PIPELINES				
SANS 1200 LB		BEDDING (PIPES)				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 2: DN 600 Steel Bypass Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C	1	SITE CLEARANCE Refer to Drawing: JW14358-16941-T-012-S11-00-TMS				
PSC 8.2.1	1.01	Clear and Grub				
	1.01.01	Strips, 3 m wide	m	500		
8.2.2	1.02	Remove and grub large trees and tree stumps of girth				
	1.02.01	Over 1 m and up to and including 2 m	No.	3		
	1.02.02	Over 2 m and up to and including 3 m	No.	5		
PSC 8.2.5	1.03	Take down existing fences, guardrails and masonry walls				
	1.03.01	a) Guardrails	m	200		
	1.03.02	b) Diamond mesh fencing	m	50		
	1.03.03	c) Steel palisade fencing	m	30		
	1.03.04	d) Clearview fencing	m	50		
	1.03.05	e) 110 mm masonry wall	m	30		
	1.03.06	f) 220 mm masonry wall	m	30		
8.2.10	1.04	Remove topsoil to nominal depth of 150 mm and stockpile	m ³	225		
PSC 8.2.11	1.05	Temporary fencing or hoarding				
		a) 1.8 m High Diamond mesh fencing	m	300		
PSC 8.2.12	1.06	Removal of man-made surfaces and kerbing				
	1.06.01	a) Road materials with Asphalt ≤ 50mm thick	m ²	200		
	1.06.02	b) Road materials with Asphalt > 50 ≤ 100mm thick	m ²	600		
	1.06.03	c) Interlocking concrete segmental paving blocks, Class 2.6/40MPa (all colours)	m ²	100		
	1.06.04	d) Concrete paving blocks, Class 2.6/40MPa (various sizes)	m ²	50		
Total carried forward						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 2: DN 600 Steel Bypass Pipeline

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSC 8.2.13	1.06.05	e) Brick paving	m ²	50		
	1.06.06	f) Unreinforced concrete ≤ 75mm thick	m ²	50		
	1.06.07	g) Reinforced concrete ≤ 75mm thick	m ²	50		
	1.06.08	h) Garden, lawns and grassing	m ²	50		
	1.06.09	i) All types of Kerbing including channel	m	300		
	1.07	Backfilling and reinstatement of man-made surfaces re-using removed materials				
	1.07.01	a) Interlocking concrete segmental paving blocks, Class 2.6/40MPa (all colours)	m ²	100		
	1.07.02	b) Concrete paving blocks, Class 2.6/40MPa (various sizes)	m ²	50		
	1.07.03	c) Brick paving	m ²	50		
	1.07.04	d) Kerbing (all types of kerbing)	m	200		
PSC 8.2.14	1.08	Take down and re-erect existing fences and guardrails				
	1.08.01	a) Guardrails	m	160		
	1.08.02	b) Diamond mesh fencing	m	80		
	1.08.03	c) Steel palisade fencing	m	40		
	1.08.04	d) Clearview fencing	m	40		
PSC 8.2.15	1.09	Reinstatement of existing masonry walls, steel fences and guard rails using new materials				
PSC 8.2.15.1	1.09.1	Face brick walls				
	1.09.1.1	a) 110 mm wall	m ²	20		
	1.09.1.2	b) 220 mm wall	m ²	20		
PSC 8.2.15.2	1.09.2	Plastered walls				
	1.09.2.01	a) 110 mm wall	m ²	20		
	1.09.2.02	b) 220 mm wall	m ²	20		
Total carried forward						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 2: DN 600 Steel Bypass Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSC 8.2.15.3	1.09.3	Steel fences				
	1.09.3.01	b) Palisade fencing	m ²	20		
	1.09.3.02	c) Clearview fencing	m ²	20		
PSC 8.2.16	1.10	Protection of trees	No	6		
PSC 8.2.21	1.11	Temporary removal and reinstatement of electrical infrastructure				
	1.11.01	a) Electrical Poles	No	6		
	1.11.02	b) Street Lights	No	6		
	1.11.03	c) Traffic Signals	No	5		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 2: DN 600 Steel Bypass Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
SANS 1200 DB	2	EARTHWORKS (PIPE TRENCHES)				
		Refer to Drawing: JW14358-16941-T-012-S11-00-TMS				
PSDB 8.3.2	2.01	a) Excavate in all materials, for trenches, backfill compact and dispose of surplus material				
	2.01.01	Pipes of diameter of DN 600 for depths:				
	2.01.01.01	Up to 1,0 m	m	30		
	2.01.01.02	Over 1,0 m up to 2,0 m	m	50		
	2.01.01.03	Over 2,0 m up to 3,0 m	m	360		
	2.01.01.04	Over 3,0 m up to 4,0 m	m	150		
PSDB 8.3.2	2.02	Extra over item 2.01 above for:				
	2.02.01	1) Intermediate excavation	m ³	180		
	2.02.02	2) Hard rock excavation	m ³	180		
	2.02.03	3) Hand excavation where ordered by the Project Manager				
	2.02.03.01	a) Soft material	m ³	180		
	2.02.03.02	b) Intermediate material	m ³	180		
	2.02.03.03	c) Hard material	m ³	90		
PSDB 8.3.2	2.02.04	4) Backfill stabilized with 5% cement where directed by the Project Manager	m ³	350		
PSDB 8.3.2	2.02.05	5) Soilcrete backfill where directed by the Project Manager	m ³	350		
8.3.2	2.02.06	c) Excavate and dispose of unsuitable material from trench bottom (provisional)	m ³	100		
8.3.3	2.03	Excavation Ancillaries				
8.3.3.1	2.03.01	Make up deficiency in backfill material				
	2.03.01.01	a) from other necessary excavations on site	m ³	80		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 2: DN 600 Steel Bypass Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	2.03.01.02	c) by importation from commercial or off-site sources selected by the contractor	m ³	80		
PSDB 8.3.3.3	2.03.02	Compaction in roadways	m ³	1200		
PSDB 8.3.4	2.04	Particular Items				
PSDB 8.3.4 (a)	2.02.04	a) Shore trench opposite structure or service	m	300		
PSDB 8.3.4 (c)	2.04.02	Dealing with groundwater				
	2.04.02.01	(1) Crushed stone (14 mm or 20 mm)	m ³	40		
	2.04.02.02	(2) Nonwoven, needle punched, continuous filament, polyester Geotextile	m ²	360		
PSDB 8.3.5	2.05	Existing Services that Intersect or Adjoin a Pipe Trench				
PSDB 8.3.5	2.05.01	a) Services that intersect a trench				
	2.05.01.01	Water pipes up to DN 225	No.	5		
	2.05.01.02	Water mains DN 250 up to DN 1500	No.	3		
	2.05.01.03	Sewer pipes up to DN 175	No.	5		
	2.05.01.04	Sewer mains DN 200 up to DN 1500	No.	3		
	2.05.01.05	Stormwater pipes (any size)	No.	10		
	2.05.01.06	Cables (Electrical, data or telephone)	No.	20		
	2.05.01.07	Drainage furrows and channels	No.	5		
PSDB 8.3.5	2.05.02	b) Services that adjoin a trench				
	2.05.02.01	Water pipes up to DN 225	m	100		
	2.05.02.02	Water mains DN 250 up to DN 1500	m	50		
	2.05.02.03	Sewer pipes up to DN 175	m	100		
	2.05.02.04	Sewer mains DN 200 up to DN 1500	m	50		
	2.05.02.05	Stormwater pipes (any size)	m	100		
	2.05.02.06	Cables (Electrical, data or telephone)	m	100		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 2: DN 600 Steel Bypass Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSDB 8.3.5 c	2.05.02.07	Drainage furrows and channels	m	60		
	2.06.03	c) Services that require special care				
	2.06.03.01	Crossing underneath power lines up to 11 kV	No.	1		
	2.06.03.02	Crossing underneath power lines up to 300 kV	No.	1		
	2.06.03.03	Crossing underneath telephone lines	No.	4		
	2.06.02.04	Working alongside electricity poles	No.	15		
	2.06.02.05	Working alongside telephone poles	No.	5		
	2.06.02.06	Working alongside traffic signals	No.	4		
	2.06.02.07	Working alongside street lights	No.	40		
PSDB 8.3.6	2.07	Finishing				
PSDB8.3.6.1	2.07.01	Reinstate road surfaces complete with all courses				
	2.07.01.01	a) Gravel on shoulders	m ²	45		
	2.07.01.02	b) Asphalt of thickness 40 mm in parking area	m ²	100		
	2.07.01.03	c) Asphalt of thickness 40 mm in roadway	m ²	700		
	2.07.01.04	d) Re-instatement of unreinforced concrete	m ²	60		
	2.07.01.05	e) Re-instatement of reinforced concrete	m ³	60		
	2.07.01.06	f) Re-instatement of bricks, concrete pre-cast units and interlocking concrete segmental paving	m ²	100		
	2.07.01.07	g) Re-instatement of grouted brick paving, complete	m ²	50		
	2.07.01.08	h) Re-instatement of gardens, lawns and grassing	m ²	50		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 2: DN 600 Steel Bypass Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSDB8.3.6.2	2.07.02	Reinstatement of surfacing for walkways				
	2.07.02.01	a) Re-instatement of walkways with unreinforced concrete	m ²	60		
	2.07.02.02	b) Re-instatement of walkways with interlocking concrete segmental paving	m ²	360		
PSDB8.3.6.3	2.07.03	Reinstatement of kerbs and channels				
		a) Re-instatement of all types of precast kerbing, complete	m	200		
		b) Re-instatement of precast concrete gutter, complete	m	150		
		c) Re-instatement of all types of insitu cast concrete kerbing, complete	m	100		
		d) Re-instatement of all types of insitu cast concrete gutter, complete	m	150		
PSDB 8.3.7	2.08	Accommodation of traffic	sum	1		
Total carried forward to summary						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 2: DN 600 Steel Bypass Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 L	3	MEDIUM-PRESSURE PIPELINES				
		Refer to Drawing: JW14358-16941-T-012-S11-00-TMS				
PSL 8.2.16	3.01	Supply, Lay and Bed Steel Pipes Complete with Welded Joints				
	3.01.01	DN 600 welded steel pipe; 6 mm wall thickness; API 5L X42 steel pipe; with Rigid Polyurethane Coating (RPU) and Solvent Free Liquid Epoxy lining (SFE); Bedded as per Drg. JW14358-16941-T-017-S05-00-TMS	m	510		
PSL 8.2.19	3.02	Extra over 3.01 for the Supplying, Laying, Welding or Jointing and Bedding of Steel specials				
	3.02.01	DN 600 steel; 6 mm wall thickness; API 5LX42 steel, long radius bends, with Rigid Polyurethane Coating (RPU) and Solvent Free Liquid Epoxy lining (SFE):				
	3.02.01.01	Item 1: DN 600, 46° up to 90°, 5 segment bend to SANS 719; centre line radius R = 1220 mm, unflanged	No.	3		
	3.02.01.02	Item 2: DN 600, 23° up to 45°, 3 segment bend to SANS 719; centre line radius R = 1220 mm, unflanged	No.	2		
	3.02.01.03	Item 3: DN 600, 11.25 up to 22.5°, 2 segment bend to SANS 719; centre line radius R = 1220 mm, unflanged	No.	2		
	3.02.02	Mitres up to 11.25°	No.	4		
	3.02.03	DN 600 loose flanges to SANS 1123 table 1600/3 for welding on site	No.	6		
PSL 8.2.22	3.03	Flushing and sterilising of pipelines				
	3.03.01	DN 600 steel pipe	m	510		
PSL 8.2.23	3.04	Hydraulic field-testing of pipelines				
	3.04.01	DN 600 steel pipe	m	510		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 2: DN 600 Steel Bypass Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSL 8.2.24	3.05	Pipeline and Valve Markers				
	3.05.01	a) Precast Concrete Marker (drawing JW14358-16941-T-017-S07-00-TMS)	No.	10		
	3.05.02	b) Kerb Marking (drawing JW14358-16941-T-017-S07-00-TMS)	No.	10		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 2: DN 600 Steel Bypass Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 LB	4	BEDDING (PIPES)				
		Refer to Drawing: JW14358-16941-T-012-S11-00-TMS				
PSLB 8.2.1.1	4.01	Provision of bedding from trench excavations without the need for screening or other treatments				
	4.01.01	Selected granular material	m ³	30		
	4.01.02	Selected fill material	m ³	60		
PSLB 8.2.1.2	4.02	Provision of bedding from trench excavations including screening or other treatments				
	4.02.01	Selected granular material	m ³	60		
	4.02.02	Selected fill material	m ³	40		
8.2.2	4.03	Supply only of bedding by importation				
	4.03.01	From other necessary excavations (Provisional)				
	4.03.01.01	Selected granular material	m ³	20		
	4.03.01.02	Selected fill material	m ³	20		
	4.03.02	From commercial sources (Provisional)				
	4.03.02.01	Selected granular material	m ³	370		
	4.03.02.02	Selected fill material	m ³	40		
8.2.4	4.04	Encasing of pipes in concrete				
	4.04.01	Encasing DN 600 steel pipe				
	4.04.01.01	Class 15 MPa/19 mm	m ³	10		
	4.04.01.02	Class 30 MPa/19 mm	m ³	5		
PSLB 8.2.6	4.05	Extra over items 4.01 and 4.02 for bedding stabilized with 5% cement	m ³	40		
PSLB 8.2.7	4.06	Compaction Testing using a Nuclear Moisture Density Gauge	No.	10		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 2: DN 600 Steel Bypass Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C		SUMMARY				
SANS 1200 DB		SITE CLEARANCE				
SANS 1200 L		EARTHWORKS (PIPE TRENCHES)				
SANS 1200 LB		MEDIUM-PRESSURE PIPELINES				
		BEDDING (PIPES)				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 3: DN 800 Steel Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C	1	SITE CLEARANCE Refer to Drawing: JW14358-16941-T-012-S14-00-TMS				
PSC 8.2.1	1.01	Clear and Grub				
	1.01.01	Strips, 3 m wide	m	120		
8.2.2	1.02	Remove and grub large trees and tree stumps of				
	1.02.01	Over 1 m and up to and including 2 m	No.	2		
	1.02.02	Over 2 m and up to and including 3 m	No.	2		
PSC 8.2.5	1.03	Take down existing fences, guardrails and masonry walls				
	1.03.01	a) Guardrails	m	30		
	1.03.02	b) Diamond mesh fencing	m	20		
	1.03.03	c) Steel palisade fencing	m	10		
	1.03.04	d) Clearview fencing	m	20		
	1.03.05	e) 110 mm masonry wall	m	10		
	1.03.06	f) 220 mm masonry wall	m	10		
8.2.10	1.04	Remove topsoil to nominal depth of 150 mm and	m ³	54		
PSC 8.2.11	1.05	Temporary fencing or hoarding				
	1.05.01	a) 1.8 m High Diamond mesh fencing	m	100		
PSC 8.2.12	1.06	Removal of man-made surfaces and kerbing				
	1.06.01	a) Road materials with Asphalt ≤ 50mm thick	m ²	20		
	1.06.02	b) Road materials with Asphalt > 50 ≤ 100mm thick	m ²	40		
	1.06.03	c) Interlocking concrete segmental paving blocks,	m ²	40		
	1.06.04	d) Concrete paving blocks, Class 2.6/40MPa	m ²	20		
Total carried forward						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 3: DN 800 Steel Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	1.06.05	e) Brick paving	m ²	20		
	1.06.06	f) Unreinforced concrete ≤ 75mm thick	m ²	20		
	1.06.07	g) Reinforced concrete ≤ 75mm thick	m ²	20		
	1.06.08	h) Garden, lawns and grassing	m ²	40		
	1.06.09	i) All types of Kerbing including channel	m	50		
PSC 8.2.13	1.07	Backfilling and reinstatement of man-made				
	1.07.01	a) Interlocking concrete segmental paving blocks,	m ²	40		
	1.07.02	b) Concrete paving blocks, Class 2.6/40MPa	m ²	20		
	1.07.03	c) Brick paving	m ²	20		
	1.07.04	d) Kerbing (all types of kerbing)	m	50		
PSC 8.2.14	1.08	Take down and re-erect existing fences and				
	1.08.01	a) Guardrails	m	30		
	1.08.02	b) Diamond mesh fencing	m	10		
	1.08.03	c) Steel palisade fencing	m	10		
	1.08.04	d) Clearview fencing	m	10		
PSC 8.2.15	1.09	Reinstatement of existing masonry walls and steel fences				
PSC 8.2.15.1	1.09.1	Face brick walls				
	1.09.1.1	a) 110 mm wall	m ²	10		
	1.09.1.2	b) 220 mm wall	m ²	10		
PSC 8.2.15.2	1.09.2	Plastered walls				
	1.09.2.01	a) 110 mm wall	m ²	10		
	1.09.2.02	b) 220 mm wall	m ²	10		
Total carried forward						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□



Part B - Section 3: DN 800 Steel Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSC 8.2.15.3	1.10.3	Steel fences				
	1.10.3.01	b) Palisade fencing	m ²	10		
	1.10.3.02	c) Clearview fencing	m ²	10		
PSC 8.2.16	1.11	Protection of trees	No	6		
PSC 8.2.21	1.11	Temporary removal and reinstatement of				
	1.11.01	a) Electrical Poles	No	1		
	1.11.02	b) Street Lights	No	1		
Total carried forward to summary						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 3: DN 800 Steel Pipeline

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 DB	2	EARTHWORKS (PIPE TRENCHES)				
		Refer to Drawing: JW14358-16941-T-012-S14-00-TMS				
PSDB 8.3.2	2.01	a) Excavate in all materials, for trenches, backfill compact and dispose of surplus material				
	2.01.01	Pipes of diameter of DN 800 for depths:				
	2.01.01.01	Up to 1,0 m	m	10		
	2.01.01.02	Over 1,0 m up to 2,0 m	m	10		
	2.01.01.03	Over 2,0 m up to 3,0 m	m	105		
	2.01.01.04	Over 3,0 m up to 4,0 m	m	10		
PSDB 8.3.2	2.02	b) Extra over item 2.01 above for:				
	2.02.01	1) Intermediate excavation	m ³	50		
	2.02.02	2) Hard rock excavation	m ³	50		
	2.02.03	3) Hand excavation where ordered by the Project				
	2.02.03.01	a) Soft material	m ³	50		
	2.02.03.02	b) Intermediate material	m ³	50		
	2.02.03.03	c) Hard material	m ³	30		
PSDB 8.3.2	2.02.04	4) Backfill stabilized with 5% cement where directed	m ³	100		
PSDB 8.3.2	2.02.05	5) Soilcrete backfill where directed by the Project	m ³	100		
8.3.2	2.02.06	c) Excavate and dispose of unsuitable material from	m ³	80		
8.3.3	2.03	Excavation Ancillaries				
8.3.3.1	2.03.01	Make up deficiency in backfill material				
	2.03.01.01	a) from other necessary excavations on site	m ³	60		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 3: DN 800 Steel Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	2.03.01.02	c) by importation from commercial or off-site sources	m ³	60		
PSDB 8.3.3.3	2.03.02	Compaction in roadways	m ³	105		
PSDB 8.3.4	2.04	Particular Items				
PSDB 8.3.4 (a)	2.04.01	a) Shore trench opposite structure or service	m	100		
PSDB 8.3.4 (c)	2.04.02	Dealing with groundwater				
	2.04.02.01	(1) Crushed stone (14 mm or 20 mm)	m ³	20		
	2.04.02.02	(2) Nonwoven, needle punched, continuous filament,	m ²	200		
PSDB 8.3.5	2.05	Existing Services that Intersect or Adjoin a Pipe Trench				
PSDB 8.3.5	2.05.01	a) Services that intersect a trench				
	2.05.01.01	Water pipes up to DN 225	No.	2		
	2.05.01.02	Water mains DN 250 up to DN 1500	No.	1		
	2.05.01.03	Sewer pipes up to DN 175	No.	2		
	2.05.01.04	Sewer mains DN 200 up to DN 1500	No.	1		
	2.05.01.05	Stormwater pipes (any size)	No.	2		
	2.05.01.06	Cables (Electrical, data or telephone)	No.	5		
	2.05.01.07	Drainage furrows and channels	No.	1		
PSDB 8.3.5	2.05.02	b) Services that adjoin a trench				
	2.05.02.01	Water pipes up to DN 225	m	20		
	2.05.02.02	Water mains DN 250 up to DN 1500	m	10		
	2.05.02.03	Sewer pipes up to DN 175	m	20		
	2.05.02.04	Sewer mains DN 200 up to DN 1500	m	10		
	2.05.02.05	Stormwater pipes (any size)	m	30		
	2.05.02.06	Cables (Electrical, data or telephone)	m	50		
Total carried forward						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 3: DN 800 Steel Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSDB 8.3.5 c	2.05.02.07	Drainage furrows and channels	m	20		
	2.06.03	c) Services that require special care				
	2.06.03.01	Crossing underneath power lines up to 11 kV	No.	1		
	2.06.03.02	Crossing underneath power lines up to 300 kV	No.	1		
	2.06.03.03	Crossing underneath telephone lines	No.	2		
	2.06.02.04	Working alongside electricity poles	No.	4		
	2.06.02.05	Working alongside telephone poles	No.	2		
	2.06.02.06	Working alongside traffic signals	No.	2		
PSDB 8.3.6	2.06.02.07	Working alongside street lights	No.	20		
	2.07	Finishing				
PSDB8.3.6.1	2.07.01	Reinstate road surfaces complete with all courses				
	2.07.01.01	a) Gravel on shoulders	m ³	20		
	2.07.01.02	b) Asphalt of thickness 40 mm in parking area	m ²	35		
	2.07.01.03	c) Asphalt of thickness 40 mm in roadway	m ²	65		
	2.07.01.04	d) Re-instatement of unreinforced concrete	m ²	10		
	2.07.01.05	e) Re-instatement of reinforced concrete	m ³	5		
	2.07.01.06	f) Re-instatement of bricks, concrete pre-cast units	m ²	20		
	2.07.01.07	g) Re-instatement of grouted brick paving, complete	m ²	10		
	2.07.01.08	h) Re-instatement of gardens, lawns and grassing	m ²	10		
Total carried forward						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 3: DN 800 Steel Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSDB8.3.6.2	2.07.02	Reinstatement of surfacing for walkways				
	2.07.02.01	a) Re-instatement of walkways with unreinforced	m ²	10		
	2.07.02.02	b) Re-instatement of walkways with interlocking	m ²	30		
PSDB8.3.6.3	2.07.03	Reinstatement of kerbs and channels				
		a) Re-instatement of all types of precast kerbing,	m	10		
		b) Re-instatement of precast concrete gutter,	m	10		
		c) Re-instatement of all types of insitu cast concrete	m	5		
		d) Re-instatement of all types of insitu cast concrete	m	5		
PSDB 8.3.7	2.08	Accommodation of traffic	sum	1		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 3: DN 800 Steel Pipeline

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 L	3	MEDIUM-PRESSURE PIPELINES				
		Refer to Drawing: JW14358-16941-T-012-S14-00-TMS				
PSL 8.2.16	3.01	Supply, Lay and Bed Steel Pipes Complete with				
	3.03.01	DN 800 steel; 8 mm wall thickness; API 5L X42 steel pipe; with Rigid Polyurethane Coating (RPU) and Solvent Free Liquid Epoxy lining (SFE); Bedded as per Drg. JW14358-16941-T-017-S05-00-TMS	m	115		
PSL 8.2.19	3.02	Extra over 3.01 for the Supplying, Laying,				
	3.02.01	DN 800 steel; 8 mm wall thickness; API 5LX42 steel, long radius bends; with Rigid Polyurethane Coating (RPU) and Solvent Free Liquid Epoxy lining (SFE):				
	3.02.01.01	Item 1: DN 800, 46° up to 90°, 5 segment bend to	No.	2		
	3.02.01.02	Item 2: DN 800, 23° up to 45°, 3 segment bend to	No.	2		
	3.02.01.03	Item 3: DN 800, 11.25 up to 22.5°, 2 segment bend	No.	2		
	3.02.02	Mitres up to 11.25°	No.	4		
	3.02.03	DN 800 loose flanges to SANS 1123 Table 2500/3	No.	4		
PSL 8.2.22	3.03	Flushing and sterilising of pipelines				
	3.03.01	DN 800 steel pipe	m	115		
PSL 8.2.23	3.04	Hydraulic field-testing of pipelines				
	3.04.01	DN 800 steel pipe	m	115		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 3: DN 800 Steel Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSL 8.2.24	3.05	Pipeline and Valve Markers				
	3.05.01	a) Precast Concrete Marker (drawing JW14358-16941-T-017-S07-00-TMS)	No.	5		
	3.05.02	b) Kerb Marking (drawing JW14358-16941-T-017-S07-00-TMS)	No.	5		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 3: DN 800 Steel Pipeline

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 LB	4	BEDDING (PIPES)				
		Refer to Drawing: JW14358-16941-T-012-S14-00-TMS				
PSLB 8.2.1.1	4.01	Provision of bedding from trench excavations without the need for screening or other treatments				
	4.01.01	Selected granular material	m ³	10		
	4.01.02	Selected fill material	m ³	15		
PSLB 8.2.1.2	4.02	Provision of bedding from trench excavations including screening or other treatments				
	4.02.01	Selected granular material	m ³	10		
	4.02.02	Selected fill material	m ³	15		
8.2.2	4.03	Supply only of bedding by importation				
	4.03.01	From other necessary excavations (Provisional)				
	4.03.01.01	Selected granular material	m ³	10		
	4.03.01.02	Selected fill material	m ³	10		
	4.03.01	From commercial sources (Provisional)				
	4.03.01.01	Selected granular material	m ³	110		
	4.03.01.02	Selected fill material	m ³	20		
8.2.4	4.04	Encasing of pipes in concrete				
	4.04.01	Encasing DN 800 steel pipe				
	4.04.01.01	Class 15 MPa/19 mm	m ³	20		
	4.04.01.02	Class 30 MPa/19 mm	m ³	10		
PSLB 8.2.6	4.05	Extra over items 4.01 and 4.02 for bedding stabilized with 5% cement	m ³	30		
PSLB 8.2.7	4.06	Compaction Testing using a Nuclear Moisture Density Gauge	No.	6		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 3: DN 800 Steel Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C		SUMMARY				
SANS 1200 DB		SITE CLEARANCE				
SANS 1200 L		EARTHWORKS (PIPE TRENCHES)				
SANS 1200 LB		MEDIUM-PRESSURE PIPELINES				
		BEDDING (PIPES)				
Total carried forward to summary						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 4: DN 200 High Impact mPVC Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C	1	SITE CLEARANCE Refer to Drawing: JW14358-16941-T-012-S13-00-TMS & JW14358-16941-T-012-S13-00-TMS				
PSC 8.2.1	1.01	Clear and Grub				
	1.01.02	Strips, 2 m wide	m	830		
8.2.2	1.02	Remove and grub large trees and tree stumps of girth				
	1.02.01	Over 1 m and up to and including 2 m	No.	5		
	1.02.02	Over 2 m and up to and including 3 m	No.	8		
PSC 8.2.5	1.03	Take down existing fences, guardrails and masonry walls				
	1.03.01	a) Guardrails	m	120		
	1.03.02	b) Diamond mesh fencing	m	80		
	1.03.03	c) Steel palisade fencing	m	20		
	1.03.04	d) Clearview fencing	m	60		
	1.03.05	e) 110 mm masonry wall	m	40		
	1.03.06	f) 220 mm masonry wall	m	40		
8.2.10	1.04	Remove topsoil to nominal depth of 150 mm and stockpile	m ³	250		
PSC 8.2.11	1.05	Temporary fencing or hoarding				
		a) 1.8 m High Diamond mesh fencing	m	400		
PSC 8.2.12	1.06	Removal of man-made surfaces and kerbing				
	1.06.01	a) Road materials with Asphalt ≤ 50mm thick	m ²	100		
	1.06.02	b) Road materials with Asphalt > 50 ≤ 100mm thick	m ²	200		
	1.06.03	c) Interlocking concrete segmental paving blocks, Class 2.6/40MPa (all colours)	m ²	100		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 4: DN 200 High Impact mPVC Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSC 8.2.13	1.06.04	d) Concrete paving blocks, Class 2.6/40MPa	m ²	50		
	1.06.05	e) Brick paving	m ²	50		
	1.06.06	f) Unreinforced concrete ≤ 75mm thick	m ²	50		
	1.06.07	g) Reinforced concrete ≤ 75mm thick	m ²	50		
	1.06.08	h) Garden, lawns and grassing	m ²	200		
	1.06.09	i) All types of Kerbing including channel	m	400		
	1.07	Backfilling and reinstatement of man-made surfaces re-using removed materials				
	1.07.01	a) Interlocking concrete segmental paving blocks, Class 2.6/40MPa (all colours)	m ²	100		
	1.07.02	b) Concrete paving blocks, Class 2.6/40MPa (various sizes)	m ²	50		
PSC 8.2.14	1.07.03	c) Brick paving	m ²	50		
	1.07.04	d) Kerbing (all types of kerbing)	m	200		
	1.08	Take down and re-erect existing fences and guardrails				
	1.08.01	a) Guardrails	m	200		
	1.08.02	b) Diamond mesh fencing	m	100		
PSC 8.2.15	1.08.03	c) Steel palisade fencing	m	50		
	1.08.04	d) Clearview fencing	m	50		
	1.09	Reinstatement of existing masonry walls and steel fences				
PSC 8.2.15.1	1.09.1	Face brick walls				
	1.09.1.1	a) 110 mm wall	m ²	20		
	1.09.1.2	b) 220 mm wall	m ²	20		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 4: DN 200 High Impact mPVC Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSC 8.2.15.2	1.09.2	Plastered walls				
	1.09.2.01	a) 110 mm wall	m ²	20		
	1.09.2.02	b) 220 mm wall	m ²	20		
PSC 8.2.15.3	1.09.3	Steel fences				
	1.09.3.01	b) Palisade fencing	m ²	20		
	1.09.3.02	c) Clearview fencing	m ²	20		
PSC 8.2.16	1.10	Protection of trees	No	8		
PSC 8.2.21	1.11	Temporary removal and reinstatement of				
	1.11.01	a) Electrical Poles	No	10		
	1.11.02	b) Street Lights	No	8		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 4: DN 200 High Impact mPVC Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 DB	2	EARTHWORKS (PIPE TRENCHES)				
		Refer to Drawing: JW14358-16941-T-012-S13-00-TMS & JW14358-16941-T-012-S13-00-TMS				
PSDB 8.3.2	2.01	a) Excavate in all materials, for trenches, backfill compact and dispose of surplus material				
	2.01.02	Pipes of diameter of DN 200 for depths:				
	2.01.02.01	Up to 1,0 m	m	20		
	2.01.02.02	Over 1,0 m up to 2,0 m	m	680		
	2.01.02.03	Over 2,0 m up to 3,0 m	m	120		
PSDB 8.3.2	2.02	b) Extra over item 2.01 above for:				
	2.02.01	1) Intermediate excavation	m ³	120		
	2.02.02	2) Hard rock excavation	m ³	120		
	2.02.03	3) Hand excavation where ordered by the Project Manager				
	2.02.03.01	a) Soft material	m ³	120		
	2.02.03.02	b) Intermediate material	m ³	120		
	2.02.03.03	c) Hard material	m ³	120		
PSDB 8.3.2	2.02.04	4) Backfill stabilized with 5% cement where directed by the Project Manager	m ³	240		
PSDB 8.3.2	2.02.05	5) Soilcrete backfill where directed by the Project Manager	m ³	240		
8.3.2	2.02.06	c) Excavate and dispose of unsuitable material from trench bottom (provisional)	m ³	80		
8.3.3	2.03	Excavation Ancillaries				
8.3.3.1	2.03.01	Make up deficiency in backfill material				
	2.03.01.01	a) from other necessary excavations on site	m ³	60		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 4: DN 200 High Impact mPVC Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	2.03.01.02	c) by importation from commercial or off-site sources selected by the contractor	m ³	60		
PSDB 8.3.3.3	2.03.02	Compaction in roadways	m ³	200		
PSDB 8.3.4	2.04	Particular Items				
PSDB 8.3.4 (a)	2.04.01	a) Shore trench opposite structure or service	m	200		
PSDB 8.3.4 (c)	2.04.02	c) Dealing with groundwater				
	2.04.02.01	(1) Crushed stone (14 mm or 20 mm)	m ³	50		
	2.04.02.02	(2) Nonwoven, needle punched, continuous filament, polyester Geotextile	m ²	450		
PSDB 8.3.5	2.05	Existing Services that Intersect or Adjoin a Pipe Trench				
PSDB 8.3.5	2.05.01	a) Services that intersect a trench				
	2.05.01.01	Water pipes up to DN 225	No.	8		
	2.05.01.02	Water mains DN 250 up to DN 1500	No.	4		
	2.05.01.03	Sewer pipes up to DN 175	No.	8		
	2.05.01.04	Sewer mains DN 200 up to DN 1500	No.	4		
	2.05.01.05	Stormwater pipes (any size)	No.	10		
	2.05.01.06	Cables (Electrical, data or telephone)	No.	25		
	2.05.01.07	Drainage furrows and channels	No.	5		
PSDB 8.3.5	2.05.02	b) Services that adjoin a trench				
	2.05.02.01	Water pipes up to DN 225	m	120		
	2.05.02.02	Water mains DN 250 up to DN 1500	m	50		
	2.05.02.03	Sewer pipes up to DN 175	m	120		
	2.05.02.04	Sewer mains DN 200 up to DN 1500	m	50		
	2.05.02.05	Stormwater pipes (any size)	m	120		
	2.05.02.06	Cables (Electrical, data or telephone)	m	150		
Total carried forward						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part B - Section 4: DN 200 High Impact mPVC Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSDB 8.3.5 c	2.05.02.07	Drainage furrows and channels	m	60		
	2.06.03	c) Services that require special care				
	2.06.03.01	Crossing underneath power lines up to 11 kV	No.	1		
	2.06.03.02	Crossing underneath power lines up to 300 kV	No.	1		
	2.06.03.03	Crossing underneath telephone lines	No.	4		
	2.06.02.04	Working alongside electricity poles	No.	15		
	2.06.02.05	Working alongside telephone poles	No.	5		
	2.06.02.06	Working alongside traffic signals	No.	4		
PSDB 8.3.6	2.06.02.07	Working alongside street lights	No.	50		
	2.07	Finishing				
PSDB8.3.6.1	2.07.01	Reinstate road surfaces complete with all courses				
	2.07.01.01	a) Gravel on shoulders	m ³	45		
	2.07.01.02	b) Asphalt of thickness 40 mm in parking area	m ²	100		
	2.07.01.03	c) Asphalt of thickness 40 mm in roadway	m ²	200		
	2.07.01.04	d) Re-instatement of unreinforced concrete	m ²	60		
	2.07.01.05	e) Re-instatement of reinforced concrete	m ³	60		
	2.07.01.06	f) Re-instatement of bricks, concrete pre-cast units and interlocking concrete segmental paving	m ²	100		
	2.07.01.07	g) Re-instatement of grouted brick paving, complete	m ²	50		
	2.07.01.08	h) Re-instatement of gardens, lawns and grassing	m ²	400		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 4: DN 200 High Impact mPVC Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSDB8.3.6.2	2.07.02	Reinstatement of surfacing for walkways				
	2.07.02.01	a) Re-instatement of walkways with unreinforced concrete	m ²	60		
	2.07.02.02	b) Re-instatement of walkways with interlocking concrete segmental paving	m ²	360		
PSDB8.3.6.3	2.07.03	Reinstatement of kerbs and channels				
		a) Re-instatement of all types of precast kerbing, complete	m	300		
		b) Re-instatement of precast concrete gutter, complete	m	200		
		c) Re-instatement of all types of insitu cast concrete kerbing, complete	m	200		
		d) Re-instatement of all types of insitu cast concrete gutter, complete	m	200		
PSDB 8.3.7	2.08	Accommodation of traffic	sum	1		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 4: DN 200 High Impact mPVC Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 L	3	MEDIUM-PRESSURE PIPELINES				
		Refer to Drawing: JW14358-16941-T-012-S13-00-TMS & JW14358-16941-T-012-S13-00-TMS				
PSL 8.2.1	3.01	Supply, Lay, and Bed Pipes Complete with Couplings				
	3.01.01	High-Impact mPVC Class 16 complete with shouldered end coupling system				
	3.01.01.01	Class 16 DN 200	m	830		
PSL 8.2.20	3.02	Supply, Lay and Bed HDPE Pipes Complete with Welded Joints				
	3.02.01	PN16 PE100 HDPE				
	3.02.01.01	PN16 DN 250	m	100		
8.2.2	3.03	Extra-over 3.0.1 for the Supplying, Laying, and Bedding of Specials Complete with Couplings				
	3.03.01	High-Impact mPVC Class 16 bends complete with shouldered end coupling system				
	3.03.01.01	DN 200, 11.25° bend	No.	8		
	3.03.01.02	DN 200, 22.5° bend	No.	8		
	3.03.01.03	DN 200, 45° bend	No.	3		
	3.03.01.04	DN 200, 90° bend	No.	3		
	3.03.02	High-Impact mPVC Class 16 shouldered end repair couplings				
	3.03.02.01	DN 200	No.	4		
	3.03.04	Flange adaptors for High-Impact mPVC Class 16 complete with shouldered end coupling system				
	3.03.04.01	DN 200	No.	6		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 4: DN 200 High Impact mPVC Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSL 8.2.21	3.04	Extra over 3.02 for the Supplying, Laying, Butt Fusion Welding and Bedding of HDPE specials				
	3.04.01	HDPE PN16 PE100 bends				
	3.04.01.01	DN 250 90° bend	No.	2		
	3.04.01.02	DN 250 45° bend	No.	2		
	3.04.01.03	DN 250 22.5° bend	No.	2		
	3.04.01.04	DN 250 11.25° bend	No.	2		
PSL 8.2.22	3.05	Flushing and sterilising of pipelines				
	3.05.01	Class 16 DN 200 High-Impact mPVC pipe	m	830		
	3.05.02	PN16 PE100 DN250 HDPE	m	100		
PSL 8.2.23	3.06	Hydraulic field-testing of pipelines				
	3.06.01	Class 16 DN 200 High-Impact mPVC pipe	m	830		
	3.06.02	PN16 PE100 DN 250 HDPE	m	100		
PSL 8.2.24	3.07	Pipeline and Valve Markers				
	3.07.01	a) Precast Concrete Marker (drawing JW14358-16941-T-017-S07-00-TMS)	No.	8		
	3.07.02	b) Kerb Marking (drawing JW14358-16941-T-017-S07-00-TMS)	No.	8		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 4: DN 200 High Impact mPVC Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 LB	4	BEDDING (PIPES) Refer to Drawing: JW14358-16941-T-012-S13-00-TMS & JW14358-16941-T-012-S13-00-TMS				
PSLB 8.2.1.1	4.01	Provision of bedding from trench excavations without the need for screening or other treatments				
	4.01.01	Selected granular material	m ³	20		
	4.01.02	Selected fill material	m ³	120		
PSLB 8.2.1.2	4.01	Provision of bedding from trench excavations including screening or other treatments				
	4.01.01	Selected granular material	m ³	20		
	4.01.02	Selected fill material	m ³	40		
8.2.2	4.02	Supply only of bedding by importation:				
	4.02.01	From other necessary excavations (Provisional)				
	4.02.01.01	Selected granular material	m ³	20		
	4.02.01.02	Selected fill material	m ³	20		
	4.02.03	From commercial sources (Provisional)				
	4.02.03.01	Selected granular material	m ³	270		
	4.02.03.02	Selected fill material	m ³	40		
8.2.4	4.03	Encasing of pipes in concrete				
	4.03.01	Encasing DN 200 mPVC pipe				
	4.03.01.01	Class 15 MPa/19 mm	m ³	10		
	4.03.01.02	Class 30 MPa/19 mm	m ³	5		
PSLB 8.2.6	4.04	Extra over items 4.01 and 4.02 for bedding stabilized with 5% cement	m ³	40		
PSLB 8.2.7	4.05	Compaction Testing using a Nuclear Moisture Density Gauge	No.	8		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part B - Section 4: DN 200 High Impact mPVC Pipeline						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		SUMMARY				
SANS 1200 C		SITE CLEARANCE				
SANS 1200 DB		EARTHWORKS (PIPE TRENCHES)				
SANS 1200 L		MEDIUM-PRESSURE PIPELINES				
SANS 1200 LB		BEDDING (PIPES)				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C	1	SITE CLEARANCE Refer to Drawings: JW14358-16941-T-013-S14-00-TMS & JW14358-16941-T-013-S16-00-TMS				
PSC 8.2.1	1.01	Clear and grub				
	1.01.01	Areas	m ²	450		
8.2.10	1.02	Remove topsoil to nominal depth of 150 mm and stockpile	m ³	70		
PSC 8.2.14	1.03	Take down and re-erect existing fences and guardrails				
	1.03.01	a) Guardrails	m	80		
	1.03.02	b) Diamond mesh fencing	m	75		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 DB	2	EARTHWORKS (PIPE TRENCHES)				
		Refer to Drawings: JW14358-16941-T-013-S14-00-TMS & JW14358-16941-T-013-S16-00-TMS				
PSDB 8.3.2	2.01	Excavation				
	2.01.01	d) Excavate in all materials for stormwater inlet and outlet structures and for manholes, catchpits, valve chambers and the like, irrespective of depth, and backfill around structures	m ³	850		
	2.01.02	e) Extra over 2.01.01 for excavating in				
	2.01.02.01	1) intermediate material	m ³	100		
	2.01.02.02	2) hard material	m ³	100		
	2.01.03	f) Hand excavation where ordered by the Project Manager				
	2.01.03.01	1) Soft material	m ³	100		
	2.01.03.02	2) Intermediate material	m ³	100		
	2.01.03.03	3) Hard material	m ³	100		
	2.01.04	g) Backfill stabilized with 5% cement where directed by the Project Manager	m ³	200		
	2.01.05	h) Soilcrete backfill where directed by the Project Manager	m ³	200		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 DK	3	GABIONS AND PITCHING				
		Refer to Drawings: JW14358-16941-T-013-S14-00-TMS				
8.2.2	3.01	Gabions				
	3.01.01	Gabion mattresses of galvanized wire, up to 0,3 m deep				
	3.01.01.01	60 mm x 80 mm mesh, 2.2 mm dia wire, 6 m x 2 m x 0.17 m mattress	m ³	15		
8.2.4	3.02	Geotextile				
	3.02.01	Bidim A4 or approved equivalent	m ²	150		
8.2.5	3.03	Pitching				
	3.03.01	Grouted pitching				
	3.03.01.01	a) Light pitching	m ²	110		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 L	4	MEDIUM-PRESSURE PIPELINES Refer to Drawings: JW14358-16941-T-013-S15-00-TMS & JW14358-16941-T-013-S16-00-TMS				
PSL 8.2.1	4.01	Supply, Lay, and Bed Pipes Complete with Couplings				
	4.01.01	High-Impact mPVC Class 16 complete with shouldered end coupling system				
	4.01.01.01	Class 16 DN 250	m	400		
8.2.2	4.02	Extra-over 4.0.1 for the Supplying, Laying, and Bedding of Specials Complete with Couplings				
	4.02.01	High-Impact mPVC Class 16 bends complete with shouldered end coupling system				
	4.02.01.01	DN 250, 11.25° bend	No.	8		
	4.02.01.02	DN 250, 22.5° bend	No.	4		
	4.02.01.03	DN 250, 45° bend	No.	3		
	4.02.01.04	DN 250, 90° bend	No.	3		
	4.02.02	High-Impact mPVC Class 16 shouldered end repair couplings				
	4.02.02.01	DN 250	No.	8		
	4.02.03	Flange adaptors for High-Impact mPVC Class 16 complete with shouldered end coupling system				
	4.04.01.01	DN 250	No.	8		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
8.2.3	4.03	Extra-over PSL 8.2.16 for Supplying, Fixing, and Bedding of Valves				
	4.03.01	Scour Valve Chamber 1				
	4.03.01.01	Item 2: DN250 PN16 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	6		
	4.03.02	Scour Valve Chamber 2				
	4.03.02.01	Item 2: DN250 PN16 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	1		
PSL 8.2.19	4.04	Extra over 8.2.16 for the Supplying, Laying, Welding or Jointing and Bedding of Steel specials				
	4.04.01	Specials for Scour Valve Chamber 1 as per drawing JW14358-16941-T-013-S15-00-TMS				
	4.04.01.01	Item 1: Spool piece DN 250; wall thickness t = 6 mm; flanged both ends to SANS 1123 Table 1600/3, with puddle flange	No.	5		
	4.04.01.02	Item 3: Spool piece DN 250; wall thickness t = 6 mm; flanged one end to SANS 1123 Table 1600/3, with puddle flange	No.	5		
	4.04.01.03	Item 4: Spool piece DN 250; wall thickness t = 6 mm; flanged both ends to SANS 1123 Table 1600/3	No.	5		
	4.04.01.04	Item 5: DN 250, 45 degree, 3 segment bend, wall thickness t = 6 mm, both ends flanged to SANS 1123 Table 1600/3	No.	5		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSL 8.2.34	4.04.01.05	Item 6: Reducing tee piece DN 600 x DN 250 mm; SANS 719 wall thickness t = 6 mm; Flanged all ends SANS 1123 Table 1600/3	No.	5		
	4.04.01.06	Item 7: Spool piece DN 600 wall thickness t = 6 mm; one end flanged to SANS 1123 Table 1600/3	No.	10		
	4.04.02	Specials for Scour Valve Chamber 2 as per drawing JW14358-16941-T-013-S16-00-TMS				
	4.04.02.01	Item 1: Spool piece DN 250; wall thickness t = 6 mm; flanged both ends drilled to SANS 1123 Table 1600/3; with puddle flange	No.	4		
	4.04.02.02	Item 4a: Stub flange and backing flange for connecting DN 250 HDPE pipe; flange drilled to SANS 1123 Table 1600/3	No.	2		
	4.04.02.03	Item 4b: DN 250 Flange adaptor for High-Impact mPVC Class 16 complete with shouldered end coupling system; Flange drilled to SANS 1123 Table 1600/3	No.	2		
	4.04.02.04	Item 5: DN 250, 45 degree, 3 segment bend, wall thickness t = 6 mm, both ends flanged to SANS 1123 Table 1600/3	No.	2		
	4.04.02.05	Item 6: Reducing Tee-piece DN 600 x DN 250; wall thickness t = 6 mm; all ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	2		
	4.04.02.06	Item 7: Spool piece DN 600; wall thickness t = 6 mm; one end flanged to SANS 1123 Table 1600/3	No.	4		
	4.05	Operation and Maintenance Manuals for Valves and Flow Meters				
		DN250 Wedge Gate Valve (PN16)	Sum	1		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 LE	5	STORMWATER DRAINAGE				
		Refer to Drawings: JW14358-16941-T-013-S38-00-TMS				
8.2.1	5.01	Supply and Lay Concrete Pipe Culverts on Class B Bedding				
	5.01.01	Class 100 D Pipes				
	5.01.01.01	300 mm Diameter	m	20		
	5.01.01.02	450 mm Diameter	m	20		
	5.01.01.03	525 mm Diameter	m	20		
	5.01.01.04	600 mm Diameter	m	20		
	5.01.01.05	750 mm Diameter	m	20		
8.2.8	5.02	Supply and Install Manholes, Catchpits, and the like				
	5.02.01	Precast kerb inlet as per drawing JW14358-16941-T-013-S38-00-TMS	No.	5		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 2001 PART CC1	6	CONCRETE WORKS (STRUCTURAL) Refer to Drawings: JW14358-16941-T-013-S14-00-TMS SCHEDULED FORMWORK ITEMS				
PSCC1.002	6.01	Smooth				
	6.01.01	Vertical formwork to				
	6.01.01.01	Foundations (Floor)	m ²	30		
	6.01.01.02	Plinths	m ²	7		
	6.01.01.03	Walls	m ²	550		
	6.01.01.04	Sump	m ²	21		
	6.01.02	Horizontal formwork to				
	6.01.02.01	Precast roof slabs	m ²	85		
PSCC1.005	6.02	Narrow widths (up to 300 mm wide)				
	6.02.01	Vertical Smooth formwork to				
	6.02.01.01	Precast roof slabs	m	150		
PSCC1.006	6.03	Box out holes/form voids				
	6.03.01	a) Small, circular, of diameter up to 0,35 m				
	6.03.01.01	0 m up to and including 0,5 m	No.	50		
	6.03.02	d) Large, other than circular, areas over 0.1 m ² up				
	6.03.02.01	0 m up to and including 0,5 m	No.	14		
	6.03.02.02	Over 2,0 m deep	No.	14		
		SCHEDULED REINFORCEMENT ITEMS				
PSCC1.007	6.04	Steel bars				
	6.04.01	a) Steel bars irrespective of grade and diameter	t	30		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.008	6.05	High-tensile welded mesh				
	6.05.01	Mesh Ref 245	m ²	85		
		SCHEDULED CONCRETE ITEMS				
PSCC1.011	6.06	Blinding layer in Grade 15 MPa/19 mm concrete				
	6.06.01	50 mm thickness	m ²	140		
PSCC1.012	6.07	Strength concrete				
	6.07.01	Grade 30 MPa/19 mm concrete in				
	6.07.01.01	Foundations (Floor)	m ³	24		
	6.07.01.02	Plinths	m ³	4		
	6.07.01.03	Walls	m ³	90		
	6.07.01.04	Roof Slabs	m ³	18		
	6.07.01.05	Sump	m ³	4		
PSCC1.013	6.08	Unformed surface finishes				
	6.08.01	a) Steel-floated finish				
	6.08.01.01	Foundations (Floor)	m ²	82		
	6.08.01.02	Plinths	m ²	9		
	6.08.01.03	Walls	m ²	40		
	6.08.01.04	Roof Slab	m ²	85		
	6.08.02	d) Broomed finish				
	6.08.02.01	Blinding layer	m ²	140		
	6.08.03	e) Screed in 3:1 Sand and Cement Mix				
	6.08.03.01	Chamber floor screed	m ³	8		
PSCC1.016	6.09	Joints				
	6.09.01	Polysulphide sealant between precast slabs	m	30		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.018	6.10	Grouting				
	6.10.01	a) Under bases of pipe supports and straps	m ³	5		
	6.10.01	c) Pipe box-outs	m ³	5		
PSCC1.019	6.11	HD bolts and miscellaneous metal work				
	6.11.01	Metal work for Scour Valve Chamber 1 as per drawing JW14358-16941-T-013-S14-00-TMS				
	6.11.01.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	10		
	6.11.01.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	5		
	6.11.01.03	Fabricate and cast in short outlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	5		
	6.11.01.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	10		
	6.11.01.05	Fabricate and cast in galvanised acour overflow frame	No.	5		
	6.11.01.06	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	40		
	6.11.02	Metal work for Scour Valve Chamber 2 as per drawing JW14358-16941-T-013-S16-00-TMS				
	6.11.02.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	2		
	6.11.02.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	2		
Total carried forward						

Employer:▣	▣	Contractor:▣	▣
Witness:▣	▣	Witness:▣	▣

Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.020	6.11.02.03	Fabricate and cast in short outlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	2		
	6.11.02.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	2		
	6.11.02.05	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	16		
	6.11.03	Metal work for Welling Chamber Type 1 as per drawing JW14358-16941-T-013-S28-00-TMS				
	6.11.03.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	2		
	6.11.03.02	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	2		
	6.11.03.03	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	20		
	6.12	Colour Mitigation				
	6.12.01	Exposed Chambers along roadways	m²	70		
		MISCELLANEOUS ITEMS				
PSCC1.021	6.13	Polythene sheeting under concrete				
	6.13.01	250 micron green medium density polyethylene dampproof sheeting	m²	85		
PSCC1.023	6.14	FRP items				
	6.14.01	c) FRP Grating				
	6.14.01.01	450 mm x 450 mm x 38 mm deep FRP grating	No.	7		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.024	6.15	Casting pipes and specials in concrete				
	6.15.01	DN 250 Steel pipe cast into chamber wall	No.	14		
PSCC1.025	6.16	Installation of precast elements				
	6.16.01	Precast roof slabs as per drawing JW14358-16941-T-013-S14-00-TMS	No.	12		
	6.16.02	Precast roof slabs as per drawing JW14358-16941-T-013-S16-00-TMS	No.	2		
PSCC1.026	6.16	Drilling cores through concrete				
	6.16.01	100 mm diameter core through 250 mm thick concrete slab	No.	7		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		SUMMARY				
SANS 1200 C		SITE CLEARANCE				
SANS 1200 DB		EARTHWORKS (PIPE TRENCHES)				
SANS 1200 DK		GABIONS AND PITCHING				
SANS 1200 L		MEDIUM-PRESSURE PIPELINES				
SANS 1200 LE		STORMWATER DRAINAGE				
SANS 2001 CC1		CONCRETE WORKS (STRUCTURAL)				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C	1	SITE CLEARANCE Refer to Drawing: JW14358-16941-T-013-S03-00-TMS, JW14358-16941-T-013-S05-00-TMS, JW14358-16941-T-013-S07-00-TMS, JW14358-16941-T-013-S09-00-TMS, JW14358-16941-T-013-S12-00-TMS				
PSC 8.2.1	1.01	Clear and grub				
	1.01.01	Areas	m ²	225		
8.2.10	1.02	Remove topsoil to nominal depth of 150 mm and	m ²	144		
PSC 8.2.14	1.03	Take down and re-erect existing fences and guardrails				
	1.03.01	a) Guardrails	m	45		
	1.03.02	b) Diamond mesh fencing	m	25		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 DB	2	EARTHWORKS (PIPE TRENCHES) Refer to Drawing: JW14358-16941-T-013-S03-00-TMS, JW14358-16941-T-013-S05-00-TMS, JW14358-16941-T-013-S07-00-TMS, JW14358-16941-T-013-S09-00-TMS, JW14358-16941-T-013-S12-00-TMS				
PSDB 8.3.2	2.01	Excavation				
	2.01.01	d) Excavate in all materials for stormwater inlet and outlet structures and for manholes, catchpits, valve chambers and the like, irrespective of depth, and backfill around structures	m ³	1320		
	2.01.02	e) Extra over 2.01.01 for excavating in				
	2.01.02.01	1) intermediate material	m ³	135		
	2.01.02.02	2) hard material	m ³	135		
	2.01.03	f) Hand excavation where ordered by the Project Manager				
	2.01.03.01	a) Soft material	m ³	135		
	2.01.03.02	b) Intermediate material	m ³	135		
	2.01.03.03	c) Hard material	m ³	135		
	2.01.04	g) Backfill stabilized with 5% cement where directed by the Project Manager	m ³	270		
	2.01.05	h) Soilcrete backfill where directed by the Project Manager	m ³	270		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 L	3	MEDIUM-PRESSURE PIPELINES Refer to Drawing: JW14358-16941-T-013-S04-00-TMS, JW14358-16941-T-013-S06-00-TMS, JW14358-16941-T-013-S08-00-TMS, JW14358-16941-T-013-S10-00-TMS, JW14358-16941-T-013-S13-00-TMS				
8.2.3	3.01	Extra-over PSL 8.2.1 or PSL 8.2.16 for Supplying, Fixing, and Bedding of Valves				
	3.01.01	DN 600 Air Valve Chamber 1 as per drawing JW14358-16941-T-013-S04-00-TMS				
	3.01.01.01	Item 5: DN 100 PN16 Resilient Seal Gate Valve; Non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.01.01.02	Item 6: DN 100 PN16 Double orifice with anti-shock orifice mechanism air release valve, Vent-O-Mat RBX or similar approved; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.01.02	DN 200 Air Valve Chamber 2 as per drawing JW14358-16941-T-013-S06-00-TMS				
	3.01.02.01	Item 5: DN 100 PN16 Resilient Seal Gate Valve; Non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	2		
	3.01.02.02	Item 6: DN 100 PN16 Double orifice with anti-shock orifice mechanism air release valve, Vent-O-Mat RBX or similar approved; flanges drilled to SANS 1123 Table 1600/3	No.	2		
	3.01.02.03	Item 8: DN 200 PN16 Wedge Gate Valve; Non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled	No.	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.01.03	DN 600 Air Valve Chamber 2 as per drawing JW14358-16941-T-013-S08-00-TMS				
	3.01.03.01	Item 5: DN 100 PN16 Resilient Seal Gate Valve; Non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.01.03.02	Item 6: DN 100 PN16 Double orifice with anti-shock orifice mechanism air release valve, Vent-O-Mat RBX or similar approved; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.01.03.03	Item 7: DN 600 PN16 Wedge Gate Valve; Non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.01.04	DN 600 Air Valve Chamber 3 as per drawing JW14358-16941-T-013-S10-00-TMS				
	3.01.04.01	Item 5: DN 100 PN16 Resilient Seal Gate Valve; Non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.01.04.02	Item 6: DN 100 PN16 Double orifice with anti-shock orifice mechanism air release valve, Vent-O-Mat	No.	1		
	3.01.04.03	Item 7: DN 600 PN16 Wedge Gate Valve; Non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSL 8.2.19	3.01.05	DN 600 Air Valve Chamber 4 as per drawing JW14358-16941-T-013-S13-00-TMS				
	3.01.05.01	Item 5: DN 100 PN16 Resilient Seal Gate Valve; Non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.01.05.02	Item 6: DN 100 PN16 Double orifice with anti-shock orifice mechanism air release valve, Vent-O-Mat RBX or similar approved; flanges drilled to SANS	No.	1		
	3.01.05.03	Item 7: DN 600 PN16 Wedge Gate Valve; Non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.02	Extra over PSL 8.2.1 or 8.2.16 for the Supplying,				
	3.02.01	DN 600 Air Valve Chamber 1 as per drawing JW14358-16941-T-013-S04-00-TMS				
	3.02.01.01	Item 1: Spool piece DN 600; wall thickness t = 6 mm	No.	2		
	3.02.01.02	Item 2: Spool piece DN 600; wall thickness t = 6 mm	No.	2		
	3.02.01.03	Item 3: Unequal tee DN 600 x DN 400 mm SANS	No.	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.02.01.04	Item 4: Spool piece DN 100 x 200 mm long; SANS 62 heavy class; one end flanged DN 600 to SANS 1123 Table 1600/3; other end welded to DN 100	No.	1		
	3.02.02	DN 200 Air Valve Chamber 2 as per drawing JW14358-16941-T-013-S06-00-TMS				
	3.02.02.01	Item 1: Spool piece DN 200; SANS 719 wall thickness t = 6 mm; flanged both ends to SANS 1123	No.	2		
	3.02.02.02	Item 2: Spool piece DN 200; wall thickness t = 6 mm SANS 719; flanged both ends to SANS 1123 Table 1600/3	No.	2		
	3.02.02.03	Item 03: Unequal tee DN 200 x DN 100 mm SANS 719 wall thickness t = 6 mm; Flanged all ends SANS 1123 Table 1600/3; With pipe support	No.	2		
	3.02.02.04	Item 4: Spool piece DN 100 x 250 mm long; SANS 62 heavy class; both ends flanged to SANS 1123 Table 1600/3	No.	2		
	3.02.02.05	Item 9: DN 250 Flange adaptor for High-Impact mPVC Class 16 complete with shouldered end coupling system; Flange drilled to SANS 1123 Table 1600/3	No.	2		
	3.02.03	DN 600 Air Valve Chamber 2 as per drawing JW14358-16941-T-013-S08-00-TMS				
	3.02.03.01	Item 1: Spool piece DN 600; wall thickness t = 6 mm SANS 719; one end flanged to SANS 1123 Table 1600/3	No.	2		
	3.02.03.02	Item 2: Spool piece DN 600; wall thickness t = 6 mm SANS 719; flanged both ends to SANS 1123 Table 1600/3 with puddle flange	No.	2		
Total carried forward						

Employer:▣	▣	Contractor:▣	▣
Witness:▣	▣	Witness:▣	▣

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSL 8.2.34	3.02.03.03	Item 3: Unequal tee DN 600 x DN 400 mm SANS	No.	1		
	3.02.03.04	Item 4: Spool piece DN 100, 200 mm long; SANS 62	No.	1		
	3.02.04	DN 600 Air Valve Chamber 3 as per drawing JW14358-16941-T-013-S10-00-TMS				
	3.02.04.01	Item 1: Spool piece DN 600; wall thickness t = 6 mm	No.	2		
	3.02.04.02	Item 2: Spool piece DN 600; wall thickness t = 6 mm	No.	2		
	3.02.04.03	Item 3: Unequal tee DN 600 x DN 400 mm SANS	No.	1		
	3.02.04.04	Item 4: Spool piece DN 100, 200 mm long; SANS 62	No.	1		
	3.03	Operation and Maintenance Manuals for Valves				
	3.03.01	DN 100 Resilient Seal Gate Valve (PN16)	Sum	1		
	3.03.02	DN 600 Wedge Gate Valve (PN16)	Sum	1		
	3.03.03	DN 100 Air Valve (PN16)	Sum	1		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 2001 PART CC1	4	CONCRETE (STRUCTURAL) Refer to Drawing: JW14358-16941-T-013-S03-00-TMS SCHEDULED FORMWORK ITEMS				
PSCC1.002	4.01	Smooth:				
	4.01.01	Vertical formwork to:				
	4.01.01.01	Foundations (Floor)	m ²	60		
	4.01.01.02	Plinths	m ²	12		
	4.01.01.03	Walls	m ²	1060		
	4.01.01.04	Sump	m ²	30		
	4.01.02	Horizontal formwork to:				
	4.01.02.01	Precast roof slabs	m ²	135		
PSCC1.005	4.02	Narrow widths (up to 300 mm wide):				
	4.02.01	Vertical Smooth formwork to:				
	4.02.01.01	Precast roof slabs	m	300		
PSCC1.006	4.03	Box out holes/form voids:				
	4.03.01	a) Small, circular, of diameter up to 0,35 m				
	4.03.01.01	2) Over 0,5 m and up to and including 1,0 m	No.	120		
	4.03.02	d) Large, other than circular, areas over 0.1 m2 up to 2,0 m2				
	4.03.02.01	Over 0,5 m and up to and including 1,0 m	No.	15		
	4.03.02.02	Over 2,0 m deep	No.	24		
PSCC1.007	4.04	SCHEDULED REINFORCEMENT ITEMS Steel bars irrespective of grade and diameter				
	4.04.01	a) Steel bars irrespective of grade and diameter	t	57		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
		SCHEDULED CONCRETE ITEMS				
PSCC1.011	4.04	Blinding layer Grade 15 MPa/19 mm concrete				
	4.06.01	50 mm thickness	m ²	340		
PSCC1.012	4.06	Strength concrete				
	4.06.01	Grade 30 MPa/19 mm concrete in				
	4.06.01.01	Foundations (Floor)	m ³	38		
	4.06.01.02	Plinths	m ³	8		
	4.06.01.03	Walls	m ³	130		
	4.06.01.04	Roof	m ³	29		
	4.06.01.05	Sump	m ³	11		
PSCC1.013	4.07	Unformed surface finishes				
	4.07.01	a) Steel-floated finish				
	4.07.01.01	Foundations (Floor)	m ²	73		
	4.07.01.02	Top of Plinths	m ²	12		
	4.07.01.03	Top of Walls	m ²	52		
	4.07.01.04	Roof Slabs	m ²	114		
	4.07.02	d) Broomed finish				
	4.07.02.01	Blinding layer	m ²	355		
	4.07.03	e) Screed in 3:1 Sand and Cement Mix				
	4.07.03.01	Chamber floor screed	m ³	20		
PSCC1.016	4.08	Joints				
	4.08.01	Polysulphide sealant between precast slabs	m	175		
	4.08.02	Extruded butyl sealant between manhole rings	m	35		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.016	4.08	Joints				
	4.08.01	Polysulphide sealant between precast slabs	m	150		
PSCC1.017	4.09	Manufacture (or supply) and erect precast units:				
	4.09.02	DN 1000 concrete ring manholes, 250 mm high,	No.	10		
PSCC1.018	4.10	Grouting				
	4.10.01	a) Under bases of pipe supports and straps	m³	12		
	4.10.02	c) Pipe box-outs	m³	12		
	4.10.03	d) Between precast sections and manhole rings	m³	2		
PSCC1.019	4.11	HD bolts and miscellaneous metal work				
	4.11.01	Metal work for DN 600 Air Valve Chamber 1 as per drawing JW14358-16941-T-013-S03-00-TMS				
	4.11.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	3		
	4.11.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	3		
	4.11.03	Fabricate and cast in short outlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	3		
	4.11.04	Fabricate and cast in galvanised access manholes	No.	3		
	4.11.05	Fabricate and cast in lifting hooks as per bolt detail	No.	6		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	4.11.02	Metal work for DN 600 Air Valve Chamber 2 as per				
	4.11.02.01	Fabricate and install galvanised mild steel ladders as	No.	4		
	4.11.02.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	4		
	4.11.02.03	Fabricate and cast in short outlet airvent as per	No.	4		
	4.11.02.04	Fabricate and cast in galvanised access manholes	No.	4		
	4.11.02.05	Fabricate and cast in lifting hooks as per bolt detail	No.	64		
	4.11.03	Metal work for DN 600 Air Valve Chamber 3 as per				
	4.11.03.01	Fabricate and install galvanised mild steel ladders as	No.	1		
	4.11.03.02	Fabricate and cast in long inlet airvent as per drawing	No.	1		
	4.11.03.03	Fabricate and cast in short outlet airvent as per	No.	1		
	4.11.03.04	Supply and cast in heavy duty ductile iron manhole	No.	1		
	4.11.03.05	Fabricate and cast in lifting hooks as per bolt detail	No.	16		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.020	4.11.04	Metal work for DN 200 Air Valve Chamber as per drawing JW14358-16941-T-013-S05-00-TMS				
	4.11.04.01	Fabricate and install galvanised mild steel ladders as	No.	1		
	4.11.04.02	Fabricate and cast in long inlet airvent as per drawing	No.	1		
	4.11.04.03	Fabricate and cast in short outlet airvent as per drawings JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.11.04.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.11.04.05	Fabricate and cast in lifting hooks as per drawing JW14358-16941-T-017-S09-00-TMS	No.	12		
	4.12	Colour Mitigation to:				
	4.12.01	Exposed Chambers along roadways	m ²	144		
		MISCELLANEOUS ITEMS				
	4.13	Polythene sheeting under concrete				
PSCC1.021	4.13.01	250 micron green medium density polyethylene dampproof sheeting	m ²	355		
PSCC1.023	4.14	FRP items				
	4.14.01	c) FRP Grating				
	4.14.01.01	450 mm x 450 mm x 38 mm deep FRP grating as per dwg JW14358-16941-T-013-S07-00-TMS	No.	12		
PSCC1.024	4.14	Casting pipes and specials in concrete				
	4.14.01	DN 600 Steel pipe cast into chamber wall	No.	22		
	4.14.02	DN 200 Steel pipe cast into chamber wall	No.	2		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.025	4.15	Installation of precast elements				
	4.15.01	Precast roof slabs as per drawing JW14358-16941-T-013-S03-00-TMS	No.	9		
	4.15.02	Precast roof slabs as per drawing JW14358-16941-T-013-S05-00-TMS	No.	12		
	4.15.03	Precast roof slabs as per drawing JW14358-16941-T-013-S07-00-TMS	No.	3		
	4.15.04	Precast roof slabs as per drawing JW14358-16941-T-013-S09-00-TMS	No.	3		
PSCC1.026	4.16	Drilling cores through concrete				
	4.16.01	100 mm diameter core through 300 mm thick concrete slab	No.	10		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C		SUMMARY				
SANS 1200 DB		SITE CLEARANCE				
SANS 1200 L		EARTHWORKS (PIPE TRENCHES)				
SANS 2001 CC1		MEDIUM-PRESSURE PIPELINES				
		CONCRETE (STRUCTURAL)				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 3 - DN 200 Flow Meter and scour Valve Chamber: Node NC3						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C	1	SITE CLEARANCE				
		Refer to Drawing: JW14358-16941-T-013-S23-00-TMS				
PSC 8.2.1	1.01	Clear and grub				
	1.01.01	Areas	m ²	100		
8.2.10	1.02	Remove topsoil to nominal depth of 150 mm and stockpile	m ³	15		
PSC 8.2.14	1.03	Take down and re-erect existing fences and guardrails				
	1.03.01	a) Guardrails	m	10		
	1.03.02	b) Diamond mesh fencing	m	10		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 3 - DN 200 Flow Meter and scour Valve Chamber: Node NC3						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 DB	2	EARTHWORKS (PIPE TRENCHES) Refer to Drawing: JW14358-16941-T-013-S23-00-TMS				
PSDB 8.3.2	2.01	Excavation				
	2.01.01	d) Excavate in all materials for stormwater inlet and outlet structures and for manholes, catchpits, valve chambers and the like, irrespective of depth, and backfill around structures	m ³	200		
	2.01.02	e) Extra over 2.01.01 for excavating in				
	2.01.02.01	1) intermediate material	m ³	20		
	2.01.02.02	2) hard material	m ³	20		
	2.01.03	f) Hand excavation where ordered by the Project Manager				
	2.01.03.01	a) Soft material	m ³	20		
	2.01.03.02	b) Intermediate material	m ³	20		
	2.01.03.03	c) Hard material	m ³	20		
	2.01.04	g) Backfill stabilized with 5% cement where directed by the Project Manager	m ³	40		
	2.01.05	h) Soilcrete backfill where directed by the Project Manager	m ³	40		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 3 - DN 200 Flow Meter and scour Valve Chamber: Node NC3						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 L	3	MEDIUM-PRESSURE PIPELINES				
		Refer to Drawing: JW14358-16941-T-013-S24-00-TMS				
8.2.3	3.01	Extra-over PSL 8.2.1 for Supplying, Fixing, and Bedding of Valves				
	3.01.01	Item 6: DN 150 PN16 Resilient Seal Gate valve; non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	3		
	3.01.02	Item 13: DN 150 Single Door Swing Check Valve to SANS 1551; Vosa or similar approved; flanged both ends to SANS 1123 Table 1600/3	No.	1		
PSL 8.2.19	3.02	Extra over 8.2.1 for the Supplying, Laying, Welding or Jointing and Bedding of Steel specials				
	3.02.01	Item 1: DN200 Flange adaptor for High-Impact mPVC Class 16 complete with shouldered end coupling system; flange drilled to SANS 1123 Table 1600/3	No.	3		
	3.02.02	Item 2: Concentric reducer DN 200 to DN 150; both ends flanged to SANS 1123 Table 1600/3	No.	3		
	3.02.03	Item 3: Spool piece DN 150 x 1300 mm long; SANS 62 Medium class; Flanged both ends to SANS 1123 Table 1600/3 with puddle flange	No.	2		
	3.02.04	Item 4: Equal Tee DN150 x DN150; SANS 62 Medium class; all ends flanged to SANS 1123 Table 1600/3	No.	1		
	3.02.05	Item 5: Spool piece DN 150 x 506 mm long; SANS 62 Medium class; Flanged both ends to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.02.06	Item 7: Spool piece DN 150 x 1300 mm long; SANS 62 Medium class; Flanged both ends to SANS 1123 Table 1600/3; with puddle flange	No.	1		
Total carried forward						

Employer:▣	▣	Contractor:▣	▣
Witness:▣	▣	Witness:▣	▣

Part C - Section 3 - DN 200 Flow Meter and scour Valve Chamber: Node NC3						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.02.07	Item 8: Spool piece DN 150 x 300 mm long; SANS 62 Medium class; Flanged both ends to SANS 1123 Table 1600/3	No.	2		
	3.02.08	Item 9a: DN150 Y-Strainer; Flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.02.09	Item 9b: DN150 T-Strainer; Flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.02.10	Item 10: Spool piece DN 150 x 750 mm long; SANS 62 Medium class; Flanged both ends to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.02.11	Item 12: Spool piece DN 150 x 450 mm long; SANS 62 Medium class; Flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.02.12	Item 14: Spool piece DN 150 x 300 mm long; SANS 62 Medium class; Flanged both ends to SANS 1123 Table 1600/3; with pipe support	No.	1		
PSL 8.2.30	3.03	Extra over 8.2.1 for for the Supplying, Installing and Commissioning of Flow Meters				
	3.02.01	Item 11: DN 150 PN16 Electromagnetic flow meter complete with sensor and remotely mounted transmitter; flanges drilled to SANS 1123 Table 1600/3; supplied with minimum 15 m of cable	No.	1		
PSL 8.2.34	3.04	Operation and Maintenance Manuals for Valves and Flow Meters				
		DN150 Resilient Seal Gate Valve (PN16)	Sum	1		
		DN150 Electromagnetic Flow Meter (PN16)	Sum	1		
		DN150 Non-return Valve (PN16)	Sum	1		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 3 - DN 200 Flow Meter and scour Valve Chamber: Node NC3						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 LC 4	4	CABLE DUCTS Refer to Drawing: JW14358-16941-T-013-S23-00-TMS JW14358-16941-T-013-S24-00-TMS				
8.2.2	4.01	Excavation				
	4.01.01	a) Excavate in all materials for trenches, backfill, compact and dispose of surplus material				
	4.01.1.01	i) Single duct trench (300 mm wide), up to 1 m deep	m ³	5		
PSLC 8.2.5	4.02	Supply, lay, bed and prove duct, including draw wire and screening wire				
		a) 110mm flexible conduit	m	10		
8.2.6	4.03	Imported bedding material, where ordered				
	4.03.01	a) Selected granular material	m ³	3		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 3 - DN 200 Flow Meter and scour Valve Chamber: Node NC3						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 2001 PART CC1	5	CONCRETE WORKS (STRUCTURAL)				
		Refer to Drawing: JW14358-16941-T-013-S23-00-TMS				
		SCHEDULED FORMWORK ITEMS				
PSCC1.002	5.01	Smooth				
	5.01.01	Vertical formwork to				
	5.01.01.01	Foundations (Floor)	m ²	10		
	5.01.01.02	Plinths	m ²	2		
	5.01.01.03	Walls	m ²	150		
	5.01.01.04	Sump	m ²	2		
	5.01.02	Horizontal formwork to				
	5.01.02.01	Precast roof slabs	m ²	20		
	5.02	Narrow widths (up to 300 mm wide)				
	5.02.01	Vertical Smooth formwork to				
PSCC1.005	5.02.01.01	Precast roof slabs	m	50		
	5.02.01.02	Concrete Bunker Apron Slab	m	10		
PSCC1.006	5.03	Box out holes/form voids				
	5.03.01	a) Small, circular, of diameter up to 0,35 m				
	5.03.01.01	0 m up to and including 0,5 m	No.	20		
	5.03.02	d) Large, other than circular, areas over 0.1 m ² up to 2,0 m ²				
	5.03.02.01	0 m up to and including 0,5 m	No.	1		
	5.03.02.02	Over 2,0 m deep	No.	3		
		SCHEDULED REINFORCEMENT ITEMS				
PSCC1.007	5.04	Steel bars				
	5.04.01	(a) Steel bars irrespective of grade and diameter	t	7		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 3 - DN 200 Flow Meter and scour Valve Chamber: Node NC3						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
		SCHEDULED CONCRETE ITEMS				
PSCC1.011	5.05	Blinding layer in Grade 15 MPa/19 mm concrete				
	5.05.01	50 mm thickness	m ²	45		
PSCC1.012	5.06	Strength concrete				
	5.06.01	Class 30 MPa/19 mm concrete in				
	5.06.01.01	Foundations (Floor)	m ³	6		
	5.06.01.02	Plinths	m ³	1		
	5.06.01.03	Walls	m ³	17		
	5.06.01.04	Roof Slabs	m ³	4		
	5.06.01.05	Sump	m ³	1		
	5.06.01.06	Concrete Bunker Apron Slab	m ³	1		
PSCC1.013	5.07	Unformed surface finishes				
	5.07.01	a) Steel-floated finish				
	5.07.01.01	Foundations (Floor)	m ²	15		
	5.07.01.02	Top of Plinths	m ²	2		
	5.07.01.03	Top of Walls	m ²	10		
	5.07.01.04	Roof Slabs	m ²	16		
	5.07.01.05	Concrete Bunker Apron Slab	m ²	10		
	5.08.02	d) Broomed finish				
	5.08.02.01	Blinding layer	m ²	45		
	5.08.03	e) Screed in 3:1 Sand and Cement Mix				
	5.08.03.01	Chamber floor screed	m ³	2		
PSCC1.016	5.08	Joints				
	5.08.01	Polysulphide sealant between precast slabs	m	35		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 3 - DN 200 Flow Meter and scour Valve Chamber: Node NC3						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.017	5.09	Manufacture (or supply) and erect precast units				
	5.09.02	Concrete Bunker (Minimum Internal Dimesions: 680 H x 500 W x 375 D)	No.	1		
PSCC1.018	5.10	Grouting				
	5.10.01	a) Under bases of pipe supports and straps	m³	1		
	5.10.02	c) Pipe box-outs	m³	1		
PSCC1.019	5.11	HD bolts and miscellaneous metal work				
	5.11.01	Metal work for DN 200 Flow Meter and Scour Valve Chamber as per drawing JW14358-16941-T-013-S23-00-TMS				
	5.11.01.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.01.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.01.03	Fabricate and cast in short outlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.01.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.01.05	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	20		
	5.11.01.06	Fabricate and install DN 160 galvanised medium duty pipe clamps as per drawing JW14358-16941-T-017-S10-00-TMS	No.	3		
PSCC1.020	5.12	Colour Mitigation to				
	5.12.01	Exposed Chambers along roadways	m²	15		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 3 - DN 200 Flow Meter and scour Valve Chamber: Node NC3						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
		MISCELLANEOUS ITEMS				
PSCC1.021	5.13	Polythene sheeting under concrete				
	5.13.01	250 micron green medium density polyethylene dampproof sheeting	m ²	45		
PSCC1.023	5.14	FRP items				
	5.14.01	c) FRP Grating				
	5.14.01.01	450 mm x 450 mm x 38 mm deep FRP grating as per dwg JW14358-16941-T-013-S23-00-TMS	No.	1		
PSCC1.024	5.14	Casting pipes and specials in concrete				
	5.14.01	DN 150 Steel pipe cast into chamber wall	No.	3		
PSCC1.025	5.15	Installation of precast elements				
	5.15.01	Precast roof slabs as per drawing JW14358-16941-T-013-S23-00-TMS	No.	5		
PSCC1.026	5.16	Drilling cores through concrete				
	4.16.01	100 mm diameter core through 250 mm thick concrete slab	No.	3		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 3 - DN 200 Flow Meter and scour Valve Chamber: Node NC3						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		SUMMARY				
SANS 1200 C		SITE CLEARANCE				
SANS 1200 DB		EARTHWORKS (PIPE TRENCHES)				
SANS 1200 L		MEDIUM-PRESSURE PIPELINES				
SANS 1200 LC		CABLE DUCTS				
SANS 2001 CC1		CONCRETE WORKS (STRUCTURAL)				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 4 - DN 800 isolation, scour and future tie-in chamber: Node ND2						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C	1	SITE CLEARANCE Refer to Drawing: JW14358-16941-T-013-S53-00-TMS				
PSC 8.2.1	1.01	Clear and grub				
	1.01.01	Areas	m ²	140		
8.2.2	1.02	Remove and grub large trees and tree stumps of girth				
	1.02.01	Over 1 m and up to and including 2 m	No.	1		
8.2.10	1.03	Remove topsoil to nominal depth of 150 mm and stockpile	m ³	21		
PSC 8.2.14	1.04	Take down and re-erect existing fences and guardrails				
	1.04.01	a) Guardrails	m	10		
	1.04.02	b) Diamond mesh fencing	m	10		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 4 - DN 800 isolation, scour and future tie-in chamber: Node ND2						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 DB	2	EARTHWORKS (PIPE TRENCHES)				
		Refer to Drawing: JW14358-16941-T-013-S53-00-TMS				
PSDB 8.3.2	2.01	Excavation				
	2.01.01	d) Excavate in all materials for stormwater inlet and outlet structures and for manholes, catchpits, valve chambers and the like, irrespective of depth, and backfill around structures	m ³	360		
	2.01.02	e) Extra over 2.01.01 for excavating in				
	2.01.02.01	1) intermediate material	m ³	40		
	2.01.02.02	2) hard material	m ³	40		
	2.01.03	f) Hand excavation where ordered by the Project Manager				
	2.01.03.01	a) Soft material	m ³	40		
	2.01.03.02	b) Intermediate material	m ³	40		
	2.01.03.03	c) Hard material	m ³	40		
	2.01.04	g) Backfill stabilized with 5% cement where directed by the Project Manager	m ³	80		
	2.01.05	h) Soilcrete backfill where directed by the Project Manager	m ³	80		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 4 - DN 800 isolation, scour and future tie-in chamber: Node ND2						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 DK	3	GABIONS AND PITCHING				
		Refer to Drawing: JW14358-16941-T-013-S53-00-TMS				
8.2.2	3.01	Gabions				
	3.01.01	Gabion mattresses of galvanized wire, up to 0,3 m deep				
	3.01.01.01	60 mm x 80 mm mesh, 2.2 mm dia wire, 6 m x 2 m x 0.17 m mattress	m ³	5		
8.2.4	3.02	Geotextile				
	3.02.01	Bidim A4 or approved equivalent	m ²	50		
8.2.5	3.03	Pitching				
	3.03.01	Grouted pitching				
	3.03.01.01	a) Light pitching	m ²	15		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 4 - DN 800 isolation, scour and future tie-in chamber: Node ND2						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 L	4	MEDIUM-PRESSURE PIPELINES				
		Refer to Drawing: JW14358-16941-T-13-S54-0-TMS				
8.2.3	4.01	Extra-over PSL 8.2.16 for Supplying, Fixing, and Bedding of Valves				
	4.01.01	Item 2: DN 800 PN25 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 2500/3	No.	2		
	4.01.02	Item 10: DN 250 PN25 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 2500/3	No.	3		
PSL 8.2.19	4.02	Extra over 8.2.16 for the Supplying, Laying, Welding or Jointing and Bedding of Steel specials				
	4.02.01	Item 1: Spool piece DN 800 x 1400 mm long SANS 719; Wall thickness t = 8 mm; flanged both ends to SANS 1123 Table 2500/3; with puddle flange	No.	3		
	4.02.02	Item 3: Unequal Tee DN 800 x 8 mm x DN 250 x 6 mm; SANS719; flanged both ends to SANS 1123 Table 2500/3	No.	5		
	4.02.03	Item 4: Equal tee; DN 800 x DN 800; SANS 719; Wall thickness t = 8 mm; all ends flanged to SANS 1123 Table 2500/3	No.	1		
	4.02.04	Item 5: Spool piece DN 800 SANS 719; 1500 mm long; Wall thickness t = 8 mm; flanged both ends to SANS 1123 Table 2500/3; with puddle flange	No.	1		
	4.02.05	Item 6: Blank flange DN 800; drilled to SANS 1123 Table 2500/8	No.	1		
Total carried forward						

Employer:▣	▣	Contractor:▣	▣
Witness:▣	▣	Witness:▣	▣

Part C - Section 4 - DN 800 isolation, scour and future tie-in chamber: Node ND2						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSL 8.2.34	4.02.06	Item 7: Spool piece DN 800 x 500 mm long; wall thickness t = 8 mm; one end flanged to SANS 1123 Table 2500/3	No.	2		
	4.02.07	Item 8: 90 Degree 3 segment short radius bend; DN 250; SANS 719; 6 mm wall thickness; flanged both ends to SANS 1123 Table 2500/3	No.	4		
	4.02.08	Item 9: Spool piece DN 250 457 mm long; SANS 719; Wall thickness t= 6 mm; flanged both ends to SANS 1123 Table 2500/3	No.	4		
	4.02.09	Item 11: Spool piece DN 250 x 1000 mm long; wall thickness t = 6 mm; one end flanged to SANS 1123 Table 2500/3	No.	1		
	4.03	Operation and Maintenance Manuals for Valves and Flow Meters				
		DN250 Wedge Gate Valve (PN25)	Sum	1		
		DN800 Wedge Gate Valve (PN25)	Sum	1		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 4 - DN 800 isolation, scour and future tie-in chamber: Node ND2						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 2001 PART CC1	5	CONCRETE WORKS (STRUCTURAL)				
		Refer to Drawing: JW14358-16941-T-013-S53-00-TMS				
		SCHEDULED FORMWORK ITEMS				
PSCC1.002	5.01	Smooth				
	5.01.01	Vertical formwork to				
	5.01.01.01	Foundations (Floor)	m ²	8		
	5.01.01.02	Plinths	m ²	2		
	5.01.01.03	Walls	m ²	220		
	5.01.01.04	Sump	m ²	2		
	5.01.02	Horizontal formwork to				
	5.01.02.01	Slabs	m ²	45		
PSCC1.005	5.02	Narrow widths (up to 300 mm wide)				
	5.02.01	Vertical Smooth formwork to				
	5.02.01.01	Precast roof slabs	m	120		
PSCC1.006	5.03	Box out holes/form voids				
	5.03.01	a) Small, circular, of diameter up to 0,35 m				
	5.03.01.01	0 m up to and including 0,5 m	No.	40		
	5.03.02	d) Large, other than circular, areas over 0.1 m ² up to 2,0 m ²				
	5.03.02.01	0 m up to and including 0,5 m	No.	2		
	5.03.02.02	Over 2,0 m deep	No.	4		
		SCHEDULED REINFORCEMENT ITEMS				
PSCC1.007	5.04	Steel bars				
	5.04.01	a) Steel bars irrespective of grade and diameter	t	21		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 4 - DN 800 isolation, scour and future tie-in chamber: Node ND2						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
		SCHEDULED CONCRETE ITEMS				
PSCC1.011	5.05	Blinding layer in Grade 15 MPa/19 mm concrete				
	5.05.01	50 mm thickness	m ²	85		
PSCC1.012	5.06	Strength concrete				
	5.06.01	Class 30 MPa/19 mm concrete in				
	5.06.01.01	Foundations (Floor)	m ³	20		
	5.06.01.02	Plinths	m ³	2		
	5.06.01.03	Walls	m ³	58		
	5.06.01.04	Roof slab	m ³	12		
	5.06.01.05	Sump	m ³	2		
PSCC1.013	5.07	Unformed surface finishes				
	5.07.01	a) Steel-floated finish				
	5.07.01.01	Foundations (Floor)	m ²	30		
	5.07.01.02	Top of Plinths	m ²	2		
	5.07.01.03	Top of Walls	m ²	30		
	5.07.01.04	Roof Slabs	m ²	48		
	5.07.02	d) Broomed finish				
	5.07.02.01	Blinding layer	m ²	85		
	5.08.03	e) Screed in 3:1 Sand and Cement Mix				
	5.08.03.01	Chamber floor screed	m ³	5		
PSCC1.016	5.08	Joints				
	5.08.01	Polysulphide sealant between precast slabs	m	65		
Total carried forward						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part C - Section 4 - DN 800 isolation, scour and future tie-in chamber: Node ND2						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.018	5.09	Grouting				
	5.09.01	a) Under bases of pipe supports and straps	m³	1		
	5.09.02	c) Pipe box-outs	m³	2		
PSCC1.019	5.10	HD bolts and miscellaneous metal work				
	5.10.01	Metal work for DN 800 Isolation, scour and future tie-in Chamber as per drawing JW14358-16941-T-013-S53-00-TMS				
	5.10.01.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	2		
	5.10.01.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	2		
	5.10.01.03	Fabricate and cast in short outlet airvent as per drawings JW14358-16941-T-017-S09-00-TMS	No.	2		
	5.10.01.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	2		
	5.10.01.05	Fabricate and cast in galvanised overflow frame and grating as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.10.01.06	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	40		
	5.10.01.07	Fabricate and install galvanised steel grating platform, including frame and supports	t	0.5		
	5.10.01.08	Fabricate and install galvanised steel handrails	t	0.2		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 4 - DN 800 isolation, scour and future tie-in chamber: Node ND2						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.020	5.11	Colour Mitigation to				
	5.11.01	Exposed Chambers along roadways	m ²	30		
		MISCELLANEOUS ITEMS				
PSCC1.021	5.12	Polythene sheeting under concrete				
	5.12.01	250 micron green medium density polyethylene dampproof sheeting	m ²	85		
PSCC1.023	5.13	FRP items				
	5.13.01	b) FRP Handrails				
	5.13.01.01	Round hand railing system	m	18		
	5.13.02	c) FRP Grating				
	5.13.02.01	450 mm x 450 mm x 38 mm deep FRP grating	No.	3		
	5.13.03	e) FRP platforms including frames and supports				
	5.13.03.01	38 mm deep FRP grating platform	m ²	15		
PSCC1.024	5.14	Casting pipes and specials in concrete				
	5.14.01	DN 250 Steel pipe cast into chamber wall	No.	1		
	5.14.02	DN 800 Steel pipe cast into chamber wall	No.	3		
PSCC1.025	5.15	Installation of precast elements				
	5.15.01	Precast roof slabs as per drawing JW14358-16941-T-013-S53-00-TMS	No.	10		
PSCC1.026	5.16	Drilling cores through concrete				
	4.16.01	100 mm diameter core through 250 mm thick concrete slab	No.	3		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 4 - DN 800 isolation, scour and future tie-in chamber: Node ND2						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		SUMMARY				
SANS 1200 C		SITE CLEARANCE				
SANS 1200 DB		EARTHWORKS (PIPE TRENCHES)				
SANS 1200 DK		GABIONS AND PITCHING				
SANS 1200 L		MEDIUM-PRESSURE PIPELINES				
SANS 2001 CC1		CONCRETE WORKS (STRUCTURAL)				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C	1	SITE CLEARANCE Refer to Drawings: JW14358-16941-T-013-S30-00-TMS, JW14358-16941-T-013-S32-00-TMS, JW14358-16941-T-013-S51-00-TMS				
PSC 8.2.1	1.01	Clear and grub				
	1.01.01	Areas	m ²	300		
8.2.2	1.02	Remove and grub large trees and tree stumps of girth				
	1.02.01	Over 1 m and up to and including 2 m	No.	4		
8.2.10	1.03	Remove topsoil to nominal depth of 150 mm and stockpile	m ³	45		
PSC 8.2.14	1.04	Take down and re-erect existing fences and guardrails				
	1.04.01	a) Guardrails	m	15		
	1.04.02	b) Diamond mesh fencing	m	15		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 DB	2	EARTHWORKS (PIPE TRENCHES) Refer to Drawings: JW14358-16941-T-013-S30-00-TMS, JW13038-16941-T-013-S32-00-TMS, JW14358-16941-T-013-S51-00-TMS				
PSDB 8.3.2	2.01	Excavation				
	2.01.01	d) Excavate in all materials for stormwater inlet and outlet structures and for manholes, catchpits, valve chambers and the like, irrespective of depth, and backfill around structures	m³	750		
	2.01.02	e) Extra over 2.01.01 for excavating in				
	2.01.02.01	1) intermediate material	m³	75		
	2.01.02.02	2) hard material	m³	75		
	2.01.03	f) Hand excavation where ordered by the Project Manager				
	2.01.03.01	a) Soft material	m³	75		
	2.01.03.02	b) Intermediate material	m³	75		
	2.01.03.03	c) Hard material	m³	75		
	2.01.04	g) Backfill stabilized with 5% cement where directed by the Project Manager	m³	150		
	2.01.05	h) Soilcrete backfill where directed by the Project Manager	m³	150		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 L 8.2.3	3	MEDIUM-PRESSURE PIPELINES				
	3.01	Extra-over PSL 8.2.16 for Supplying, Fixing, and Bedding of Valves				
	3.01.01	DN 525 Tie-in Chamber as per drawing JW14358-16941-T-013-S31-00-TMS				
	3.01.01.01	Item 3: DN 500 PN25 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 2500/3	No.	1		
	3.01.01.02	Item 7: DN 250 PN25 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 2500/3	No.	1		
	3.01.02	DN 600 to DN 1500 Tie-in Chamber as per drawing JW14358-16941-T-013-S33-00-TMS				
	3.01.02.01	Item 3: DN 600 PN25 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 2500/3	No.	1		
	3.01.02.02	Item 7: DN 250 PN25 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 2500/3	No.	1		
	3.01.03	DN 800 Tie-in Chamber as per drawing JW14358-16941-T-013-S52-00-TMS				
	3.01.03.01	Item 3: DN 800 PN25 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 2500/3	No.	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSL 8.2.19	3.01.03.02	Item 7: DN 250 PN25 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 2500/3	No.	1		
	3.02	Extra over 8.2.16 for the Supplying, Laying, Welding or Jointing and Bedding of Steel specials				
	3.02.01	DN 525 Tie-in Chamber as per drawing JW14358-16941-T-013-S31-00-TMS				
	3.02.01.01	Item 1: Spool piece DN 800 x 500 mm long; SANS 719; wall thickness t = 8 mm; flanged one end to SANS 1123 Table 2500/3	No.	1		
	3.02.01.02	Item 2: Spool piece DN 800 x 1290 mm long; SANS 719; wall thickness t = 8 mm; flanged both ends to SANS 1123 Table 2500/3; with puddle flange	No.	1		
	3.02.01.03	Item 5: Unequal Tee DN 500 x DN 250; SANS 719; 6 mm wall thickness; all ends flanged to SANS 1123 Table 2500/3	No.	2		
	3.02.01.04	Item 6: Spool piece DN 250 x 307 mm long; SANS 719; wall thickness t = 6 mm; flanged both ends to SANS 1123 Table 2500/3	No.	2		
	3.02.01.05	Item 8: 3 Segment Short Radius Bend 90°, DN 250 X 6mm SANS 719; R=280, Both ends flanged to SANS 1123 Table 2500/3	No.	2		
	3.02.01.06	Item 9: Concentric reducer DN 800 x DN 500 x 600 mm long; SANS 719; wall thickness t = 8 mm; flanged both ends to SANS 1123 Table 2500/3	No.	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.02.02	DN 600 to DN 1500 Tie-in Chamber as per drawing JW14358-16941-T-013-S33-00-TMS				
	3.02.02.01	Item 1: Spool piece DN 600 x 500 mm long; SANS 719; wall thickness t = 6 mm; flanged one end to SANS 1123 Table 2500/3	No.	1		
	3.02.02.02	Item 2: Spool piece DN 600 x 964 mm long; SANS 719; wall thickness t = 6 mm; flanged both ends to SANS 1123 Table 2500/3; with puddle flange	No.	1		
	3.02.02.03	Item 5: Unequal Tee DN 600 x DN 250; SANS 719; 6 mm wall thickness; all ends flanged to SANS 1123 Table 2500/3	No.	2		
	3.02.02.04	Item 6: Spool piece DN 250 x 452 mm long; SANS 719; wall thickness t = 6 mm; flanged both ends to SANS 1123 Table 2500/3	No.	2		
	3.02.02.05	Item 8: 90 Degree 3 segment short radius bend; DN 250; SANS 719; 6 mm wall thickness; flanged both ends to SANS 1123 Table 2500/3	No.	2		
	3.02.03	DN 800 Tie-in Chamber as per drawing JW14358-16941-T-013-S52-00-TMS				
	3.02.03.01	Item 1: Spool piece DN 800 x 500 mm long; SANS 719; wall thickness t = 8 mm; flanged one end to SANS 1123 Table 2500/3	No.	1		
	3.02.03.02	Item 2: Spool piece DN 800 x 1464 mm long; SANS 719; wall thickness t = 8 mm; flanged both ends to SANS 1123 Table 2500/3; with puddle flange	No.	1		
	3.02.02.03	Item 5: Unequal Tee DN 800 wall thickness t = 8 mm x DN 250 x 6 mm; SANS 719; all ends flanged to SANS 1123 Table 2500/3	No.	2		
	3.02.02.04	Item 6: Spool piece DN 250 x 730 mm long; SANS 719; wall thickness t = 6 mm; flanged both ends to SANS 1123 Table 2500/3	No.	2		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSL 8.2.28	3.02.02.05	Item 8: 90 Degree 3 segment short radius bend; DN	No.	2		
	3.03	Connect to Existing Mains using Hot Tapping				
	3.03.01	a) Connect DN 600 (PN25) stub to existing DN 1500 pipeline	No.	1		
	3.03.02	b) Connect DN 800 (PN25) stub to existing DN 1200 pipeline	No.	1		
PSL 8.2.34	3.03.03	c) Connect DN 500 (PN25) stub to existing DN 525 pipeline	No.	1		
	3.04	Operation and Maintenance Manuals for Valves and Flow Meters				
	3.05.01	DN 500 Wedge Gate Valve (PN25)	Sum	1		
	3.05.02	DN 600 Wedge Gate Valve (PN25)	Sum	1		
	3.05.03	DN 800 Wedge Gate Valve (PN25)	Sum	1		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 2001 PART CC1	4	CONCRETE WORKS (STRUCTURAL) Refer to Drawings: JW14358-16941-T-013-S30-00-TMS, JW13038-16941-T-013-S32-00-TMS, JW14358-16941-T-013-S51-00-TMS SCHEDULED FORMWORK ITEMS				
PSCC1.002	4.01	Smooth				
	4.01.01	Vertical formwork to				
	4.01.01.01	Foundations (Floor)	m ²	20		
	4.01.01.02	Plinths	m ²	10		
	4.01.01.03	Walls	m ²	500		
	4.01.01.04	Sump	m ²	3		
	4.01.01.05	Stairs	m ²	32		
	4.01.02	Horizontal formwork to				
	4.01.02.01	Slabs	m ²	75		
PSCC1.005	4.02	Narrow widths (up to 300 mm wide)				
	4.02.01	Vertical Smooth formwork to				
	4.02.01.01	Precast slabs	m	200		
PSCC1.006	4.03	Box out holes/form voids				
	4.03.01	a) Small, circular, of diameter up to 0,35 m				
	4.03.01.01	0 m up to and including 0,5 m	No.	52		
	4.03.02	d) Large, other than circular, areas over 0.1 m² up to 2,0 m²				
	4.03.02.01	0 m up to and including 0,5 m	No.	3		
	4.03.02.02	Over 2,0 m deep	No.	9		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.007	4.04	SCHEDULED REINFORCEMENT ITEMS				
		Steel bars				
	4.04.01	a) Steel bars irrespective of grade and diameter	t	30		
PSCC1.011	4.05	SCHEDULED CONCRETE ITEMS				
		Blinding layer in Grade 15 MPa/19 mm concrete				
	4.05.01	50 mm thickness	m ²	165		
PSCC1.012	4.06	Strength concrete				
	4.06.01	Class 30 MPa/19 mm concrete in:				
	4.06.01.01	Foundations (Floor)	m ³	20		
	4.06.01.02	Plinths	m ³	6		
	4.06.01.03	Walls	m ³	70		
	4.06.01.04	Roof slab	m ³	20		
	4.06.01.05	Sump	m ³	4		
	4.06.01.06	Stairs	m ³	8		
PSCC1.013	4.07	Unformed surface finishes				
	4.07.01	a) Steel-floated finish				
	4.07.01.01	Foundations (Floor)	m ²	80		
	4.07.01.02	Top of Plinths	m ²	4		
	4.07.01.03	Top of Walls	m ²	30		
	4.07.02	d) Broomed finish				
	4.07.02.01	Blinding layer	m ²	165		
	4.07.03	e) Screed in 3:1 Sand and Cement Mix				
	4.07.03.01	Chamber floor screed	m ³	8		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.016	4.08	Joints				
	4.08.01	Polysulphide sealant between precast slab	m	80		
PSCC1.018	4.09	Grouting				
	4.09.01	a) Under bases of pipe supports and straps	m³	4		
	4.09.02	b) Pipe box-outs	m³	4		
PSCC1.019	4.10	HD bolts and miscellaneous metal work				
	4.10.01	DN 525 Tie-in Chamber as per drawings JW14358-16941-T-013-S30-00-TMS & JW14358-16941-T-013-S31-00-TMS				
	4.10.01.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.01.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.01.03	Fabricate and cast in short outlet airvent as per drawings JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.01.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.01.05	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	16		
	4.10.01.06	Fabricate and install galvanised steel grating platform, including frame and supports	t	0.5		
	4.10.01.07	Fabricate and install galvanised steel handrails	t	0.2		
	4.10.02	DN 600 to DN 1500 Tie-in Chamber as per drawing JW14358-16941-T-013-S32-00-TMS & JW14358-16941-T-013-S33-00-TMS				
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	4.10.02.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.02.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.02.03	Fabricate and cast in short outlet airvent as per drawings JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.02.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.02.05	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	16		
	4.10.02.06	Fabricate and install galvanised steel grating platform, including frame and supports	t	0.5		
	4.10.02.07	Fabricate and install galvanised steel handrails	t	0.2		
	4.10.03	DN 800 Tie-in Chamber as per drawing JW14358-16941-T-013-S51-00-TMS & JW14358-16941-T-013-S52-00-TMS				
	4.10.03.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.03.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.03.03	Fabricate and cast in short outlet airvent as per drawings JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.03.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.03.05	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	20		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.020	4.10.03.06	Fabricate and install galvanised steel grating platform, including frame and supports	t	0.5		
	4.10.03.07	Fabricate and install galvanised steel handrails	t	0.2		
	4.11	Colour Mitigation to				
	4.11.01	Exposed Chambers along roadways	m ²	190		
		MISCELLANEOUS ITEMS				
PSCC1.021	4.12	Polythene sheeting under concrete				
	4.12.01	250 micron green medium density polyethylene dampproof sheeting	m ²	165		
PSCC1.023	4.13	FRP items				
	4.13.01	b) FRP Handrails				
	4.13.01.01	Round hand railing system	m	18		
	4.13.01	c) FRP Grating				
	4.13.01.01	450 mm x 450 mm x 38 mm deep FRP grating	No.	3		
	4.13.01	e) FRP platforms including frames and supports				
	4.13.01.02	38 mm deep FRP grating platform	m ²	15		
PSCC1.024	4.14	Casting pipes and specials in concrete				
	4.14.01	DN 600 Steel pipe cast into chamber wall	No.	1		
	4.14.02	DN 800 Steel pipe cast into chamber wall	No.	2		
PSCC1.025	4.15	Installation of precast elements				
	4.15.01	Precast roof slabs as per drawing JW14358-16941-T-013-S30-00-TMS	No.	4		
	4.15.02	Precast roof slabs as per drawing JW14358-16941-T-013-S32-00-TMS	No.	4		
	4.15.03	Precast roof slabs as per drawing JW14358-16941-T-013-S51-00-TMS	No.	5		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯



Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C		SUMMARY				
SANS 1200 DB		SITE CLEARANCE				
SANS 1200 L		EARTHWORKS (PIPE TRENCHES)				
SANS 2001 CC1		MEDIUM-PRESSURE PIPELINES				
		CONCRETE WORKS (STRUCTURAL)				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯



Part C - Section 6 - Upgrades to Existing Butterfly Valve Chambers						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C	1	SITE CLEARANCE Refer to Drawings: JW14358-16941-T-013-S45-00-TMS, JW14358-16941-T-014-S46-00-TMS, JW14358-16941-T-013-S47-00-TMS				
PSC 8.2.1	1.01	Clear and grub				
	1.01.01	Areas	m ²	40		
8.2.10	1.02	Remove topsoil to nominal depth of 150 mm and	m ³	6		
PSC 8.2.12	1.03	Removal of man-made surfaces and kerbing				
	1.03.01	c) Interlocking concrete segmental paving blocks, Class 2.6/40MPa (all colours)	m ²	30		
PSC 8.2.14	1.03	Take down and re-erect existing fences and guardrails				
	1.03.01	a) Guardrails	m	15		
	1.03.02	b) Diamond mesh fencing	m	15		
PSC 8.2.17	1.04	Demolishing existing valve chambers				
	1.04.01	a) Unreinforced concrete	m ³	2		
	1.04.02	b) Reinforced concrete	m ³	8		
	1.04.02	c) 220 mm Brick wall	m ²	40		
PSC 8.2.18	1.05	Temporary removal and reinstatement of precast concrete slabs	No.	5		
PSC 8.2.19	1.06	Temporary removal and reinstatement of precast concrete bunkers	No.	1		
PSC 8.2.20	1.07	Temporary disconnection and reconnection of cathodic protection cabling inside precast concrete bunkers	No.	1		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯



Part C - Section 6 - Upgrades to Existing Butterfly Valve Chambers

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 DB	2	EARTHWORKS (PIPE TRENCHES) Refer to Drawings: JW14358-16941-T-013-S45-00-TMS, JW14358-16941-T-014-S46-00-TMS, JW14358-16941-T-013-S47-00-TMS				
PSDB 8.3.2	2.01	Excavation				
	2.01.01	d) Excavate in all materials for stormwater inlet and outlet structures and for manholes, catchpits, valve chambers and the like, irrespective of depth, and backfill around structures	m ³	30		
	2.01.02	e) Extra over 2.01.01 for excavating in				
	2.01.02.01	1) intermediate material	m ³	5		
	2.01.02.02	2) hard material	m ³	5		
	2.01.03	f) Hand excavation where ordered by the Project Manager				
	2.01.03.01	a) Soft material	m ³	5		
	2.01.03.02	b) Intermediate material	m ³	5		
	2.01.03.03	c) Hard material	m ³	5		
	2.01.04	g) Backfill stabilized with 5% cement where directed by the Project Manager	m ³	5		
	2.01.05	h) Soilcrete backfill where directed by the Project Manager	m ³	5		
Total carried forward to summary						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□



Part C - Section 6 - Upgrades to Existing Butterfly Valve Chambers						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 L 8.2.5	3	MEDIUM-PRESSURE PIPELINES Refer to Drawings: JW14358-16941-T-013-S45-00-TMS, JW14358-16941-T-014-S46-00-TMS, JW14358-16941-T-013-S47-00-TMS				
	3.01	Supply and Place Pipes, Valves, and Specials (Short pipe runs)				
	3.01.01	Butterfly Valve Chamber 1				
	3.01.01.01	Item 1: DN 1200 PN25 Butterfly Valve to BS5155 (Short Body) / EN593 (Series 13); Boving or similar approved; with loose EPDM liner approved for drinking water; supplied with gearbox; flanged both ends to SANS 1123 Table 2500/3	No.	1		
	3.01.01.02	Item 2: Spool piece DN 1200 x 300 mm long; SANS 719; wall thickness t = 10 mm; both ends flanged to SANS 1123 Table 2500/3	No.	1		
	3.01.02	Butterfly Valve Chamber 2				
	3.01.02.01	Item 1: DN 1200 PN25 Butterfly Valve to BS5155 (Short Body) / EN593 (Series 13); Boving or similar approved; with loose EPDM liner approved for drinking water; supplied with gearbox; flanged both ends to SANS 1123 Table 2500/3	No.	1		
	3.01.02.02	Item 2: DN 300 PN25 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 2500/3	No.	1		
	3.01.02.03	Item 3: Spool piece DN 1200 x 300 mm long; SANS 719; wall thickness t = 10 mm; both ends flanged to SANS 1123 Table 2500/3	No.	1		
	3.01.02.04	Item 4: DN1200 x DN300 Scour Tee; Wall thickness t = 10 mm (DN1200) / t = 6 mm (DN300); length of DN1200 section = 760 mm; all ends flanged to SANS 1123 Table 2500/3	No.	2		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯



Part C - Section 6 - Upgrades to Existing Butterfly Valve Chambers						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	
Total brought forward						
PSL 8.2.31	3.03	Insitu repair of epoxy coated and lined pipe specials				
	3.03.01	a) Flanges				
	3.03.01.01	DN 300 Flange	No.	4		
	3.03.01.01	DN 1200 Flange	No.	1		
	3.03.02	b) Pipes	m ²	4		
PSL 8.2.32	3.04	Replacement of Existing Valves and Specials under Shutdown Conditions				
	3.04.01	a) Butterfly Valve Chamber 1 (drawings JW14358-16941-T-013-S45-00-TMS and JW14358-16941-T-013-S46-00-TMS)	Sum	1		
	3.04.02	b) Butterfly Valve Chamber 1 (drawing JW14358-16941-T-013-S47-00-TMS)	Sum	1		
PSL 8.2.34	3.05	Operation and Maintenance Manuals for Valves and Flow Meters				
	3.05.01	DN 1200 Butterfly Valve (PN25)	Sum	1		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯



Part C - Section 6 - Upgrades to Existing Butterfly Valve Chambers						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 2001 PART CC1	4	CONCRETE WORKS (STRUCTURAL)				
		Take down and re-erect existing fences and guardrails				
		SCHEDULED FORMWORK ITEMS				
PSCC1.002	4.01	Smooth				
	4.01.01	Vertical formwork to				
	4.01.01.01	Walls	m ²	40		
	4.01.02	Horizontal formwork to				
	4.01.02.01	Slabs	m ²	40		
PSCC1.005	4.02	Narrow widths (up to 300 mm wide)				
	4.02.01	Vertical Smooth formwork to				
	4.02.01.01	Slabs	m	50		
PSCC1.006	4.03	Box out holes/form voids:				
	4.03.01	a) Small, circular, of diameter up to 0,35 m				
	4.03.01.01	0 m up to and including 0,5 m	No.	20		
	4.03.02	d) Large, other than circular, areas over 0.1 m ² up to 2,0 m ²				
	4.03.02.01	0 m up to and including 0,5 m	No.	3		
		SCHEDULED REINFORCEMENT ITEMS				
PSCC1.007	4.04	Steel bars				
	4.04.01	a) Steel bars irrespective of grade and diameter	t	4		
		SCHEDULED CONCRETE ITEMS				
PSCC1.012	4.05	Strength concrete				
	4.05.01	Class 30 MPa/19 mm concrete in				
	4.05.01.01	Walls	m ³	10		
	4.05.01.02	Roof slabs	m ³	10		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯



Part C - Section 6 - Upgrades to Existing Butterfly Valve Chambers						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.013	4.06	Unformed surface finishes				
	4.06.01	a) Steel-floated finish				
	4.06.01.01	Top of Walls	m ²	10		
	4.06.01.02	Roof slabs	m ²	40		
	4.06.02	e) Screed in 3:1 Sand and Cement Mix				
	4.06.02.01	Chamber floor screed	m ³	3		
PSCC1.016	4.07	Joints				
	4.07.01	Polysulphide sealant between precast slabs	m	60		
PSCC1.018	4.08	Grouting				
	4.08.01	a) Under bases of pipe supports and straps	m ³	2		
PSCC1.019	4.09	HD bolts and miscellaneous metal work as per drawing JW14358-16941-T-013-S45-00-TMS				
	4.09.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.09.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.09.03	Fabricate and cast in short outlet airvent as per drawings JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.09.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.09.05	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	8		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯



Part C - Section 6 - Upgrades to Existing Butterfly Valve Chambers						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.019	4.10	HD bolts and miscellaneous metal work as per drawing JW14358-16941-T-013-S45-00-TMS				
	4.10.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	2		
	4.10.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.03	Fabricate and cast in short outlet airvent as per drawings JW14358-16941-T-017-S09-00-TMS	No.	1		
	4.10.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	2		
	4.10.05	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	8		
PSCC1.020	4.11	Colour Mitigation to				
	4.11.01	Exposed Chambers along roadways	m ²	40		
		MISCELLANEOUS ITEMS				
PSCC1.021	4.12	Polythene sheeting under concrete				
	4.12.01	250 micron green medium density polyethylene dampproof sheeting	m ²	40		
PSCC1.023	4.13	FRP items				
	4.13.01	a) FRP Grating				
	4.13.01.01	450 mm x 450 mm x 38 mm deep FRP grating	m ²	3		
PSCC1.025	4.14	Installation of precast elements				
	4.14.01	Precast roof slabs	No.	3		
PSCC1.027	4.15	Masonry				
	4.15.01	110 mm brick wall	m ²	10		
	4.15.02	220 mm brick wall	m ²	20		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯



Part C - Section 6 - Upgrades to Existing Butterfly Valve Chambers						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		SUMMARY				
SANS 1200 C		SITE CLEARANCE				
SANS 1200 DB		EARTHWORKS (PIPE TRENCHES)				
SANS 1200 L		MEDIUM-PRESSURE PIPELINES				
SANS 2001 CC1		CONCRETE WORKS (STRUCTURAL)				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C	1	SITE CLEARANCE Refer to Drawings: JW14358-16941-T-013-S17-00-TMS, JW14358-16941-T-013-S20-00-TMS, JW14358-16941-T-013-S42-00-TMS, JW14358-16941-T-013-S49-00-TMS				
PSC 8.2.1	1.01	Clear and grub				
	1.01.01	Areas	m ²	500		
8.2.2	1.02	Remove and grub large trees and tree stumps of girth				
	1.02.01	Over 1 m and up to and including 2 m	No.	10		
8.2.10	1.03	Remove topsoil to nominal depth of 150 mm and stockpile	m ³	75		
PSC 8.2.12	1.03	Removal of man-made surfaces and kerbing				
	1.03.01	a) Road materials with Asphalt ≤ 50mm thick	m ²	36		
	1.03.02	c) Interlocking concrete segmental paving blocks, Class 2.6/40MPa (all colours)	m ²	24		
	1.03.03	h) Garden, lawns and grassing	m ²	550		
PSC 8.2.14	1.04	Take down and re-erect existing fences and guardrails				
	1.04.01	a) Guardrails	m	20		
	1.04.02	b) Diamond mesh fencing	m	20		
PSC 8.2.17	1.05	Demolishing existing valve chambers				
	1.05.01	b) Reinforced concrete	m ³	15		
	1.05.02	c) 220 mm Brick wall	m ²	36		
Total carried forward to summary						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 DB	2	EARTHWORKS (PIPE TRENCHES) Refer to Drawings: JW14358-16941-T-013-S17-00-TMS, JW14358-16941-T-013-S20-00-TMS, JW14358-16941-T-013-S42-00-TMS, JW14358-16941-T-013-S49-00-TMS				
PSDB 8.3.2	2.01	Excavation				
	2.01.01	d) Excavate in all materials for stormwater inlet and outlet structures and for manholes, catchpits, valve chambers and the like, irrespective of depth, and backfill around structures	m ³	1000		
	2.01.02	e) Extra over 2.01.01 for excavating in				
	2.01.02.01	1) intermediate material	m ³	100		
	2.01.02.02	2) hard material	m ³	100		
	2.01.03	f) Hand excavation where ordered by the Project Manager				
	2.01.03.01	a) Soft material	m ³	100		
	2.01.03.02	b) Intermediate material	m ³	100		
	2.01.03.03	c) Hard material	m ³	100		
	2.01.04	g) Backfill stabilized with 5% cement where directed by the Project Manager	m ³	200		
	2.01.05	h) Soilcrete backfill where directed by the Project Manager	m ³	200		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 L	4	MEDIUM-PRESSURE PIPELINES Refer to Drawings: JW14358-16941-T-013-S18-00-TMS, JW14358-16941-T-013-S21-00-TMS, JW14358-16941-T-013-S43-00-TMS, JW14358-16941-T-013-S50-00-TMS				
PSL 8.2.1	3.01	Supply, Lay, and Bed Pipes Complete with Couplings				
	3.01.01	High-Impact mPVC Class 16 complete with shouldered end coupling system				
	3.01.01.01	Class 16 DN 160	m	30		
8.2.2	3.02	Extra-over 3.0.1 for the Supplying, Laying, and Bedding of Specials Complete with Couplings				
	3.02.01	High-Impact mPVC Class 16 bends complete with shouldered end coupling system				
	3.02.01.01	DN 160 11.25° bend	No.	1		
	3.02.01.02	DN 160 22.5° bend	No.	1		
	3.02.01.03	DN 160 45° bend	No.	1		
	3.02.01.04	DN 160 90° bend	No.	1		
	3.02.02	High-Impact mPVC Class 16 shouldered end repair couplings				
	3.02.02.01	DN 160	No.	2		
	3.02.03	Flange adaptors for High-Impact mPVC Class 16 complete with shouldered end coupling system				
	3.02.03.01	DN 160	No.	2		
8.2.3	3.03	Extra-over PSL 8.2.16 for Supplying, Fixing, and Bedding of Valves				
	3.03.01	DN 600 Pressure Reducing Valve Chamber 1 (Drawing JW14358-16941-T-013-S21-00-TMS)				
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.03.01.01	Item 8: DN 300 PN25 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 2500/3	No.	4		
	3.03.01.02	Item 10: DN 300 PN25 Pressure Reducing Valve, flanged both ends to SANS 1123 Table 2500/3	No.	2		
	3.03.01.03	Item 16: DN 100 PN25 Resilient Seal Gate valve; non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 2500/3	No.	1		
	3.03.01.05	Item 17: DN 100 PN25 Double orifice with anti-shock orifice mechanism air release valve, Vent-O-Mat RBX or similar approved; flanges drilled to SANS 1123 Table 2500/3	No.	1		
	3.03.02	DN 600 Bypass Pressure Reducing Valve Chamber (Drawing JW14358-16941-T-013-S43-00-TMS)				
	3.03.01.01	Item 5: DN 100 PN16 Double orifice with anti-shock orifice mechanism air release valve, Vent-O-Mat RBX or similar approved; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.03.01.02	Item 7: DN 300 PN16 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	2		
	3.03.01.03	Item 12: DN 300 PN16 Pressure Reducing Valve, flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.03.01.04	Item 15: DN 150 PN16 Pressure Reducing Valve, flanged both ends to SANS 1123 Table 1600/3	No.	1		
Total carried forward						

Employer:▣	▣	Contractor:▣	▣
Witness:▣	▣	Witness:▣	▣

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.03.01.05	Item 16: DN 150 PN16 Resilient Seal Gate Valve; non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.03.01.06	Item 17: DN 150 PN16 Resilient Seal Gate Valve; non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	2		
	3.03.03	Existing DN 150 PRV Chamber Upgrade (Drawing JW14358-16941-T-013-S50-00-TMS)				
	3.03.03.01	Item 3: DN 100 PN 16 Resilient Seal Gate Valve; non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.03.03.02	Item 8: DN 150 PN 16 Resilient Seal Gate Valve; non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.03.03.03	Item 10: DN 150 PN16 Pressure Reducing Valve, flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.03.04	DN 200 Non-return Valve Chamber (Drawing JW14358-16941-T-013-S18-00-TMS)				
	3.03.04.01	Item 5: DN 100 PN16 Double orifice with anti-shock orifice mechanism air release valve, Vent-O-Mat RBX or similar approved; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.03.04.02	Item 7: DN 150 PN 16 Resilient Seal Gate Valve; non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	4		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
Total brought forward						
PSL 8.2.19	3.03.04.03	Item 13: DN 150 Single Door Swing Check Valve to SANS 1551; Vosa or similar approved; flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.04	Extra over 8.2.16 for the Supplying, Laying, Welding or Jointing and Bedding of Steel specials				
	3.04.01	DN 600 Pressure Reducing Valve Chamber 1 (Drawing JW14358-16941-T-013-S21-00-TMS)				
	3.04.01.01	Item 1: Concentric reducer DN 600 to DN 300; SANS 719; Wall Thickness t = 6 mm; 610 mm long; both ends flanged to SANS 1123 Table 2500/3	No.	2		
	3.04.01.02	Item 2: Spool piece DN 300; 1450 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 2500/3; with puddle flange	No.	1		
	3.04.01.03	Item 3a: DN 300 Y-Strainer; Flanged both ends to SANS 1123 Table 2500/3	No.	2		
	3.04.01.04	Item 3b: DN 300 T-Strainer; Flanged both ends to SANS 1123 Table 2500/3	No.	2		
	3.04.01.05	Item 04: Dismantling joint DN 300; Flanged to SANS 1123 Table 2500/3	No.	2		
	3.04.01.06	Item 5: Equal tee; DN 300 x DN 300; SANS 719; wall thickness = 6 mm; flanged all ends to SANS 1123 Table 2500/3	No.	3		
	3.04.01.07	Item 7: Medium Radius 90 degree DN300 bend; SANS 719; wall thickness t = 6 mm; Flanged both ends to SANS 1123 Table 2500/3	No.	4		
	3.04.01.08	Item 9: Spool piece DN 300; 725 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 2500/3; with pipe support	No.	4		
	3.04.01.09	Item 11: Spool piece DN 300; 1475 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 2500/3; with pipe support	No.	1		
Total carried forward						

Employer:▣	▣	Contractor:▣	▣
Witness:▣	▣	Witness:▣	▣

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.04.01.10	Item 13: Spool piece DN 300; 1426 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 2500/3; with puddle flange	No.	1		
	3.04.01.11	Item 14: Spool piece DN 100 x 200 mm long; SANS 62 heavy class; one end flanged to SANS 1123 Table 2500/3; other end welded to DN200 blank flange to SANS 1123 Table 2500/8 with hole drilled for DN 100 pipe	No.	1		
	3.04.01.12	Item 15: Spool piece DN 100 x 200 mm long; SANS 62 heavy Class; both ends flanged to SANS 1123 Table 2500/3	No.	1		
	3.04.01.13	Item 19: Spool piece DN 300 x 900 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 2500/3; with pipe support	No.	1		
	3.04.01.14	Item 20: Spool piece DN 600 x 500 mm long; SANS 719; Wall Thickness t = 6 mm; one end flanged to SANS 1123 Table 2500/3	No.	2		
	3.04.02	DN 600 Bypass Pressure Reducing Valve Chamber (Drawing JW14358-16941-T-013-S43-00-TMS)				
	3.04.02.01	Item 1: Spool piece DN 600 x 500 mm long; SANS 719; Wall Thickness t = 6 mm; one end flanged to SANS 1123 Table 1600/3	No.	2		
	3.04.02.02	Item 2: Concentric Reducer DN 600 to DN 300 ; SANS 719; Wall Thickness t = 6 mm; 600 mm long; both ends flanged to SANS 1123 Table 1600/3	No.	2		
	3.04.02.03	Item 3: Spool piece DN 300 x 1155 mm long SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with puddle flange	No.	2		
	3.04.02.04	Item 4: Spool piece DN 100 x 200 mm long; SANS 62 heavy class; one end flanged to SANS 1123 Table 1600/3; other end welded to DN 150 blank flange to SANS 1123 Table 1600/8 with hole drilled for DN 100 pipe	No.	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.04.02.05	Item 6: Unequal tee; DN 300 x DN 150; SANS 719; wall thickness = 6 mm; flanged all ends to SANS 1123 Table 1600/3	No.	2		
	3.04.02.06	Item 8: Spool piece DN 300 x 596 mm long SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.02.07	Item 9a: DN 300 Y-Strainer; Flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.04.02.08	Item 9b: DN 300 T-Strainer; Flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.04.02.09	Item 10: Spool piece DN 300; 1060 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.02.10	Item 11: Spool piece DN 300; 500 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.02.11	Item 13: Unequal tee; DN 300 x DN 150; SANS 719 wall thickness = 6 mm (DN 300) / SANS 62 Heavy Class (DN 150); flanged all ends to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.02.12	Item 14: Bend DN 150; SANS 62 Heavy Class; both ends flanged to SANS 1123 Table 1600/3	No.	2		
	3.04.02.13	Item 18: Spool piece DN 150; 552 mm long; SANS 62 heavy class; both ends flanged to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.02.14	Item 19a: DN 150 Y-Strainer; Flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.04.02.15	Item 19b: DN 150 T-Strainer; Flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.04.02.16	Item 20: Spool piece DN 150; 552 mm long; SANS 62 heavy class; both ends flanged to SANS 1123 Table 1600/3	No.	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.04.02.17	Item 21: Spool piece DN 150; 610 mm long; SANS 62 heavy class; both ends flanged to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.02.18	Item 22: Spool piece DN 150; 538 mm long; SANS 62 heavy class; both ends flanged to SANS 1123 Table 1600/3	No.	1		
	3.04.02.19	Item 23: Dismantling joint DN 150; Flanged to SANS 1123 Table 1600/3	No.	1		
	3.04.02.20	Item 24: Dismantling joint DN 300; Flanged to SANS 1123 Table 1600/3	No.	1		
	3.04.03	Existing DN 150 PRV Chamber Upgrade (Drawing JW14358-16941-T-013-S50-00-TMS)				
	3.04.03.01	Item 1: Spool piece DN 200; 1220 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with puddle flange	No.	2		
	3.04.03.02	Item 2: Unequal tee; DN 200 x DN 100; SANS 719 wall thickness = 6 mm (DN 200) / SANS 62 Medium Class (DN 100); flanged all ends to SANS 1123 Table 1600/3	No.	1		
	3.04.03.03	Item 4: Spool piece DN 100; 1450 mm long; SANS 62 medium class; both ends flanged to SANS 1123 Table 1600/3	No.	1		
	3.04.03.04	Item 5: Equal tee; DN 200 x DN 200; SANS 719; wall thickness t = 6 mm; flanged all ends to SANS 1123 Table 1600/3	No.	2		
	3.04.03.05	Item 6: Spool piece DN 200; 1540 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with puddle flange	No.	3		
	3.04.03.06	Item 7: Concentric reducer DN 200 to DN 150; SANS 719; Wall Thickness t = 6 mm; 300 mm long; both ends flanged to SANS 1123 Table 1600/3	No.	4		
	3.04.03.07	Item 9: Spool piece DN 150; 320 mm long; SANS 62 medium class; both ends flanged to SANS 1123 Table 1600/3	No.	2		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.04.03.08	Item 11: Spool piece DN 150; 170 mm long; SANS 62 medium class; both ends flanged to SANS 1123 Table 1600/3	No.	1		
	3.04.03.09	Item 12: Dismantling joint DN 150; Flanged to SANS 1123 Table 1600/3	No.	1		
	3.04.03.10	Item 13: Spool piece DN 150; 200 mm long; SANS 62 medium class; both ends flanged to SANS 1123 Table 1600/3; with pressure socket	No.	1		
	3.04.03.11	Item 14: Spool piece DN 150; 1420 mm long; SANS 62 medium class; both ends flanged to SANS 1123 Table 1600/3	No.	1		
	3.04.03.12	Item 15: DN 200 Flange adaptor for High-Impact mPVC Class 16 complete with shouldered end coupling system flange drilled to SANS 1123 Table 1600/3	No.	2		
	3.04.03.13	Item 16: DN 150 Flange adaptor for High-Impact mPVC Class 16 complete with shouldered end coupling system flange drilled to SANS 1123 Table 1600/3	No.	1		
	3.04.03.14	Item 17: DN 100 Flange adaptor for High-Impact mPVC Class 16 complete with shouldered end coupling system flange drilled to SANS 1123 Table 1600/3	No.	1		
	3.04.04	DN 200 Non-return Valve Chamber (Drawing JW14358-16941-T-013-S18-00-TMS)				
	3.04.04.01	Item 1: DN 200 Flange adaptor for High-Impact mPVC Class 16 complete with shouldered end coupling system flange drilled to SANS 1123 Table 1600/3	No.	2		
	3.04.04.02	Item 2: Spool piece DN 150; 1250 mm long; SANS 62 medium class; both ends flanged to SANS 1123 Table 1600/3	No.	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.04.04.03	Item 3: Concentric reducer DN 200 to DN 150; SANS 719; Wall Thickness t = 6 mm; 180 mm long; both ends flanged to SANS 1123 Table 1600/3	No.	2		
	3.04.04.04	Item 4: Spool piece DN 100 x 200 mm long; SANS 62 heavy class; one end flanged to SANS 1123 Table 1600/3; other end welded to DN 200 blank flange to SANS 1123 Table 1600/8 with hole drilled for DN 100 pipe	No.	1		
	3.04.04.05	Item 6: Spool piece DN 150; 454 mm long; SANS 62 medium class; both ends flanged to SANS 1123 Table 1600/3	No.	1		
	3.04.04.06	Item 8: Spool piece DN 150; 773 mm long; SANS 62 medium class; both ends flanged to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.04.07	Item 9a: DN 150 Y-Strainer; Flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.04.04.08	Item 9b: DN 150 T-Strainer; Flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.04.04.09	Item 12: Spool piece DN 150; 830 mm long; SANS 62 medium class; both ends flanged to SANS 1123 Table 1600/3; with pipe support	No.	2		
	3.04.04.10	Item 15: Spool piece DN 150; 1038 mm long; SANS 62 medium class; both ends flanged to SANS 1123 Table 1600/3; with puddle flange	No.	1		
	3.04.04.11	Item 17: Spool piece DN 150; 1256 mm long; SANS 62 medium class; both ends flanged to SANS 1123 Table 1600/3; with puddle flange	No.	1		
	3.04.04.12	Item 18a: DN 160 PE100 PN16 HDPE Stub flange with backing ring	No.	1		
	3.04.04.13	Item 18b: DN 150 Flange adaptor for High-Impact mPVC Class 16 complete with shouldered end coupling system; Flange drilled to SANS 1123 Table 1600/3	No.	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSL 8.2.30	3.04.04.14	Item 19: Equal tee; DN 150 x DN 150; SANS 62 medium Class; flanged all ends to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.04.15	Item 20: Equal tee; DN 150 x DN 150; SANS 62 medium Class; flanged all ends to SANS 1123 Table 1600/3;	No.	1		
	3.05	Extra over 8.2.16 for for the Supplying, Installing and Commissioning of Flow Meters				
	3.05.01	DN 600 Pressure Reducing Valve Chamber 1 (Drawing JW14358-16941-T-013-S21-00-TMS)				
	3.05.01.01	Item 12: DN 300 PN25 Electromagnetic flow meter complete with sensor and remotely mounted transmitter; flanges drilled to SANS 1123 Table 2500/3; supplied with 15 m of cable	No.	1		
PSL 8.2.33	3.06	Supplying, Installing and Commissioning Pressure transmitters with GSM Battery operated data loggers	No.	10		
PSL 8.2.34	3.07	Operation and Maintenance Manuals for Valves and Flow Meters				
	3.07.01	DN 100 Resilient Seal Gate Valve (PN25)	Sum	1		
	3.07.02	DN 150 Resilient Seal Gate Valve (PN16)	Sum	1		
	3.07.03	DN 300 Wedge Gate Valve (PN16)	Sum	1		
	3.07.04	DN 300 Wedge Gate Valve (PN25)	Sum	1		
	3.07.05	DN 100 Air Valve (PN25)	Sum	1		
	3.07.06	DN 150 Pressure Reducing Valve (PN16)	Sum	1		
	3.07.07	DN 300 Pressure Reducing Valve (PN16)	Sum	1		
	3.07.08	DN 300 Pressure Reducing Valve (PN25)	Sum	1		
	3.07.09	DN 150 Y-type Strainer (PN16)	Sum	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.07.10	DN 150 T-type Strainer (PN16)	Sum	1		
	3.07.11	DN 300 Y-type Strainer (PN16)	Sum	1		
	3.07.12	DN 300 T-type Strainer (PN16)	Sum	1		
	3.07.13	DN 300 Y-type Strainer (PN25)	Sum	1		
	3.07.14	DN 300 T-type Strainer (PN25)	Sum	1		
	3.07.15	DN 150 Resilient Seal Gate Valve (PN16)	Sum	1		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 LC 4	4	CABLE DUCTS				
		Refer to Drawing: JW14358-16941-T-013-S20-00-TMS				
8.2.2	4.01	Excavation				
	4.01.01	a) Excavate in all materials for trenches, backfill, compact and dispose of surplus material				
	4.01.01.01	i) Single duct trench (300 mm wide), up to 1 m deep	m ³	5		
PSLC 8.2.5	4.02	Supply, lay, bed and prove duct, including draw wire and screening wire				
	4.02.01	a) 110mm flexible conduit	m	10		
8.2.6	4.03	Imported bedding material, where ordered				
	4.03.01	a) Selected granular material	m ³	3		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 2001 PART CC1	5	CONCRETE WORKS (STRUCTURAL)				
		Refer to Drawings: JW14358-16941-T-013-S17-00-TMS, JW14358-16941-T-013-S20-00-TMS, JW14358-16941-T-013-S42-00-TMS, JW14358-16941-T-013-S49-00-TMS				
		SCHEDULED FORMWORK ITEMS				
PSCC1.002	5.01	Smooth				
	5.01.01	Vertical formwork to				
	5.01.01.01	Foundations (Floor)	m ²	30		
	5.01.01.02	Plinths	m ²	10		
	5.01.01.03	Walls	m ²	620		
	5.01.01.04	Sump	m ²	5		
	5.01.01.05	Stairs	m ²	44		
	5.02.01	Horizontal formwork to				
	5.02.01.01	Precast roof slabs	m ²	120		
PSCC1.005	5.02	Narrow widths (up to 300 mm wide)				
	5.02.01	Vertical Smooth formwork to				
	5.02.01.01	Precast slabs	m	265		
	5.02.01.02	Concrete Bunker Apron Slab	m	10		
PSCC1.006	5.03	Box out holes/form voids				
	5.03.01	a) Small, circular, of diameter up to 0,35 m				
	5.03.01.01	0 m up to and including 0,5 m	No.	60		
	5.03.02	d) Large, other than circular, areas over 0.1 m2 up to 2,0 m2				
	5.03.02.01	0 m up to and including 0,5 m	No.	6		
	5.03.02.02	Over 2,0 m deep	No.	12		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.007	5.04	SCHEDULED REINFORCEMENT ITEMS				
		Steel bars				
	5.04.01	a) Steel bars irrespective of grade and diameter	t	45		
PSCC1.011	5.05	SCHEDULED CONCRETE ITEMS				
		Blinding layer in Grade 15 MPa/19 mm concrete				
	5.05.01	50 mm thickness	m ²	265		
PSCC1.012	5.06	Strength concrete				
	5.06.01	Class 30 MPa/19 mm concrete in				
	5.06.01.01	Foundations (Floor)	m ³	40		
	5.06.01.02	Plinths	m ³	8		
	5.06.01.03	Walls	m ³	100		
	5.06.01.04	Roof slabs	m ³	36		
	5.06.01.05	Sump	m ³	4		
	5.06.01.06	Stairs	m ³	17		
	5.06.01.07	Concrete Bunker Apron Slab	m ³	1		
	5.07	Unformed surface finishes				
	5.07.01	a) Steel-floated finish				
	5.07.01.01	Foundations (Floor)	m ²	150		
PSCC1.013	5.07.01.02	Top of Plinths	m ²	11		
	5.07.01.03	Top of Walls	m ²	25		
	5.07.01.04	Roof slabs	m ²	120		
	5.07.01.05	Concrete Bunker Apron Slab	m ²	10		
	5.07.02	d) Broomed finish				
	5.07.02.01	Blinding layer	m ²	265		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.017	5.07.03	e) Screed in 3:1 Sand and Cement Mix				
	5.07.03.01	Chamber floor screed	m³	15		
PSCC1.016	5.08	Manufacture (or supply) and erect precast units				
	5.08.01	Concrete Bunker (Minimum Internal Dimesions: 680	No.	1		
PSCC1.018	5.09	Joints				
	5.09.01	Polysulphide sealant between precast slabs	m	105		
PSCC1.019	5.10	Grouting				
	5.10.01	a) Under bases of pipe supports and straps	m³	5		
	5.10.02	c) Pipe box-outs	m³	5		
	5.11	HD bolts and miscellaneous metal work				
	5.11.01	Metal work for DN 600 Pressure Reducing Valve Chamber 1 (Drawing JW14358-16941-T-013-S21-00-TMS)				
	5.11.01.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	2		
	5.11.01.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.01.03	Fabricate and cast in short outlet airvent as per drawings JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.01.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	2		
	5.11.01.05	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	32		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	5.11.02	Metal work for DN 600 Bypass Pressure Reducing Valve Chamber (Drawing JW14358-16941-T-013-S43-00-TMS)				
	5.11.02.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.02.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.02.03	Fabricate and cast in short outlet airvent as per drawings JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.02.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.02.05	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	20		
	5.11.02.06	Fabricate and install DN 160 galvanised medium duty pipe clamps as per drawing JW14358-16941-T-017-S10-00-TMS	No.	3		
	5.11.03	Metal work for Existing DN 150 PRV Chamber Upgrade (Drawing JW14358-16941-T-013-S50-00-TMS)				
	5.11.03.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.03.02	Fabricate and install DN 160 galvanised medium duty pipe clamps as per drawing JW14358-16941-T-017-S10-00-TMS	No.	3		
	5.11.03.03	Fabricate and install DN 200 galvanised medium duty pipe clamps as per drawing JW14358-16941-T-017-S10-00-TMS	No.	3		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.020	5.11.04	Metal work for DN 200 Non-return Valve Chamber (Drawing JW14358-16941-T-013-S18-00-TMS)				
	5.11.04.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.04.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.04.03	Fabricate and cast in short outlet airvent as per drawings JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.04.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.04.05	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	20		
	5.11.04.06	Fabricate and install DN 160 galvanised medium duty pipe clamps as per drawing JW14358-16941-T-017-S10-00-TMS	No.	3		
	5.12	Colour Mitigation to				
	5.12.01	Exposed Chambers along roadways	m ²	300		
		MISCELLANEOUS ITEMS				
PSCC1.021	5.13	Polythene sheeting under concrete				
	5.13.01	250 micron green medium density polyethylene dampproof sheeting	m ²	265		
PSCC1.023	5.14	FRP items				
	5.14.01	a) FRP Grating				
	5.14.01.01	450 mm x 450 mm x 38 mm deep FRP grating	No.	5		
Total carried forward						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.024	5.15	Casting pipes and specials in concrete				
	5.15.01	DN 100 Steel pipe cast into chamber wall	No.	2		
	5.15.02	DN 150 Steel pipe cast into chamber wall	No.	6		
	5.15.03	DN 200 Steel pipe cast into chamber wall	No.	6		
	5.15.04	DN 300 Steel pipe cast into chamber wall	No.	6		
PSCC1.025	5.16	Installation of precast elements				
	5.16.01	Precast roof slabs as per drawing JW14358-16941-T-013-S17-00-TMS	No.	6		
	5.16.02	Precast roof slabs as per drawing JW14358-16941-T-013-S20-00-TMS	No.	9		
	5.16.03	Precast roof slabs as per drawing JW14358-16941-T-013-S42-00-TMS	No.	6		
PSCC1.026	5.16	Drilling cores through concrete				
	5.16.01	100 mm diameter core through 250 mm thick concrete slab	No.	10		
PSCC1.027	4.15	Masonry				
	4.15.01	110 mm brick wall	m ²	10		
	4.15.02	220 mm brick wall	m ²	30		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		SUMMARY				
SANS 1200 C		SITE CLEARANCE				
SANS 1200 DB		EARTHWORKS (PIPE TRENCHES)				
SANS 1200 L		MEDIUM-PRESSURE PIPELINES				
SANS 1200 LC		CABLE DUCTS				
SANS 2001 CC1		CONCRETE WORKS (STRUCTURAL)				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C	1	SITE CLEARANCE Refer to Drawings: JW14358-16941-T-013-S26-00-TMS, JW14358-16941-T-013-S35-00-TMS				
PSC 8.2.1	1.01	Clear and grub				
	1.01.01	Areas	m ²	270		
8.2.2	1.02	Remove and grub large trees and tree stumps of girth				
	1.02.01	Over 1 m and up to and including 2 m	No.	2		
8.2.10	1.03	Remove topsoil to nominal depth of 150 mm and stockpile	m ³	40		
PSC 8.2.14	1.04	Take down and re-erect existing fences and guardrails				
	1.04.01	a) Guardrails	m	15		
	1.04.02	b) Diamond mesh fencing	m	15		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 DB	2	EARTHWORKS (PIPE TRENCHES)				
		Refer to Drawings: JW14358-16941-T-013-S26-00-TMS, JW14358-16941-T-013-S35-00-TMS				
PSDB 8.3.2	2.01	Excavation				
	2.01.01	d) Excavate in all materials for stormwater inlet and outlet structures and for manholes, catchpits, valve chambers and the like, irrespective of depth, and backfill around structures	m ³	600		
	2.01.02	e) Extra over 2.01.01 for excavating in				
	2.01.02.01	1) intermediate material	m ³	60		
	2.01.02.02	2) hard material	m ³	60		
	2.01.03	f) Hand excavation where ordered by the Project Manager				
	2.01.03.01	a) Soft material	m ³	60		
	2.01.03.02	b) Intermediate material	m ³	60		
	2.01.03.03	c) Hard material	m ³	60		
	2.01.04	g) Backfill stabilized with 5% cement where directed by the Project Manager	m ³	120		
	2.01.05	h) Soilcrete backfill where directed by the Project Manager	m ³	120		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 L	3	MEDIUM-PRESSURE PIPELINES				
		Refer to Drawings: JW14358-16941-T-013-S27-00-TMS, JW14358-16941-T-013-S36-00-TMS				
PSL 8.2.1	3.01	Supply, Lay, and Bed Pipes Complete with Couplings				
	3.01.01	High-Impact mPVC Class 16 complete with shouldered end coupling system				
	3.01.01.01	Class 16 DN 200	m	100		
8.2.2	3.02	Extra-over 3.0.1 for the Supplying, Laying, and Bedding of Specials Complete with Couplings				
	3.02.01	High-Impact mPVC Class 16 bends complete with shouldered end coupling system				
	3.02.01.01	DN 200, 11.25° bend	No.	2		
	3.02.01.02	DN 200, 22.5° bend	No.	2		
	3.02.01.03	DN 200, 45° bend	No.	2		
	3.02.01.04	DN 200, 90° bend	No.	2		
	3.02.02	High-Impact mPVC Class 16 shouldered end repair couplings				
	3.02.02.01	DN 200	No.	2		
	3.02.03	Flange adaptors for High-Impact mPVC Class 16 complete with shouldered end coupling system				
	3.02.03.01	DN 200	No.	2		
8.2.3	3.03	Extra-over PSL 8.2.16 for Supplying, Fixing, and Bedding of Valves				
	3.03.01	DN 600 Tie-in Chamber 2 (Drawing JW14358-16941-T-013-S27-00-TMS)				
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.03.01.01	Item 5: DN 100 PN16 Resilient Seal Gate valve; non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	2		
	3.03.01.02	Item 7: DN 100 PN16 Double orifice with anti-shock orifice mechanism air release valve, Vent-O-Mat RBX or similar approved; flanges drilled to SANS 1123 Table 1600/3	No.	2		
	3.03.01.03	Item 9: DN 600 PN16 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	2		
	3.03.02	DN 400 Tie-in Chamber				
	3.03.02.01	Item 3: DN 400 PN16 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	2		
	3.03.02.02	Item 6: DN 400 PN16 Single Door Swing Check Valve to SANS 1551; flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.03.02.03	Item 16: DN 100 PN16 Resilient Seal Gate valve; non rising spindle; anti-clockwise closing to SANS 664; manually operated; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.03.02.04	Item 17: DN 100 PN16 Double orifice with anti-shock orifice mechanism air release valve, Vent-O-Mat RBX or similar approved; flanges drilled to SANS 1123 Table 1600/3	No.	1		
Total carried forward						

Employer:▣	▣	Contractor:▣	▣
Witness:▣	▣	Witness:▣	▣

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSL 8.2.19	3.03.02.05	Item 19: DN 200 PN16 wedge gate valve for vertical operation; non rising spindle; anti-clockwise closing to SANS 664; manually operated; Vosa or similar approved; both ends flanged; flanges drilled to SANS 1123 Table 1600/3	No.	1		
	3.04	Extra over 8.2.16 for the Supplying, Laying, Welding or Jointing and Bedding of Steel specials				
	3.04.01	Specials for DN 600 Tie-in Chamber 2 as per drawing JW14358-16941-T-013-S27-00-TMS				
	3.04.01.01	Item 1: Concentric reducer DN 600 to DN 400; SANS 719; Wall Thickness t = 6 mm; 610 mm long; both ends flanged to SANS 1123 Table 1600/3	No.	2		
	3.04.01.02	Item 2: Spool piece DN 400; 1260 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with puddle flange	No.	1		
	3.04.01.03	Item 4: Spool piece DN 100 x 200 mm long; SANS 62 medium class; one end flanged to SANS 1123 Table 1600/3; other end welded to DN200 blank flange to SANS 1123 Table 1600/8 with hole drilled for DN100 pipe	No.	2		
	3.04.01.04	Item 6: Spool piece DN 100 x 200 mm long; SANS 62 Medium Class; both ends flanged to SANS 1123 Table 1600/3	No.	2		
	3.04.01.05	Item 8: Dismantling joint DN 400; flanged to SANS 1123 Table 1600/3	No.	1		
	3.04.01.06	Item 10: Spool piece DN 400 x 1200 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with pressure testing socket	No.	1		
	3.04.01.07	Item 12: Spool piece DN 400; 2000 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with pipe support	No.	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.04.01.08	Item 13a: DN 400 Y-Strainer; Flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.04.01.09	Item 13b: DN 400 T-Strainer; Flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.04.01.10	Item 14: Spool piece DN 400; 1278 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with puddle flange	No.	1		
	3.04.01.11	Item 15: DN 600 90 degree 4 segment medium radius bend; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3;	No.	1		
	3.04.01.12	Item 16: Equal tee; DN 400 x DN 400 SANS 719; wall thickness = 6 mm; flanged all ends to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.01.13	Item 17: Spool piece DN 400; 1052 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.01.14	Item 18: Unequal tee; DN 400 x DN 300 SANS 719; wall thickness = 6 mm; flanged all ends to SANS 1123 Table 1600/3; with pipe support	No.	2		
	3.04.01.15	Item 19: Spool piece DN 400; 1317 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with puddle flange	No.	1		
	3.04.01.16	Item 20: DN 400 90 degree 4 segment medium radius bend; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3;	No.	1		
	3.04.01.17	Item 21: Concentric reducer DN 500 to DN 400; SANS 719; Wall Thickness t = 6 mm; 510 mm long; both ends flanged to SANS 1123 Table 1600/3	No.	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	3.04.02	Specials for DN 400 Tie-in Chamber as per drawing JW14358-16941-T-013-S36-00-TMS				
	3.04.02.01	Item 1: Unequal tee; DN 400 x DN 300; SANS 719; wall thickness = 6 mm; flanged all ends to SANS 1123 Table 1600/3	No.	2		
	3.04.02.02	Item 2: Spool piece DN 400; 1260 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with puddle flange	No.	1		
	3.04.02.03	Item 4: Unequal tee; DN 400 x DN 200; SANS 719; wall thickness = 6 mm; flanged all ends to SANS 1123 Table 1600/3	No.	1		
	3.04.02.04	Item 5: Spool piece DN 400; 1070 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.02.05	Item 7: Spool piece DN 400; 846 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.02.06	Item 8: Equal tee; DN 400 x DN 400; SANS 719; wall thickness = 6 mm; flanged all ends to SANS 1123 Table 1600/3	No.	1		
	3.04.02.07	Item 9: Spool piece DN 400; 1052 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.02.08	Item 10: Spool piece DN 400; 1317 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with puddle flange	No.	1		
	3.04.02.09	Item 11: Spool piece DN 400; 1889 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3; with puddle flange	No.	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSL 8.2.20	3.04.02.10	Item 12: Concentric reducer DN 600 to DN 400; SANS 719; Wall Thickness t = 6 mm; 610 mm long; both ends flanged to SANS 1123 Table 1600/3	No.	1		
	3.04.02.11	Item 13: Spool piece DN 600; 500 mm long; SANS 719; Wall Thickness t = 6 mm; one end flanged to SANS 1123 Table 1600/3	No.	1		
	3.04.02.12	Item 14: Unequal tee; DN 200 x DN 100; SANS 719; wall thickness = 6 mm (DN 200) / SANS 62 Medium Class (DN 100); flanged all ends to SANS 1123 Table 1600/3; with pipe support	No.	1		
	3.04.02.13	Item 15: Spool piece; DN100 x 200 mm long; SANS 62 Medium Class; flanged both ends to SANS 1123 Table 1600/3	No.	1		
	3.04.02.14	Item 18: Spool piece DN 200; 1284 mm long; SANS 719; Wall Thickness t = 6 mm; both ends flanged to SANS 1123 Table 1600/3	No.	1		
	3.04.02.15	Item 20: DN 300 Blank flange to SANS 1123 Table 1600/8	No.	2		
	3.04.02.15	Item 21: DN 400 Loose flange drilled to SANS 1123 Table 1600/3	No.	2		
	3.05	Supply, Lay and Bed HDPE Pipes Complete with Welded Joints				
	3.05.01	PN16 PE100 HDPE pipe				
	3.05.01.01	PN16 DN 315 mm	m	40		
PSL 8.2.21	3.06	Extra over 4.05 for the Supplying, Laying, Butt Fusion Welding and Bedding of HDPE specials				
	3.06.01	PN16 PE100 HDPE bends				
	3.06.01.01	DN 315mm, 11.25° bend	No.	2		
	3.06.01.02	DN 315 mm, 22.5° bend	No.	2		
	3.06.01.03	DN 315 mm, 45° bend	No.	2		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSL 8.2.27	3.06.01.04	DN 315 mm, 90° bend	No.	2		
	3.06.02	PN16 HDPE stub flange and backing ring				
	3.06.02.01	DN 315 mm	No.	2		
PSL 8.2.30	3.07	Connect to Existing Mains				
	3.07.01	a) Tie-in of new DN 400 chamber on existing DN 400 pipeline (drawing JW14358-16941-T-013-S35-00-TMS)	sum	1		
	3.08	Extra over 8.2.16 for for the Supplying, Installing and Commissioning of Flow Meters				
PSL 8.2.34	3.08.01	Item 11: DN 400 PN16 Electromagnetic flow meter complete with sensor and remotely mounted transmitter; flanges drilled to SANS 1123 Table 1600/3; supplied with 15 m of cable	No.	1		
	3.09	Operation and Maintenance Manuals for Valves and Flow Meters				
	3.09.01	a) DN 200 Wedge Gate Valve (PN16)	Sum	1		
	3.09.02	b) DN 400 Wedge Gate Valve (PN16)	Sum	1		
	3.09.03	c) DN 400 Swing type Check Valve (PN16)	Sum	1		
	3.09.04	d) DN 400 Electromagnetic Flow Meter (PN16)	Sum	1		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 LC 4	4	CABLE DUCTS				
		Refer to Drawing: JW14358-16941-T-013-S26-00-TMS				
8.2.2	4.01	Excavation				
	4.01.01	a) Excavate in all materials for trenches, backfill, compact and dispose of surplus material				
	4.01.01.01	i) Single duct trench (300 mm wide), up to 1 m deep	m ³	5		
PSLC 8.2.5	4.02	Supply, lay, bed and prove duct, including draw wire and screening wire				
	4.02.01	a) 110mm flexible conduit	m	10		
8.2.6	4.03	Imported bedding material, where ordered				
	4.03.01	a) Selected granular material	m ³	3		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 2001 PART CC1	5.00	CONCRETE (STRUCTURAL)				
		Take down and re-erect existing fences and guardrails				
		SCHEDULED FORMWORK ITEMS				
PSCC1.002	5.01	Smooth				
	5.01.01	Vertical formwork to				
	5.01.01.01	Foundations (Floor)	m ²	16		
	5.01.01.02	Plinths	m ²	9		
	5.01.01.03	Walls	m ²	375		
	5.01.01.04	Sump	m ²	4		
	5.01.01.05	Stairs	m ²	32		
	5.02.01	Horizontal formwork to				
	5.02.01.01	Slabs	m ²	80		
PSCC1.005	5.02	Narrow widths (up to 300 mm wide)				
	5.02.01	Vertical Smooth formwork to				
	5.02.01.01	Precast slabs	m	105		
	5.02.01.02	Concrete Bunker Apron Slab	m	10		
PSCC1.006	5.03	Box out holes/form voids				
	5.03.01	a) Small, circular, of diameter up to 0,35 m				
	5.03.01.01	0 m up to and including 0,5 m	No.	32		
	5.03.02	d) Large, other than circular, areas over 0.1 m ² up to 2,0 m ²				
	5.03.02.01	0 m up to and including 0,5 m	No.	2		
	5.03.02.02	Over 2,0 m deep	No.	7		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.007	5.04	SCHEDULED REINFORCEMENT ITEMS				
		Steel bars				
	5.04.01	a) Steel bars irrespective of grade and diameter	t	24		
PSCC1.011	5.05	SCHEDULED CONCRETE ITEMS				
		Blinding layer in Grade 15 MPa/19 mm concrete				
	5.05.01	50 mm thickness	m ²	170		
PSCC1.012	5.06	Strength concrete				
		Class 30 MPa/19 mm concrete in				
	5.06.01.01	Foundations (Floor)	m ³	24		
	5.06.01.02	Plinths	m ³	6		
	5.06.01.03	Walls	m ³	47		
	5.06.01.04	Roof slab	m ³	22		
	5.06.01.05	Sump	m ³	2		
	5.06.01.06	Stairs	m ³	4		
	5.06.01.07	Concrete Bunker Apron Slab	m ³	1		
PSCC1.013	5.07	Unformed surface finishes				
		a) Steel-floated finish				
	5.07.01.01	Foundations (Floor)	m ²	90		
	5.07.01.02	Top of Plinths	m ²	5		
	5.07.01.03	Top of Walls	m ²	30		
	5.07.01.04	Roof slabs	m ²	90		
	5.07.01.05	Concrete Bunker Apron Slab	m ²	10		
	5.07.02	d) Broomed finish				
	5.07.02.01	Blinding layer	m ²	170		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.017	5.07.03	e) Screed in 3:1 Sand and Cement Mix				
	5.07.03.01	Chamber floor screed	m ³	6		
PSCC1.016	5.08	Manufacture (or supply) and erect precast units				
	5.08.01	Concrete Bunker (Minimum Internal Dimesions: 680 H x 500 W x 375 D)	No.	1		
PSCC1.018	5.09	Joints				
	5.09.01	Polysulphide sealant between precast slab	m	50		
PSCC1.019	5.10	Grouting				
	5.10.01	a) Under bases of pipe supports and straps	m ³	4		
PSCC1.019	5.10.02	c) Pipe box-outs	m ³	4		
	5.11	HD bolts and miscellaneous metal work				
	5.11.01	Metal work for DN 600 Tie-in Chamber 2 as per drawing JW14358-16941-T-013-S26-00-T				
	5.11.01.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.01.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.01.03	Fabricate and cast in short outlet airvent as per drawings JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.01.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.01.05	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	16		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.020	5.11.02	Metal work for DN 400 Tie-in Chamber as per drawing JW14358-16941-T-013-S35-00-T				
	5.11.02.01	Fabricate and install galvanised mild steel ladders as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.02.02	Fabricate and cast in long inlet airvent as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.02.03	Fabricate and cast in short outlet airvent as per drawings JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.02.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	1		
	5.11.02.05	Fabricate and cast in lifting hooks as per bolt detail on drawing JW14358-16941-T-017-S10-00-TMS	No.	16		
	5.12	Colour Mitigation to:				
	5.12.01	Exposed Chambers along roadways	m²	60		
		MISCELLANEOUS ITEMS				
	5.13	Polythene sheeting under concrete				
	5.13.01	250 micron green medium density polyethylene dampproof sheeting	m²	170		
	5.14	FRP items				
PSCC1.023	5.14.01	a) FRP Grating				
	5.14.01.01	450 mm x 450 mm x 38 mm deep FRP grating	m²	2		
	5.15	Casting pipes and specials in concrete				
	5.15.01.01	DN 200 Steel pipe cast into chamber wall	No.	1		
PSCC1.024	5.15.01.02	DN 400 Steel pipe cast into chamber wall	No.	6		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.025	5.16	Installation of precast elements				
	5.16.01	Precast roof slabs as per drawing JW14358-16941-T-013-S26-00-TMS	No.	4		
	5.16.02	Precast roof slabs as per drawing JW14358-16941-T-013-S35-00-TMS	No.	4		
PSCC1.026	5.16	Drilling cores through concrete				
	5.16.01	100 mm diameter core through 250 mm thick concrete slab	No.	5		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part C - Section 8 - Tie-in chambers: Node NA103, NB12						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		SUMMARY				
SANS 1200 C		SITE CLEARANCE				
SANS 1200 DB		EARTHWORKS (PIPE TRENCHES)				
SANS 1200 L		MEDIUM-PRESSURE PIPELINES				
SANS 1200 LC		CABLE DUCTS				
SANS 2001 CC1		CONCRETE (STRUCTURAL)				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part E - Section 1 - Trenchless Piping							
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
SANS 1200 LG 1	1	PIPE JACKING					
8.2.1	1.01	Jacking Establishment					
	1.01.01	a) Fixed charges					
	1.01.01.01	Over Marlboro Drive, from Lilium Ave to South Rd, Marlboro Gardens	sum	1			
	1.01.01.02	Over Woodlands Drive via R55 (Woodmead drive), Woodmead	sum	1			
	1.01.01.03	Over South Road, adjacent to Impala road, Marlboro Gardens	sum	1			
	1.01.02	b) Time-related charges					
	1.01.02.01	Over Marlboro Drive, from Lilium Ave to South Rd, Marlboro Gardens	sum	1			
	1.01.02.02	Over Woodlands Drive via R55 (Woodmead drive), Woodmead	sum	1			
	1.01.02.03	Over South Road, adjacent to Impala road, Marlboro Gardens	sum	1			
	8.2.2	1.02	Supply of pipes to be Jacked				
		1.02.01	DN 1800 mm Class 100D In-The-Wall Joint pre-cast concrete jacking pipes (Rocla or similar approved)				
		1.02.01.01	Over Marlboro Drive, from Lilium Ave to South Rd, Marlboro Gardens	m	75		
1.02.01.02		Over Woodlands Drive via R55 (Woodmead drive), Woodmead	m	40			
1.02.01.03		Over South Road, adjacent to Impala road, Marlboro Gardens	m	40			
8.2.3	1.03	Jacking of pipes					
	1.03.01	DN 1800 mm Class 100D In-The-Wall Joint pre-cast concrete jacking pipes (Rocla or similar approved)					
	1.03.01.01	Over Marlboro Drive, from Lilium Ave to South Rd, Marlboro Gardens	m	75			
	1.03.01.02	Over Woodlands Drive via R55 (Woodmead drive), Woodmead	m	40			
	1.03.01.03	Over South Road, adjacent to Impala road, Marlboro Gardens	m	40			
Total carried forward							

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part E - Section 1 - Trenchless Piping						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
8.2.4	1.04	Excavation for pipe jacking				
	1.04.01	Soft excavation	m³	233		
	1.04.02	Intermediate excavation	m³	53		
	1.04.03	Hard rock excavation	m³	53		
8.2.5	1.05	Extra over items 1.01 and 1.0.4 for unforeseen rock	Sum	1	300 000.00	
8.2.9	1.06	Stabilization of Unstable Areas or Grouting of Voids where Ordered				
	1.06.01	a) Provision and establishment of equipment on Site, and removal on completion of operation	Sum	1		
	1.06.02	b) Operation of equipment	Day	24		
	1.06.03	c) Materials used	m³	100		
8.2.10	1.07	Standing time for pipe jacking gang and the jacking equipment covered by item 1.01	h	40		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part E - Section 1 - Trenchless Piping						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 L	2	MEDIUM-PRESSURE PIPELINES				
PSL 8.2.25	2.01	Supply and Installation of pipe through Horizontal Direction Drilling (HDD)				
	2.01.01	PN16 PE100 HDPE				
	2.01.01.01	DN 200	m	200		
	2.01.01.02	DN 250	m	300		
PSL 8.2.26	2.02	Laboratory testing of HDPE joints	P.Sum	1	100 000.00	100 000.00
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part E - Portion 1 - Trenchless Piping						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 2001 PART CC1	3	CONCRETE WORKS (STRUCTURAL)				
		SCHEDULED FORMWORK ITEMS				
PSCC1.002	3.01	Smooth				
	3.01.01	Vertical formwork to				
	3.01.01.01	Foundations (Floor)	m ²	20		
	3.01.01.02	Walls	m ²	580		
	3.01.01.03	Sump	m ²	4		
	3.02.01	Horizontal formwork to				
	3.02.01.01	Slabs	m ²	45		
PSCC1.005	3.02	Narrow widths (up to 300 mm wide)				
	3.02.01	Vertical Smooth formwork to				
	3.02.01.01	Precast slabs	m	60		
PSCC1.006	3.03	Box out holes/form voids				
	3.03.01	a) Small, circular, of diameter up to 0,35 m				
	3.03.01.01	0 m up to and including 0,5 m	No.	32		
	3.03.02	d) Large, other than circular, areas over 0.1 m ² up to 2,0 m ²				
	3.03.02.01	0 m up to and including 0,5 m	No.	4		
		SCHEDULED REINFORCEMENT ITEMS				
PSCC1.007	3.04	Steel bars				
	3.04.01	a) Steel bars irrespective of grade and diameter	t	24		
		SCHEDULED CONCRETE ITEMS				
PSCC1.011	3.05	Blinding layer in Grade 15 MPa/19 mm concrete				
	3.05.01	50 mm thickness	m ²	150		
Total carried forward						

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□

Part E - Section 1 - Trenchless Piping						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.012	3.06	Strength concrete				
	3.06.01	Class 30 MPa/19 mm concrete in				
	3.06.01.01	Foundations (Floor)	m ³	15		
	3.06.01.02	Walls	m ³	90		
	3.06.01.03	Roof slab	m ³	12		
	3.06.01.04	Sump	m ³	2		
PSCC1.013	3.07	Unformed surface finishes				
	3.07.01	a) Steel-floated finish				
	3.07.01.01	Foundations (Floor)	m ²	40		
	3.07.01.02	Top of Walls	m ²	15		
	3.07.01.03	Roof slabs	m ²	45		
	3.07.02	d) Broomed finish				
	3.07.02.01	Blinding layer	m ²	150		
	3.07.03	e) Screed in 3:1 Sand and Cement Mix				
	3.07.03.01	Chamber floor screed	m ³	5		
PSCC1.016	3.08	Joints				
	3.08.01	Polysulphide sealant between precast slab	m	30		
PSCC1.019	3.09	HD bolts and miscellaneous metal work				
	3.09.01	Fabricate and install galvanised mild steel ladders (5 m long) as per drawing JW14358-16941-T-017-S09-00-TMS	No.	4		
	3.09.02	Fabricate and cast in long inlet airvent (5 m long) as per drawing JW14358-16941-T-017-S09-00-TMS	No.	4		
	3.09.03	Fabricate and cast in short outlet airvent as per drawings JW14358-16941-T-017-S09-00-TMS	No.	4		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part E - Section 1 - Trenchless Piping						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.020	3.09.04	Fabricate and cast in galvanised access manholes as per drawing JW14358-16941-T-017-S09-00-TMS	No.	4		
	3.09.05	Fabricate and cast in lifting hooks as per drawing JW14358-16941-T-017-S09-00-TMS	No.	32		
	3.10	Colour Mitigation to				
	3.10.01	Exposed Chambers along roadways	m ²	60		
		MISCELLANEOUS ITEMS				
PSCC1.021	3.11	Polythene sheeting under concrete				
	3.11.01	250 micron green medium density polyethylene dampproof sheeting	m ²	150		
PSCC1.023	3.12	FRP items				
	3.12.01	a) FRP Grating				
	3.12.01.01	450 mm x 450 mm x 38 mm deep FRP grating	m ²	4		
PSCC1.025	3.13	Installation of precast elements				
	3.13.01	Precast roof slabs	No.	8		
PSCC1.027	3.14	Masonry				
	3.14.01	110 mm brick wall	m ²	10		
	3.14.02	220 mm brick wall	m ²	20		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯



Part E - Section 1 - Trenchless Piping						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 LG		SUMMARY				
SANS 1200 L		PIPE JACKING				
SANS 2001 CC1		MEDIUM-PRESSURE PIPELINES				
		CONCRETE WORKS (STRUCTURAL)				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SECTION A	A	Transformer Rectifier Infrastructure Installations				
	A1	PRELIMINARY AND GENERAL				
	A1.01	For one Transformer Rectifier Infrastructure Installation - to include for all plant, equipment, personnel, site establishment, travelling, concrete testing by SANAS accredited laboratory for all concrete mixes, barricading of trenches dewatering, security for the protection of cables left exposed overnight and removal of all excess and waste materials on completion	Each	1		
	A2	Supply and Installation of Negative and Monitoring Cables				
	A2.01	Negative Cable Trench				
	A2.01.01	From the connection point on the pipeline, excavate a 300mm wide, 1m deep trench to the TRU installation position. Top soil is to be removed and stored separately.				
	A2.01.01.01	a) Excavation of top soil and separate storage	m	5		
	A2.01.01.02	b) Excavation of main trench	m	5		
	A2.01.01.03	c) Extra over for un-pickable material	m ³	1		
	A2.01.01.04	d) Extra over for rock	m ³	1		
	A2.02	Cable Connections to Pipeline				
	A2.02.01	Remove existing coating to expose an area of sufficient size to make the necessary cable connections. Cable connections are to be by thermit welding or pin brazing as directed by the engineer.				
	A2.02.01.01	a) Coating Removal for 3 cable connections	Each	1		
	A2.02.01.02	b) 35mm ² negative cable connections	Each	2		
	A2.02.01.03	c) 10mm ² monitoring cable connection	Each	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	A2.03	Permanent Reference Electrode and Coupon				
	A2.03.01	The coupon is to be attached to the pipeline anywhere between the 10 o'clock and 2 o'clock positions. The permanent reference electrode is to be installed at a position 200mm perpendicularly away from the pipe and coupon				
	A2.03.01.01	a) Supply Permanent Reference electrode, coupon	Each	1		
	A2.03.01.02	b) Install reference electrode and coupon	Each	1		
	A2.04	Cables				
	A2.04.01	From the pipeline, negative, reference, coupon and monitor cables are to be installed inside 110mm PVC conduits with long radius bends. Coating of the cable to nine connection points is to be carried out				
	A2.04.01.01	a) Supply coating material for 3 cable connections	Each	1		
	A2.04.01.01	b) Supply 110mm PVC Conduit	m	5		
	A2.04.01.01	c) Supply 35mm ² black PVC/PVC negative cable	m	15		
	A2.04.01.01	d) Supply 10mm ² black PVC/PVC monitoring cable	m	10		
	A2.04.01.01	e) Supply 10mm ² black PVC/PVC coupon cable	m	10		
	A2.04.01.01	f) Supply 10mm ² red PVC/PVC reference cable	m	10		
	A2.04.01.01	g) Install coating material, conduit and cables	Each	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	A2.05	Concrete Encasement				
	A2.05.01	Cable conduits are to be sealed at the pipeline end with Denso mastic or equivalent. The entire cable trench is to be filled with 40MPa concrete up to a level 400mm from the trench floor. Where the conduits come up to ground level the vertical portions of the conduits are to be encased in 40MPa concrete such that the minimum coverage at any point is 400mm.				
	A2.05.01.01	a) Concrete Encasement	m	5		
	A2.06	Backfilling to Natural Ground Level				
	A2.06.01	Once the concrete has set sufficiently in the trench, backfilling is to be carried out in 200mm layers with compaction of each layer being carried out to 90% modified AASHTO. The Separately stored topsoil is to be installed at the surface.				
	A2.06.01.01	a) Backfilling	m	5		
	A3	Supply and Installation of Power Supply Cable				
	A3.01	Power Supply Cable Trench				
	A3.01.01	From the power supply metering box, excavate a 450mm wide, 1m deep trench to the TRU installation position. Top soil is to be removed and stored separately.				
	A3.01.01.01	a) Excavation of top soil and separate storage	m	50		
	A3.01.01.02	b) Excavation of main trench	m	50		
	A3.01.01.03	c) Shoring of Trench	m	50		
	A3.01.01.04	d) Extra over for un-pickable material	m ³	1		
	A3.01.01.05	e) Extra over for rock	m ³	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	A3.02	Cable				
	A3.02.01	From the power supply metering box the AC supply cable is to be installed inside a 110mm PVC conduit with long radius bends.				
	A3.02.01.01	a) Supply 110mm PVC Conduit	m	50		
	A3.02.01.01	b) Supply 2 core 16mm ² ECC SWA power cable	m	55		
	A3.02.01.01	c) Install PVC conduit and power cable	Each	1		
	A3.03	Concrete Encasement				
	A3.03.01	The entire cable trench is to be filled with 40MPa concrete up to a level 400mm from the trench floor. Where the conduits come up to ground level the vertical portions of the conduits are to be encased in 40MPa concrete such that the minimum coverage at any point is 400mm				
	A3.02.01.01	a) Concrete Encasement	m	50		
	A3.04	Backfilling to Natural Ground Level				
	A3.04.01	Once the concrete has set sufficiently in the trench, backfilling is to be carried out in 200mm layers with compaction of each layer being carried out to 90% modified AASHTO. The Separately stored topsoil is to be installed at the surface.				
	A3.02.01.01	a) Backfilling	m	50		
	A3.05	Isolator Box				
	A3.05.01	A suitable isolator box, complete with suitably rated isolator, is to be installed in the secure underground enclosure The AC Supply cable is to be terminated inside this box. A suitable isolator box, complete with suitably rated isolator, is to be installed in the secure underground enclosure The AC Supply cable is to be terminated inside this box.				
	A3.05.01.01	a) Supply and Install Isolator	Each	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	A4	Supply and Installation of Secure Enclosure				
	A4.01	TRU Earthing				
	A4.01.01	Trenches for earthing cables are to be excavated to a depth of 0.5m. Earthing cables are to be laid as specified and 1.2m long earth spikes are to be driven in to the earth at each corner or conductor intersection. At each of these corners or intersections the conductors and earth rods are to be thermit welded together. The earthing trenches are then to be filled with 40MPa concrete and backfilled.				
	A4.01.01.01	a) Excavation of top soil and separate storage	m	16		
	A4.01.01.02	b) Excavation of main trench	m	16		
	A4.01.01.03	c) Extra over for un-pickable material	m³	1		
	A4.01.01.04	d) Extra over for rock	m³	1		
	A4.01.01.05	e) Earthing Material Supply	Sum	1		
	A4.01.01.06	f) Earthing Material Installation	Sum	1		
	A4.02	Backfilling of TRU Earthing				
	A4.02.01	Once the concrete has set sufficiently in the trenches, backfilling is to be carried out in 200mm layers with compaction of each layer being carried out to 90% modified AASHTO.				
	A4.02.01.01	a) Backfilling	Sum	1		
	A4.03	TRU Secure Enclosure				
	A4.03.01	Secure underground enclosure to be installed as per manufacturers specifications Secure underground enclosure to be installed as per manufacturers specifications				
	A4.03.01.01	a) Supply	Each	1		
	A4.03.01.02	b) Install	Each	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SECTION B	B	Supply and Installation of Transformer Rectifier Units				
	B1	P & G's				
	B1.01	Rate for one Transformer Rectifier Installation (to include for all plant, equipment, personnel, site establishment, travelling and security and removal of all excess and waste materials on completion	Each	1		
	B2	3kW SMCPR				
	B2.01	Manufacture and test Unit, carry out FAT in presence of the Engineer, deliver to site Install and issue COC. Installation to include the termination of the point of supply inside the bunker enclosure with a Schneider PM5000 series power meter and CT's (free issue from JW). Remote monitoring to be via GSM-GDSP. 40 hours of development costs to be allowed to ensure the unit is interfaced with the 24/7/365 SCADA system in the control room with the appropriate, connectivity, alarming and data storage in the MS SQL database which is hosted at JW HQ				
	B2.01.01	Supply SMCPR	Each	1		
	B2.01.02	Factory Acceptance Testing of TRU in the Presence of	Each	1		
	B2.01.03	Install SMCPR	Each	1		
	B2.01.04	Development costs for SCADA interface	Hours	40		
	Total carried forward to summary					

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SECTION C	C	Supply and Installation of Horizontal Anode P & G's				
	C1					
	C1.01	For one horizontal anode groundbed Installation - to include for all plant, equipment, personnel, site establishment, travelling, concrete testing by SANAS accredited laboratory for all concrete mixes, barricading of trenches dewatering, security for the protection of cables left exposed overnight and removal of all excess and waste materials on completion	Each	1		
	C2	Supply and Installation of Positive Cables				
	C2.01	Positive Cable Trench				
	C2.01.01	From the transformer rectifier enclosure, excavate a 300mm wide, 1m deep trench to the groundbed installation position. Top soil is to be removed and stored separately.				
	C2.01.01.01	a) Excavation of top soil and separate storage	m	320		
	C2.01.01.02	b) Excavation of main trench	m	320		
	C2.01.01.03	c) Extra over for un-pickable material	m³	1		
	C2.01.01.04	d) Extra over for rock	m³	1		
	C2.02	Supply and Installation of Positive Cable				
	C2.02.01	From the furthest end of the anode groundbed cables are to be installed inside partly the groundbed trench and partly the positive cable trench. Cables are to be brought into the TRU enclosure via the cable duct.				
	C2.02.01.01	a) Supply 35mm² red PVC/PVC positive cable	m	410		
	C2.02.01.02	b) Install 35mm² red PVC/PVC positive cable	m	410		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	C2.03	Concrete Encasement				
	C2.03.01	The entire positive cable trench is to be filled with 40MPa concrete up to a level 400mm from the trench floor.				
	C2.03.01.01	a) Concrete Encasement	m	320		
	C2.04	Backfilling to Natural Ground Level				
	C2.04.01	Once the concrete has set sufficiently in the trench, backfilling is to be carried out in 200mm layers with compaction of each layer being carried out to 90% modified AASHTO. The Separately stored topsoil is to be installed at the surface.				
	C2.04.01.01	a) Backfilling	m	320		
	C2.05	Installation of Cable Route Markers				
	C2.02.01	Cable route markers are to be installed at 50m intervals and at all direction changes along the cable route.				
	C2.02.01.01	a) Cable route markers	Each	9		
	C3	Supply and Installation of Anode Groundbed				
	C3.01	Anode Groundbed Trench				
	C3.01.01	At the location indicated by the engineer, excavate a 300mm wide, 2.5m deep trench. Top soil is to be removed and stored separately.				
	C3.01.01.01	a) Excavation of top soil and separate storage	m	80		
	C3.01.01.02	b) Excavation of main trench	m	80		
	C3.01.01.03	c) Shoring of Trench	m	80		
	C3.01.01.04	d) Extra over for un-pickable material	m ³	1		
	C3.01.01.05	e) Extra over for rock	m ³	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
Supply and Installation of Horizontal Anode Ground						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	C3.02	Anodes and Canisters				
	C3.02.01	The anode canisters are to be laid next to the trench alternately with the spacer canisters. Anode tails are to be spliced to the ring main cable by means of line taps and y-type epoxy filled splicing kits. Once the epoxy has cured sufficiently anode and spacer canisters are to be lowered carefully into the trench using appropriate slings.				
	C3.02.01.01	a) Supply canisterised anodes	Each	20		
	C3.02.01.02	b) Supply spacer canisters	Each	20		
	C3.02.01.03	c) Supply Splicing kits and line taps	Each	20		
	C3.02.01.04	d) Install anode groundbed	Each	1		
	C3.03	Backfilling to Natural Ground Level				
	C3.03.01	Backfilling is to be carried out in 200mm layers with compaction of each layer being carried out to 90% modified AASHTO. The Separately stored topsoil is to be installed at the surface.				
	C3.03.01.01	Backfilling	m	80		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SECTION D	D	Supply and Installation of Cross Bonds				
	D1	P & G's				
	D2.01	For one cross bond Installation - to include for all plant, equipment, personnel, site establishment, travelling, concrete testing by SANAS accredited laboratory for all concrete mixes, barricading of trenches dewatering, security for the protection of cables left exposed overnight and removal of all excess and waste materials on completion.	Each	1		
	D2	Supply and Installation of Cross Bond				
	D2.01	Excavation				
	D2.01.01	At each cross bonding location, excavate a 300mm wide trench to a depth of 1m or depth pipeline overt (if greater than 1m). Top soil is to be removed and stored separately.				
	D2.01.01.01	a) Excavation of top soil and separate storage	m	1		
	D2.01.01.02	b) Excavation of main trench	m	1		
	D2.01.01.03	c) Shoring of Trench	m	1		
	D2.01.01.04	d) Extra over for un-pickable material	m³	1		
	D2.01.01.05	e) Extra over for rock	m³	1		
	D2.02	Cable Connections to Pipeline				
	D2.02.01	Remove existing coating to expose an area of sufficient size to make the necessary cable connections. Cable connections are to be by thermit welding .				
	D2.02.01.02	a) Coating Removal for 4 cable connections	Each	1		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	D2.03	Cables				
	D2.03.01	Cross bonding cables are to be laid between the pipelines. Coating of the cable to pipe connection points is to be carried out. Cable terminations are to be made at a 4 way link panel housed in a below ground monitoring enclosure.				
	D2.03.01.01	a) Supply coating material for 4 cable connections	Each	1		
	D2.03.01.02	b) Supply 35mm ² black PVC/PVC negative cable	m	1210		
	D2.03.01.03	c) Install coating material and cables	Each	1		
	D2.03.01.04	d) Supply 4 way link panel	Each	1		
	D2.03.01.05	e) Install 4 way link panel	Each	1		
	D2.04	Concrete Encasement				
	D2.04.01	Trenches are to be filled with 400mm of 40MPa concrete and the cable completely encased.				
	D2.04.01.01	a) Concrete Encasement	m	600		
	D2.05	Backfilling to Natural Ground Level				
	D2.05.01	In each trench, backfilling is to be carried out in 200mm layers with compaction of each layer being carried out to 90% modified AASHTO. The Separately stored topsoil is to be installed at the surface.				
	D2.05.01.01	a) Backfilling	m	600		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SECTION E	E	Supply and Installation of Continuity Bonds at Chambers				
	E1	P & G's				
	E1.01	For one chamber continuity bond Installation - to include for all plant, equipment, personnel, site establishment, travelling, concrete testing by SANAS accredited laboratory for all concrete mixes, barricading of trenches dewatering, security for the protection of cables left exposed overnight and removal of all excess and waste materials on completion	Each	23		
	E2	Supply and Installation of Chamber Continuity Bond				
	E2.01	Excavation				
	E2.01.01	At each chamber requiring bonding, excavate a 300mm wide trench to a depth of 1m or depth pipeline overt (if greater than 1m) around the chamber immediately adjacent to the chamber wall. Top soil is to be removed and stored separately.				
	E2.01.01.01	a) Excavation of top soil and separate storage	m	115		
	E2.01.01.02	b) Excavation of main trench	m	115		
	E2.01.01.03	c) Shoring of Trench	m	115		
	E2.01.01.04	d) Extra over for un-pickable material	m ³	1		
	E2.01.01.05	e) Extra over for rock	m ³	1		
	E2.02	Cable Connections to Pipeline				
	E2.02.01	Remove existing coating to expose an area of sufficient size to make the necessary cable connections. Cable connections are to be by thermit welding.				
	E2.02.01.01	a) Coating Removal for 4 cable connections	Each	184		
	E2.02.01.02	b) 35mm ² bonding cable connections	Each	92		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	E2.03	Cables				
	E2.03.01	Continuity bonding cables are to be laid around each chamber. Coating of the cable to pipe connection points is to be carried out.				
	E2.03.01.01	a) Supply coating material for cable connections	Each	92		
	E2.03.01.02	b) Supply 35mm² black PVC/PVC negative cable	Each	276		
	E2.03.01.03	c) Install coating material and cables	Each	23		
	E2.04	Concrete Encasement				
	E2.04.01	Trenches are to be filled with 400mm of 40MPa concrete and the cable completely encased.				
	E2.04.01.01	a) Concrete Encasement	m	115		
	E2.05	Backfilling to Natural Ground Level				
	E2.05.01	In each trench, backfilling is to be carried out in 200mm layers with compaction of each layer being carried out to 90% modified AASHTO. The Separately stored topsoil is to be installed at the surface.				
	E2.05.01.01	a) Backfilling	m	115		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
Supply and Installation of Monitoring Facilities						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SECTION F	F	Supply and Installation of Monitoring Facilities				
	F1	P & G's				
	F1.01	For one Monitoring Facility Installation - to include for all plant, equipment, personnel, site establishment, travelling, concrete testing by SANAS accredited laboratory for all concrete mixes, barricading of trenches dewatering, security for the protection of cables left exposed overnight and removal of all excess and waste materials on completion.	Each	9		
	F2	Supply and Installation of Monitoring Facility - Below Ground Type				
	F2.01	Monitoring Cable Trench				
	F2.01.01	At the designated point on each of the pipelines, excavate to the pipe overt and then excavate a 300mm wide, 1m deep trench to the monitoring enclosure installation position. Top soil is to be removed and stored separately.				
	F2.01.01.01	a) Excavation of top soil and separate storage	m	21		
	F2.01.01.02	b) Excavation of main trench	m	21		
	F2.01.01.03	c) Shoring of Trench	m	21		
	F2.01.01.04	d) Extra over for un-pickable material	m³	1		
	F2.01.01.05	e) Extra over for rock	m³	1		
	F2.02	Cable Connections to Pipeline				
	F2.02.01	Remove existing coating to expose an area of sufficient size to make the necessary cable connections. Cable connections are to be by thermit welding.				
	F2.02.01.01	a) Coating Removal for 1 cable connections	Each	7		
	F2.02.01.02	b) 10mm² monitoring cable connection	Each	7		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	F2.03	Permanent Reference Electrode and Coupon				
	F2.03.01	The coupon is to be attached to the pipeline anywhere between the 10 o'clock and 2 o'clock positions. The permanent reference electrode is to be installed at a position 200mm perpendicularly away from the pipe and coupon.				
	F2.03.01.01	a) Supply Permanent Reference electrode, coupon.	Each	7		
	F2.03.01.02	b) Install reference electrode and coupon	Each	7		
	F2.04	Cables				
	F2.04.01	From the pipeline, the reference, coupon and monitor cables are to be installed inside 110mm PVC conduits with long radius bends. Coating of the cable to pipe connection points is to be carried out				
	F2.04.01.01	a) Supply coating material for cable connections	Each	7		
	F2.04.01.02	b) Supply 10mm ² black PVC/PVC monitoring cable	m	35		
	F2.04.01.03	c) Supply 10mm ² black PVC/PVC coupon cable	m	35		
	F2.04.01.04	d) Supply 10mm ² red PVC/PVC reference cable	m	35		
	F2.04.01.05	e) Install coating material, permanent reference	Each	7		
	F2.05	Concrete Encasement				
	F2.05.01	The entire cable trench is to be filled with 40MPa concrete up to a level 400mm from the trench floor.				
	F2.05.01.01	a) Concrete Encasement	m	21		
	F2.06	Backfilling to Natural Ground Level				
	F2.06.01	Once the concrete has set sufficiently in the trench, backfilling is to be carried out in 200mm layers with compaction of each layer being carried out to 90% modified AASHTO. The Separately stored topsoil is to be installed at the surface.				
	F2.06.01.01	a) Backfilling	m	21		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
Supply and Installation of Monitoring Facility						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	F2.07	Monitoring Enclosure				
	F2.07.01	Supply and Install Monitoring Enclosure (Including concrete encasement)				
	F2.07.01.01	a) Supply Monitoring Enclosure	Each	7		
	F2.07.01.01	a) Install Monitoring Enclosure	Each	7		
	F3	Supply and Installation of Monitoring Facility - Big Head Test Post Type				
	F3.01	Monitoring Cable Trench				
	F3.01.01	At the designated point on each of the pipelines, excavate to the pipe overt and then excavate a 300mm wide, 1m deep trench to the monitoring enclosure installation position. Top soil is to be removed and stored separately.				
	F3.01.01.01	a) Excavation of top soil and separate storage	m	6		
	F3.01.01.02	b) Excavation of main trench	m	6		
	F3.01.01.03	c) Shoring of Trench	m	6		
	F3.01.01.04	d) Extra over for un-pickable material	m ³	1		
	F3.01.01.05	e) Extra over for rock	m ³	1		
	F3.02	Cable Connections to Pipeline				
	F3.02.01	Remove existing coating to expose an area of sufficient size to make the necessary cable connections. Cable connections are to be by thermit welding .				
	F3.02.01.01	a) Coating Removal for 1 cable connections	m	6		
	F3.02.01.02	b) 10mm ² monitoring cable connection	m	6		
	F3.03	Permanent Reference Electrode and Coupon				
	F3.03.01	The coupon is to be attached to the pipeline anywhere between the 10 o'clock and 2 o'clock positions. The permanent reference electrode is to be installed at a position 200mm perpendicularly away from the pipe and coupon				
	F3.03.01.01	a) Supply Permanent Reference electrode, coupon	Each	2		
	F3.03.01.02	b) Install reference electrode and coupon	Each	2		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
Supply and Installation of Monitoring Facility						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	F3.04	Cables				
	F3.04.01	From the pipeline, the reference, coupon and monitor cables are to be installed inside 110mm PVC conduits with long radius bends. Coating of the cable to pipe connection points is to be carried out				
	F3.04.01.01	a) Supply coating material for cable connections	Each	2		
	F3.04.01.02	b) Supply 10mm ² black PVC/PVC monitoring cable	m	10		
	F3.04.01.03	c) Supply 10mm ² black PVC/PVC coupon cable	m	10		
	F3.04.01.04	d) Supply 10mm ² red PVC/PVC reference cable	m	10		
	F3.04.01.05	e) Install coating material, permanent reference	Each	2		
	F3.05	Concrete Encasement				
	F3.05.01	The entire cable trench is to be filled with 40MPa concrete up to a level 400mm from the trench floor.				
	F3.05.01.01	a) Concrete Encasement	m	6		
	F3.06	Backfilling to Natural Ground Level				
	F3.06.01	Once the concrete has set sufficiently in the trench, backfilling is to be carried out in 200mm layers with compaction of each layer being carried out to 90% modified AASHTO. The Separately stored topsoil is to be installed at the surface.				
	F3.06.01.01	a) Backfilling	m	6		
	F3.07	Monitoring Enclosure				
	F3.07.01	Supply and Install Monitoring Enclosure (Including concrete foundation and surround)				
	F3.06.01.01	a) Supply Monitoring Enclosure	Each	2		
	F3.06.01.02	b) Install Monitoring Enclosure	Each	2		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SECTION G	G	Supply and Installation of Gradient Control Mats (Large Chambers)				
	G1	P & G's				
	G1.01	For one gradient control mat Installation - to include for all plant, equipment, personnel, site establishment, travelling, concrete testing by SANAS accredited laboratory for all concrete mixes, barricading of trenches dewatering, security for the protection of cables left exposed overnight and removal of all excess and waste materials on completion	Each	2		
	G2	Supply and Installation of Gradient Control Mat				
	G2.01	Excavation for GCM Installation				
	G2.01.01	At the designated valve chamber, excavate to the pipe at a point immediately adjacent to the chamber wall to make the cable connection to the pipe, excavate further to the level of the chamber floor to receive the GCM cables from the internal mat. Once the cables have been brought up to ground level, backfill and compact the excavation to a depth of 0.5m below natural ground level. Excavate an area 1.2m wide around the chamber to a depth of 0.5m. Top soil is to be removed and stored separately.				
	G2.01.01.01	a) Excavation of top soil and separate storage	Sum	2		
	G2.01.01.02	b) Excavation of main trench	Sum	2		
	G2.01.01.03	c) Extra over for un-pickable material	m³	1		
	G2.01.01.04	d) Extra over for rock	m³	1		
	G2.02	Cable Connections to Pipeline				
	G2.01.01	Remove existing coating to expose an area of sufficient size to make the necessary cable connections. Cable connections are to be by thermit welding.				
	G2.01.01.01	a) Coating Removal for 2 cable connections	Each	2		
	G2.01.01.02	b) 70mm² GCM pipe cable connection	Each	2		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
Supply and Installation of Gradient Control Mats (Large Chamf						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	G2.03	Cables				
	G2.03.01	From the pipeline, the internal GCM and the external GCM the pipe connection and GCM connection cables are to be brought to a point 100mm below the level of the external GCM. At this position the GCM cables are to be connected to two M10 stainless steel rods which are inserted through the wall c/w insulating sleeves and washers. Connection of the cables to the threaded rods is to be by means of lugs, nuts and washers Coating of the cable to pipe connection as well as the cable to M10 rod connection is to be carried out. The latter is to be carried out using Stopaq or equivalent.				
	G2.03.01.01	a) Supply coating material for cable connections	Each	2		
	G2.03.01.02	b) 70mm ² GCM pipe cable connection	Each	4		
	G2.03.01.03	c) Supply 70mm ² black PVC/PVC pipe cable	m	8		
	G2.03.01.04	d) Supply 70mm ² green PVC/PVC GCM cables	m	16		
	G2.03.01.05	e) Install coating material, insulated rods and cables	Each	2		
	G2.04	Internal Gradient Control Mat				
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	G2.04.01	The chamber floor is to be cleaned manually and then washed with a high pressure washer. The 100 x 100 x 4mm hot dip galvanized weld mesh is to be laid flat on the chamber floor such that the entire floor is covered with the exception of any drainage holes pipe support bases etc. The weld mesh is to be cut at least 50mm clear of any steel work attached to the chamber floor. Any joints between segments of weld mesh are to be made using thermit welds as are the two 70mm ² cable connections. These joints are to be wrapped with Stopaq or equivalent. The two 70mm ² cables are to exit through the chamber wall no more than 25mm above floor level. The entire weld mesh as well as the cables is to be covered with 75mm of 40MPa concrete. Should the chamber have any drains, the concrete should be floated to fall toward the drains at the same angle as the original floor.				
	G2.04.01.01	a) Supply galvanised weld mesh	Sum	2		
	G2.04.01.02	b) Supply coating material for cable and mesh connections	Sum	2		
	G2.04.01.03	c) Supply thermit weld connections for GCM cables and mesh joints	Sum	2		
	G2.04.01.04	d) Install GCM, thermit weld connections and cables	Each	2		
	G2.04.01.05	e) Supply and Install 75mm concrete cover of mesh and cables	Sum	2		
Total carried forward						

Employer:▣	▣	Contractor:▣	▣
Witness:▣	▣	Witness:▣	▣

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	G2.05	External Gradient Control Mat				
	G2.05.01	The floor of the GCM excavation is to be even, level and compacted. The 100 x 100 x 4mm hot dip galvanized weld mesh is to be laid flat on the excavation floor such that the entire floor is covered and a 1.2m wide border of mesh is formed around the chamber wall. Any joints between segments of weld mesh are to be made using thermit welds as are the two 70mm ² cable connections. These joints are to be wrapped with Stopaq or equivalent. The entire weld mesh as well as the cables is to be covered with 200mm of 40MPa concrete.				
	G2.05.01.01	a) Supply galvanised weld mesh including sacrificial anodes	Sum	2		
	G2.05.01.02	b) Supply coating material for cable and mesh connections	Sum	2		
	G2.05.01.03	c) Supply thermit weld connections for GCM cables and mesh joints	Sum	2		
	G2.05.01.04	d) Install GCM, thermit weld connections and cables	Each	2		
	G2.05.01.05	e) Supply and Install 200mm concrete cover of mesh and cables	Sum	2		
	G2.06	Backfilling to Natural Ground Level				
	G2.06.01	Once the concrete has set sufficiently in the trench, backfilling is to be carried out in 200mm layers with compaction of each layer being carried out to 90% modified AASHTO. The Separately stored topsoil is to be installed at the surface.				
	G2.06.01.01	a) Backfilling	Sum	2		
	G2.07	Solid State Decoupler				
	G2.07.01	Solid state decoupler to be installed inside the valve chamber immediately adjacent to the connection studs				
	G2.07.01.01	a) Supply SSD	Each	2		
	G2.07.01.02	b) Install SSD	Each	2		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SECTION H	H	Supply and Installation of Gradient Control Mats (Medium Chambers)				
	H1	P & G's				
	H1.01	For one gradient control mat Installation - to include for all plant, equipment, personnel, site establishment, travelling, concrete testing by SANAS accredited laboratory for all concrete mixes, barricading of trenches dewatering, security for the protection of cables left exposed overnight and removal of all excess and waste materials on completion	Each	6		
	H2	Supply and Installation of Gradient Control Mat				
	H2.01	Excavation for GCM Installation				
	H2.01.01	At the designated valve chamber, excavate to the pipe at a point immediately adjacent to the chamber wall to make the cable connection to the pipe, excavate further to the level of the chamber floor to receive the GCM cables from the internal mat. Once the cables have been brought up to ground level, backfill and compact the excavation to a depth of 0.5m below natural ground level. Excavate an area 1.2m wide around the chamber to a depth of 0.5m. Top soil is to be removed and stored separately.				
	H2.01.01.01	a) Excavation of top soil and separate storage	Sum	6		
	H2.01.01.02	b) Excavation of main trench	Sum	6		
	H2.01.01.03	c) Extra over for un-pickable material	m³	6		
	H2.01.01.04	d) Extra over for rock	m³	6		
	H2.02	Cable Connections to Pipeline				
	H2.02.01	Remove existing coating to expose an area of sufficient size to make the necessary cable connections. Cable connections are to be by thermit welding .				
	H2.02.01.01	a) Coating Removal for 2 cable connections	Each	6		
	H2.02.01.02	b) 70mm² GCM pipe cable connection	Each	12		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
Supply and Installation of Gradient Control Mats (Medium Cham						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	H2.03	Cables				
	H2.03.01	From the pipeline, the internal GCM and the external GCM the pipe connection and GCM connection cables are to be brought to a point 100mm below the level of the external GCM. At this position the GCM cables are to be connected to two M10 stainless steel rods which are inserted through the wall c/w insulating sleeves and washers. Connection of the cables to the threaded rods is to be by means of lugs, nuts and washers Coating of the cable to pipe connection as well as the cable to M10 rod connection is to be carried out. The latter is to be carried out using Stopaq or equivalent.				
	H2.03.01.01	a) Supply coating material for cable connections	Each	6		
	H2.03.01.02	b) Supply insulated stainless steel threaded rods	Each	12		
	H2.03.01.03	c) Supply 70mm ² black PVC/PVC pipe cable	m	24		
	H2.03.01.04	d) Supply 70mm ² green PVC/PVC GCM cables	m	48		
	H2.03.01.05	e) 70mm ² GCM pipe cable connection	Each	6		
	H2.04	Internal Gradient Control Mat				
	H2.04.01	The chamber floor is to be cleaned manually and then washed with a high pressure washer. The 100 x 100 x 4mm hot dip galvanized weld mesh is to be laid flat on the chamber floor such that the entire floor is covered with the exception of any drainage holes pipe support bases etc. The weld mesh is to be cut at least 50mm clear of any steel work attached to the chamber floor. Any joints between segments of weld mesh are to be made using thermit welds as are the two 70mm ² cable connections. These joints are to be wrapped with Stopaq or equivalent. The two 70mm ² cables are to exit through the chamber wall no more than 25mm above floor level. The entire weld mesh as well as the cables is to be covered with 75mm of 40MPa concrete. Should the chamber have any drains, the concrete should be floated to fall toward the drains at the same angle as the original floor.				
Total carried forward						

Employer:▣	▣	Contractor:▣	▣
Witness:▣	▣	Witness:▣	▣

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	H2.04.01.01	a) Supply galvanised weld mesh	Sum	6		
	H2.04.01.02	b) Supply coating material for cable and mesh connections	Sum	6		
	H2.04.01.03	c) Supply thermit weld connections for GCM cables and mesh joints	Sum	6		
	H2.04.01.04	d) Install GCM, thermit weld connections and cables	Each	6		
	H2.04.01.05	e) Supply and Install 75mm concrete cover of mesh and cables	Sum	6		
	H2.05	External Gradient Control Mat				
	H2.05.01	The floor of the GCM excavation is to be even, level and compacted. The 100 x 100 x 4mm hot dip galvanized weld mesh is to be laid flat on the excavation floor such that the entire floor is covered and a 1.2m wide border of mesh is formed around the chamber wall. Any joints between segments of weld mesh are to be made using thermit welds as are the two 70mm ² cable connections. These joints are to be wrapped with Stopaq or equivalent. The entire weld mesh as well as the cables is to be covered with 200mm of 40MPa concrete.				
	H2.05.01.01	a) Supply galvanised weld mesh including sacrificial anodes	Sum	6		
	H2.05.01.02	b) Supply coating material for cable and mesh connections	Sum	6		
	H2.05.01.03	c) Supply thermit weld connections for GCM cables and mesh joints	Sum	6		
	H2.05.01.04	d) Install GCM, thermit weld connections and cables	Each	6		
	H2.05.01.05	e) Supply and Install 75mm concrete cover of mesh and cables	Sum	6		
	H2.06	Backfilling to Natural Ground Level				
	H2.06.01	Once the concrete has set sufficiently in the trench, backfilling is to be carried out in 200mm layers with compaction of each layer being carried out to 90% modified AASHTO. The Separately stored topsoil is to be installed at the surface.				
	H2.06.01.01	a) Backfilling	Sum	6		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
Supply and Installation of Gradient Control Mats (Medium Cham						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	H2.07	Solid State Decoupler				
	H2.07.01	Solid state decoupler to be installed inside the valve chamber immediately adjacent to the connection studs				
	H2.07.01.01	a) Supply SSD	Each	6		
	H2.07.01.02	b) Install SSD	Each	6		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SECTION I	I	Supply and Installation of Gradient Control Mats (Air Valve Chamber)				
	I1	P & G's				
	I1.01	For one gradient control mat Installation - to include for all plant, equipment, personnel, site establishment, travelling, concrete testing by SANAS accredited laboratory for all concrete mixes, barricading of trenches dewatering, security for the protection of cables left exposed overnight and removal of all excess and waste materials on completion	Each	15		
	I2	Supply and Installation of Gradient Control Mat				
	I2.01	Excavation for GCM Installation				
	I2.01.01	At the designated valve chamber, excavate to the pipe at a point immediately adjacent to the chamber wall to make the cable connection to the pipe, excavate further to the level of the chamber floor to receive the GCM cables from the internal mat. Once the cables have been brought up to ground level, backfill and compact the excavation to a depth of 0.5m below natural ground level. Excavate an area 1.2m wide around the chamber to a depth of 0.5m. Top soil is to be removed and stored separately.				
	I2.01.01.01	a) Excavation of top soil and separate storage	Sum	15		
	I2.01.01.02	b) Excavation of main trench	Sum	15		
	I2.01.01.03	c) Extra over for un-pickable material	m³	15		
	I2.01.01.04	d) Extra over for rock	m³	15		
	I2.02	Cable Connections to Pipeline				
	I2.02.01	Remove existing coating to expose an area of sufficient size to make the necessary cable connections. Cable connections are to be by thermit welding .				
	I2.02.01.01	a) Coating Removal for 2 cable connections	Each	15		
	I2.02.01.02	b) 70mm² GCM pipe cable connection	Each	30		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	I2.03	Cables				
	I2.03.01	From the pipeline, the internal GCM and the external GCM the pipe connection and GCM connection cables are to be brought to a point 100mm below the level of the external GCM. At this position the GCM cables are to be connected to two M10 stainless steel rods which are inserted through the wall c/w insulating sleeves and washers. Connection of the cables to the threaded rods is to be by means of lugs, nuts and washers Coating of the cable to pipe connection as well as the cable to M10 rod connection is to be carried out. The latter is to be carried out using Stopaq or equivalent.				
	I2.03.01.01	a) Supply coating material for cable connections	Each	15		
	I2.03.01.02	b) Supply insulated stainless steel threaded rods	Each	30		
	I2.03.01.03	c) Supply 70mm² black PVC/PVC pipe cable	m	60		
	I2.03.01.04	d) Supply 70mm² green PVC/PVC GCM cables	m	90		
	I2.03.01.05	e) Install coating material, insulated rods and cables	Each	15		
	I2.04	Internal Gradient Control Mat				
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
Supply and Installation of Gradient Control Mats (Small Cham						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	I2.04.01	The crushed stone is to be removed from the chamber floor. The 100 x 100 x 4mm hot dip galvanized weld mesh is to be laid flat on the chamber floor such that the entire floor is covered. The weld mesh is to be cut at least 50mm clear of any steel work. Any joints between segments of weld mesh are to be made using thermit welds as are the two 70mm ² cable connections. These joints are to be wrapped with Stopaq or equivalent. The two 70mm ² cables are to exit through the chamber wall no more than 25mm above floor level. The entire weld mesh as well as the cables is to be covered with 75mm of 40MPa concrete. The crushed stone is then to be replaced inside the chamber.				
	I2.04.01.01	a) Supply galvanised weld mesh	Sum	15		
	I2.04.01.02	b) Supply coating material for cable and mesh connections	Sum	15		
	I2.04.01.03	c) Supply thermit weld connections for GCM cables and mesh joints	Sum	15		
	I2.04.01.04	d) Install GCM, thermit weld connections and cables	Each	15		
	I2.04.01.05	e) Supply and Install 75mm concrete cover of mesh and cables	Sum	15		
	I2.05	External Gradient Control Mat				
	I2.05.01	The floor of the GCM excavation is to be even, level and compacted. The 100 x 100 x 4mm hot dip galvanized weld mesh is to be laid flat on the excavation floor such that the entire floor is covered and a 1.2m wide border of mesh is formed around the chamber wall. Any joints between segments of weld mesh are to be made using thermit welds as are the two 70mm ² cable connections. These joints are to be wrapped with Stopaq or equivalent. The entire weld mesh as well as the cables is to be covered with 200mm of 40MPa concrete.				
	I2.05.01.01	a) Supply galvanised weld mesh	Sum	15		
	I2.05.01.02	b) Supply coating material for cable and mesh connections	Sum	15		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	I2.05.01.03	c) Supply thermit weld connections for GCM cables and mesh joints	Sum	15		
	I2.05.01.04	d) Install GCM, thermit weld connections and cables	Each	15		
	I2.05.01.05	e) Supply and Install 200mm concrete cover of mesh and cables	Sum	15		
	I2.06	Backfilling to Natural Ground Level				
	I2.06.01	Once the concrete has set sufficiently in the trench, backfilling is to be carried out in 200mm layers with compaction of each layer being carried out to 90% modified AASHTO. The Separately stored topsoil is to be installed at the surface.				
	I2.06.01.01	a) Backfilling	m	45		
	I2.07	Solid State Decoupler				
	I2.07.01	Solid state decoupler to be installed inside the valve chamber immediately adjacent to the connection studs				
	I2.07.01.01	a) Supply SSD	Each	15		
	I2.07.01.02	b) Install SSD	Each	15		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SECTION J	J	Insulating Flange Kits				
	J1	DN600 Bypass				
	J1.01	P&G's for one insulating flange installation (to include for all plant, equipment, personnel, site establishment, travelling, dewatering, security and removal of all excess and waste materials on completion	Each	1		
	J1.02	Supply and Install Bolts, Sleeves, Washers				
	J1.02.01	At the designated location, supply and install bolts, sleeves and washers				
	J1.01.01.01	a) Supply	Set	1		
	J1.01.01.02	b) Install	Set	1		
	J1.03	Supply and Install Gaskets				
	J1.03.01	At the designated location, supply and install bolts, sleeves and washers				
	J1.03.01.01	a) Supply	Set	1		
	J1.03.01.02	b) Install	Set	1		
	J2	DN600 Main				
	J2.01	P&G's for one insulating flange installation (to include for all plant, equipment, personnel, site establishment, travelling, dewatering, security and removal of all excess and waste materials on completion	Each	1		
	J2.02	Supply and Install Bolts, Sleeves, Washers				
	J2.02.01	At the designated location, supply and install bolts, sleeves and washers				
	J2.01.01.01	a) Supply	Set	1		
	J2.01.01.02	b) Install	Set	1		
	J2.03	Supply and Install Gaskets				
	J2.03.01	At the designated location, supply and install bolts, sleeves and washers				
	J2.03.01.01	a) Supply	Set	1		
	J2.03.01.02	b) Install	Set	1		
	J3	DN800				
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
						Insulating flange
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
	J3.01	P&G's for one insulating flange installation (to include for all plant, equipment, personnel, site establishment, travelling, dewatering, security and removal of all excess and waste materials on completion	Each	1		
	J3.02	Supply and Install Bolts, Sleeves, Washers				
	J3.02.01	At the designated location, supply and install bolts, sleeves and washers				
	J3.01.01.01	a) Supply	Set	1		
	J3.01.01.02	b) Install	Set	1		
	J3.03	Supply and Install Gaskets				
	J3.03.01	At the designated location, supply and install bolts, sleeves and washers				
	J3.03.01.01	a) Supply	Set	1		
	J3.03.01.02	b) Install	Set	1		
	J1	DN600 Bypass	Each	1		
	J2	DN600 Main	Each	1		
	J3	DN800	Each	2		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SECTION K	K	Other Items				
	K1	Road Crossings				
	K1.01	At each road crossing a 110mm diameter cable sleeve is to be installed by means of horizontal directional drilling at a depth of 1.5m	Each	9		
	K2	Reinstatement of Paving				
	K2.01	Paving to be reinstated to original condition	m ²	100		
	K3	Reinstatement of lawn				
	K3.01	Lawn to be reinstated to original condition				
	K3.01.01	Install	m ²	100		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part D - Portion 1 - Cathodic Protection						
PAYMENT REFERS	ITEM NO	DESCRIPTION				SUMM AMOUNT
		SUMMARY				
SECTION A		Transformer Rectifier Infrastructure Installations				
SECTION B		Supply and Installation of Transformer Rectifier Units				
SECTION C		Supply and Installation of Horizontal Anode Groundbed				
SECTION D		Supply and Installation of Cross Bonds				
SECTION E		Supply and Installation of Continuity Bonds at Chambers				
SECTION F		Supply and Installation of Monitoring Facilities				
SECTION G		Supply and Installation of Gradient Control Mats (Large				
SECTION H		Supply and Installation of Gradient Control Mats (Medium				
SECTION I		Supply and Installation of Gradient Control Mats (Air				
SECTION J		Insulating Flange Kits				
SECTION K		Other Items				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part E - Section 2 - Concrete Pipe Tunnel						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 C	1	SITE CLEARANCE Refer to Drawing: JW14358-16941-T-014-S11-00-TMS				
PSC 8.2.12	1.01	Removal of man-made surfaces and kerbing				
	1.01.01	c) Interlocking concrete segmental paving blocks, Class 2.6/40MPa (all colours)	m ²	220		
PSC 8.2.13	1.01	Backfilling and reinstatement of man-made surfaces re-using removed materials				
	1.01.01	a) Interlocking concrete segmental paving blocks, Class 2.6/40MPa (all colours)	m ²	80		
PSC 8.2.14	1.04	Take down and re-erect existing fences and guardrails				
	1.04.01	a) Guardrails	m	50		
	1.04.02	b) Diamond mesh fencing	m	50		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part E - Section 2 - Concrete Pipe Tunnel						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 1200 D	2	EARTHWORKS				
		Refer to Drawing: JW14358-16941-T-014-S11-00-TMS				
8.3.3	2.01	Restricted excavation				
8.3.3	2.02.01	a) Excavate for restricted foundations, footings and pipe trenches in all materials and use for backfill or embankment or dispose				
	2.02.01.01	Concrete Pipe Tunnel	m³	270		
8.3.3	2.02.02	b) Extra over for				
	2.02.02.01	1) intermediate excavation	m³	30		
	2.02.02.02	2) hard rock excavation	m³	30		
PSDB 8.3.3	2.02.02.03	3) Hand excavation where ordered by the Project Manager				
	2.02.02.03.01	a) Soft material	m³	30		
	2.02.02.03.02	b) Intermediate material	m³	30		
	2.02.02.03.03	c) Hard material	m³	30		
PSDB 8.3.3	2.02.02.04	4) Backfill stabilized with 5% cement where directed by the Project Manager	m³	60		
PSDB 8.3.3	2.02.02.05	5) Soilcrete backfill where directed by the Project Manager	m³	60		
PSDB 8.3.6	2.02	Finishing				
PSDB8.3.6.1	2.02.01	Reinstate road surfaces complete with all courses				
	2.02.01.01	f) Re-instatement of bricks, concrete pre-cast units and interlocking concrete segmental paving	m²	80		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part E - Section 2 - Concrete Pipe Tunnel						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
SANS 2001 PART CC1	5.00	CONCRETE (STRUCTURAL)				
		Refer to Drawing: JW14358-16941-T-014-S11-00-TMS				
		SCHEDULED FORMWORK ITEMS				
PSCC1.002	5.01	Smooth				
	5.01.01	Vertical formwork to				
	5.01.01.01	Foundations (Floor)	m ²	150		
	5.01.01.02	Walls	m ²	700		
	5.01.01.03	Plinths	m ²	30		
	5.01.02	Horizontal formwork to:				
	5.01.02.01	Floors / Roofs	m ²	270		
PSCC1.006	5.02	Box out holes/form voids				
	5.02.01	d) Large, other than circular, areas over 0.1 m ² up to 2,0 m ²				
	5.02.01.01	0 m up to and including 0,5 m	No.	3		
		SCHEDULED REINFORCEMENT ITEMS				
PSCC1.007	5.03	Steel bars				
	5.03.01	a) Steel bars irrespective of grade and diameter	t	30		
PSCC1.008	5.04	High-tensile welded mesh				
	5.04.01	Mesh Ref 395	m ²	25		
		SCHEDULED CONCRETE ITEMS				
PSCC1.011	5.05	Blinding layer in Grade 15 MPa/19 mm concrete				
	5.05.01	50 mm thickness	m ²	120		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part E - Section 2 - Concrete Pipe Tunnel						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.012	5.06	Strength concrete				
	5.06.01	Class 30 MPa/19 mm concrete in:				
	5.06.01.01	Foundation (Floor) / Roof	m ³	75		
	5.06.01.02	Walls	m ³	60		
	5.06.01.03	Plinths	m ³	6		
PSCC1.013	5.07	Unformed surface finishes				
	5.07.01	a) Steel-floated finish				
	5.07.01.01	Floor / Roof	m ²	210		
	5.07.01.02	Top of Plinths	m ²	20		
	5.07.01.03	Top of Walls	m ²	70		
	5.07.02	d) Broomed finish				
	5.07.02.01	Blinding layer	m ²	120		
PSCC1.016	5.08	Joints				
	5.08.01	10 mm thick bitumen impregnated fibre board	m ²	25		
	5.08.02	10 mm x 10 mm Polyurethane Sealant	m	110		
PSCC1.018	5.09	Grouting				
	5.09.01	a) Under bases of pipe supports and straps	m ³	2		
	5.09.02	c) Pipe box-outs	m ³	2		
PSCC1.019	5.10	HD bolts and miscellaneous metal work				
	5.10.01	Fabricate and install galvanised mild steel base plate and support bracket as per drawing JW14358-16941-T-014-S11-00-TMS	No.	24		
	5.10.02	Fabricate and install galvanised mild steel fastening strap, including bolts as per drawing JW14358-16941-T-014-S11-00-TMS	No.	24		
Total carried forward						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Part E - Section 2 - Concrete Pipe Tunnel						
PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Total brought forward						
PSCC1.020	5.10.03	Fabricate and cast in lifting hooks	No.	60		
	5.11	Colour Mitigation to				
	5.11.01	Exposed tunnel sections along roadways	m ²	150		
		MISCELLANEOUS ITEMS				
PSCC1.021	5.12	Polythene sheeting under concrete				
	5.12.01	250 micron green medium density polyethylene dampproof sheeting	m ²	120		
PSCC1.024	5.13	Casting pipes and specials in concrete				
	5.13.01	DN 250 Steel pipe cast into chamber wall	No.	1		
	5.13.02	DN 600 Steel pipe cast into chamber wall	No.	2		
PSCC1.025	5.14	Installation of precast elements				
	5.14.01	Precast tunnel sections as per drawing JW14358-16941-T-014-S11-00-TMS	No.	26		
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

**Part E - Section 2 - Concrete Pipe Tunnel**

PAYMENT REFERS	ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		SUMMARY				
SANS 1200 C		SITE CLEARANCE				
SANS 1200 D		EARTHWORKS				
SANS 2001 CC1		CONCRETE (STRUCTURAL)				
Total carried forward to summary						

Employer:▯	▯	Contractor:▯	▯
Witness:▯	▯	Witness:▯	▯

Johannesburg Water (SOC) Ltd JW14358 - Construction of Woodmead Inlet Bulk Summary of Schedule of Quantities		
ITEM NO	DESCRIPTION	AMOUNT
	SUMMARY	
1	PART A - GENERAL	
1.1	Part A - Section 1: Preliminary and General	R
2	PART B - PIPELINES	
2.1	Part B - Section 1: DN 600 Steel Main Pipeline	R
2.2	Part B - Section 2: DN 600 Steel Bypass Pipeline	R
2.3	Part B - Section 3: DN 800 Steel Pipeline	R
2.4	Part B - Section 4: DN 200 High Impact mPVC Pipeline	R
3	PART C - CHAMBERS	
3.1	Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10	R
3.2	Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11	R
3.3	Part C - Section 3 - DN 200 Flow Meter and scour Valve Chamber: Node NC3	R
3.4	Part C - Section 4 - DN 800 isolation, scour and future tie-in chamber: Node ND2	R
3.5	Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5	R
3.6	Part C - Section 6 - Upgrades to Existing Butterfly Valve Chambers	R
3.7	Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25	R
3.8	Part C - Section 8 - Tie-in chambers: Node NA103, NB12	R
4	PART D - CATHODIC PROTECTION AND AC MITIGATION	
4.1	Part D - Portion 1 - Cathodic Protection	R
5	PART E - TRENCHLESS PIPING	
5.1	Part E - Section 1 - Trenchless Piping	R
5.2	Part E - Section 2 - Concrete Pipe Tunnel	R
Sub-Total 1 TOTAL FOR SCHEDULE OF QUANTITIES		R
The above prices are Not Firm. In respect of the total value of work done by approved SMME's at 30% of Sub Total 1 (This total shall include all amounts payable to SMME's, including P&G's) PSA 8.9 = R..... (A) Allowance as a percentage (maximum 15%) for appointing and handling work done by approved SMME's % (B) Sub-Total 2 [Handling fees for subcontracting = (A) x (B)] Sub-Total 3 = Sub Total 1 + Sub Total 2		
ADD	15% VAT	R
TOTAL		R

Employer: □	□	Contractor: □	□
Witness: □	□	Witness: □	□



C2.2.1 Summary of Bill of Quantities

NO	DESCRIPTION	AMOUNT
1	PART A - GENERAL	
1.1	Part A - Section 1: Preliminary and general	
2	PART B - PIPELINES	
2.1	Part B - Section 1: DN 600 Steel Main Pipeline	
2.2	Part B - Section 2: DN 600 Steel Bypass Pipeline	
2.3	Part B - Section 3: DN 800 Steel Pipeline	
2.4	Part B - Section 4: DN 200 High Impact MPVC Pipeline	
3	PART C - CHAMBERS	
3.1	Part C - Section 1 - Scour Valve Chamber 1 and 2: NA13, NA23, NA41, NA64, NA81, NA95, NB10	
3.2	Part C - Section 2 - Air Valve Chambers: Nodes NA15,21,39,45,57,69,85,94,97, NC11	
3.3	Part C - Section 3 - DN 200 Flow Meter and scour Valve Chamber: Node NC3	
3.4	Part C - Section 4 - DN 800 isolation, scour and future tie-in chamber: Node ND2	
3.5	Part C - Section 5 - Hot-Tapping chambers: Node NA1, ND1, ND5	
3.6	Part C - Section 6 - Upgrades to Existing Butterfly Valve Chambers	
3.7	Part C - Section 7 - PRV, NRV and FM chamber: Node NA4, NB11, NC26, NC25	
3.8	Part C - Section 8 - Tie-in chambers: Node NA103, NB12	
4	PART D - CATHODIC PROTECTION AND AC MITIGATION	
4.1	Part D - Portion 1 - Cathodic Protection	
5	PART E - TRENCHLESS PIPING	
5.1	Part E - Section 1 - Trenchless Piping	
5.2	Part E - Section 2 - Concrete Pipe Tunnel	
PSA 8.9	Sub-Total 1 The above prices are Not Firm. In respect of the total value of work done by approved SMME's at 30% of Sub Total 1 (This total shall include all amounts payable to SMME's, including P&G's) = R..... (A) Allowance as a percentage (maximum 15%) for appointing and	

Employer:		Contractor:	
Witness:		Witness:	

	handling work done by approved SMME's% (B)	
	Sub-Total 2 [Handling fees for subcontracting = (A) x (B)]	
	Sub-Total 3 = Sub Total 1 + Sub Total 2	
ADD	VAT @ 15%	
	TOTAL CARRIED TO FORM OFFER	

Please confirm the rates are Firm by signing below

DATE

SIGNATURE OF TENDERER

Employer:☐	☐	Contractor:☐	☐
Witness:☐	☐	Witness:☐	☐

Johannesburg Water SOC Ltd



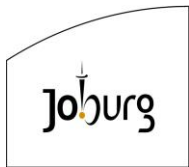
CONTRACT JW14358

**CONSTRUCTION OF WOODMEAD
INLET BULK WATER PIPELINE**

VOLUME 1

**PART 3:
SCOPE OF WORK**

Client:		Contractor:	
Witness:		Witness:	



C3 PREAMBLE TO SCOPE OF WORK

GENERAL

This section specifies and describes the supplies, services and Engineering and construction works which are to be provided and any other requirements and constraints relating to the manner in which the contract work is to be performed.

SCOPE

These Project Specifications are set out in two portions:

- Portion A: **Scope of Work** covers a general description of the project, the facilities available and the requirements to be met.
- Portion B: **Generic Specifications** covers variations to the standardized specifications and particular specifications which are applicable to the contract.
- Portion C: **Particular Specifications** covers particular specifications which are applicable to the contract.

STATUS

The Project Specifications together with the drawings and Schedule of Quantities indicate the section of Standard Specification applicable to this Contract.

In the event of any discrepancy between parts of the Standard Specification and the Project Specifications, the latter shall take precedence and shall govern.

Client:		Contractor:	
Witness:		Witness:	

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Client:		Contractor:	
Witness:		Witness:	



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Client:		Contractor:	
Witness:		Witness:	

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Client:		Contractor:	
Witness:		Witness:	

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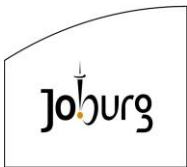
Client:		Contractor:	
Witness:		Witness:	

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Client:		Contractor:	
Witness:		Witness:	

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Client:		Contractor:	
Witness:		Witness:	



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Client:		Contractor:	
Witness:		Witness:	

PORTION A: PROJECT DESCRIPTION AND GENERAL INFORMATION

PS 1 DESCRIPTION OF THE WORKS

2. PS 1.1 CLIENT'S OBJECTIVES

The Client's main objective is to implement the 4.9 km DN 600 welded steel bulk pipeline (steel main) with all the appurtenant valves, fittings, chambers, and cathodic protection. The pipeline takes off from the Sandton Bulk System in Marlboro Gardens to supply the proposed 22 MI Woodmead Reservoir (by others) located behind the Pikitup landfill site in Woodmead, Johannesburg.

The Client's objective includes implementing the following additional pipelines with all the appurtenant valves, fittings, chambers, and cathodic protection.

- A 0.5 km DN 600 welded steel bulk pipeline (bypass) which tees off from the steel main at the Woodmead Reservoir site to tie into an existing DN 400 steel pipeline at the corner of Woodlands Drive and Lincoln Street in Woodmead.
- A 0.8 km DN 200 Hi-impact MPVC pipeline which takes off from the existing DN 400 steel pipeline at the corner of Woodlands Drive and Lincoln Street to the corner of Plymouth Street and Lincoln Street in Woodmead.
- A 0.1 km DN 800 welded steel pipeline from the existing DN 1200 steel pipeline along Viola Avenue to the tie into the existing DN 500 steel inlet pipeline which supplies the existing Marlboro Reservoirs, in Marlboro Johannesburg.

The Client's objective is to commission both the 4.9 km DN 600 welded steel bulk pipeline (steel main) between the offtake from the Sandton Bulk System in Marlboro Gardens to the new 22 MI Woodmead Reservoir and the 0.5 km DN 600 welded steel bulk pipeline (bypass) from the Woodmead Reservoir site to the existing DN 400 steel pipeline at the corner of Woodlands Drive and Lincoln Street in Woodmead in the shortest time possible for the respective pipeline section. The Contractor will therefore be required to programme his construction sequencing such that:

- a.) He has a minimum of one dedicated team constructing each of these two pipeline sections.
- b.) The construction of these two pipeline sections is programmed to start as soon as possible after award of the contract.

The secondary objective of the project is that optimum utilisation shall be made of the resources within the local community and that these resources shall be improved and enhanced through their participation in the execution of the works. The project to be implemented has taken into cognizance the prescripts of EPWP and local SMMEs. Tenderers will be appointed for work in their CIDB grading category only.

3. PS 1.2 OVERVIEW OF THE WORKS

The works consists of the following.

- Site clearing, pipe trenching, pipe bedding, trench backfilling, compacting and overall reinstatement of the existing roads and surfaces to its original state for all pipelines constructed.
- The construction of approximately 4.9 km DN 600 welded steel pipeline inclusive of bends, pipe specials and cathodic protection.
- The construction of approximately 0.5 km DN 600 welded steel pipeline inclusive of bends, pipe specials and cathodic protection.
- The construction of approximately 0.1 km DN 800 welded steel pipeline inclusive of bends, pipe specials and cathodic protection.
- The construction of approximately 0.8 km DN 200 Hi-impact mPVC pipeline inclusive of bends, pipe specials and cathodic protection.

Client:		Contractor:	
Witness:		Witness:	

- The construction of concrete air valve chambers, pressure reducing valve chambers, isolating valve chambers, bulk meter chambers and scour valve chambers for the DN 600, the DN 800, and the DN 200 pipelines inclusive of access manholes, ventilation, and access ladders.

4. PS 1.3 SCOPE OF THE WORK

The scope of work performed under this contract will consist of the following:

Contractor's establishment on site. Provision of safety measures and security for the duration of the contract.

Ordering of all long lead-time items (valves, pipes, pipe specials, reinforcing and equipment) required for the successful completion of the project within the time, cost and quality specified.

Location, exposing and protection of existing services.

Supply of all equipment, material and labour required for the construction, installation, testing and commissioning of the DN 600, DN 800 and DN 200 pipelines.

Site Clearance, trenching, trench preparation and compaction, bedding, pipe laying and jointing (welding) of the DN 600 steel main and bypass pipelines.

Site Clearance, trenching, trench preparation and compaction, bedding, pipe laying and jointing (welding) of the DN 800 pipeline.

Site Clearance, trenching, trench preparation and compaction, bedding, pipe laying and jointing of the DN 200 mPVC pipeline.

Pressure testing of pipelines (DN 200, DN 600, DN 800).

Backfilling of trenches, compaction, and reinstatement of surfaces to original state, including boundary walls and fencing where affected.

Asphalt overlay and reinstating of roads including road layer works.

Construction of concrete valve chambers with isolation, scour, air, control valves and water meters for DN 600, DN 800 and DN 200 pipelines.

Tie-in the DN 600 steel main to the existing DN 1500 steel pipeline at the take-off point in Marlboro Gardens by means of Hot-tapping.

Tie-in the DN 600 steel main to the new DN 500 reservoir inlet pipeline at the reservoir site.

Tie-in the DN 800 steel pipe to the existing DN 525 pipeline near the Marlboro Reservoir site in Marlboro Gardens by means of Hot-tapping if practical.

Tie in the DN 800 steel pipe to the existing DN 1200 steel pipeline along Viola Avenue in Marlboro Gardens by means of Hot-tapping.

Tie in the DN 600 bypass and the DN 200 to the existing DN 400 steel pipeline at the corner of Lincoln Street and Woodlands Drive in Woodmead.

Tie in the DN 200 mPVC pipeline to the existing DN 400 steel pipeline at corner Lincoln Street and Plymouth Street in Woodmead.

Tie in DN 200 and DN 250 HDPE and High Impact mPVC scour pipelines to existing stormwater manholes, grid inlets, field inlets, junction boxes and kerb inlets.

Installation of DN 1800 concrete pipes via pipe jacking for DN 600 pipeline crossings and installation of DN 600 steel pipes inside concrete sleeve.

Horizontal Directional Drilling for DN 250 HDPE scour pipelines, where required

Horizontal Directional Drilling for DN 200 HDPE scour pipelines, where required

Horizontal Directional Drilling of DN 200 HDPE pipes for road crossings of the DN 200 mPVC water pipeline, where required.

Install Cathodic Protection for all the steel pipelines (DN 600, DN 800).

Commissioning of all pipelines (DN 200, DN 600, DN 800).

Prepare operation and maintenance manuals and as built drawings for handover to the Client.

Client:		Contractor:	
Witness:		Witness:	

De-establishment of the site camp and reinstatement of the site to the original state and handover to the Client.

Monthly Submission of EPWP statistics for the duration of the contract.

Traffic management and traffic accommodation for open trenches through road crossings, in front of dwellings, businesses and anywhere necessary. The Contractor shall make all the necessary arrangements well in advance.

The Contractor's obligations shall also include strict compliance with any Environmental requirements and/or reports deemed to form part of this Contract as well as Occupational Health and Safety requirements.

This description of the works is not necessarily complete and shall not limit the work to be carried out by the Contractor under the Contract. Approximate quantities of each type of work are given in the Schedule of Quantities.

5. PS 1.4 LOCATION OF THE WORKS

The works are located on the North to the North-eastern side of Johannesburg from Marlboro Gardens to Woodmead.

Refer to the locality plan in Volume 3 of this tender document for a clear indication of the project location.

The start and end centreline coordinates of each of the pipelines are given below.

Description	Y Coordinate	X Coordinate
Start of DN 800 steel pipeline	91 382.973	2 887 748.550
End of DN 800 steel pipeline	91 422.484	2 887 683.583
Start of DN 600 steel main	90 948.044	2 887 602.499
End of DN 600 steel main	91 437.845	2 886 855.350
Start of DN 600 bypass	91 139.467	2 883 348.471
End of DN 600 bypass	91 511.661	2 883 396.477
Start of DN 200 mPVC pipeline	91 518.267	2 883 397.870
End of DN 200 mPVC pipeline	91 479.085	2 882 865.884

6. PS 1.5 TEMPORARY WORKS

The Contractor shall, as relevant:

- Provide temporary drainage to the works, temporary pumps and other equipment as might be necessary for the protection, draining and dewatering of the works.
- Construct and maintain haulage, temporary access and construction roads, subject to the approval of the Client, permits, other Contractors, statutory bodies or any other person who might require legitimate access to or through the site for the purpose of executing legitimate business, free and unhindered usage of such roads.
- Provide temporary pedestrian and vehicle access bridges to maintain continuous access to the adjacent properties all the time while working adjacent the properties.
- Provide a steel foxhole cover suitable for vehicle loads to cover the foxhole overnight to enable the cars to drive over for any pipelines constructed underneath the road.

Client:		Contractor:	
Witness:		Witness:	

- e) Temporary water connections, Contractor's offices, storage sheds, latrines and barricading of works shall be located in an approved position and subject to the approval of all authorities concerned.
- f) Safety and security of the Contractor's temporary works shall be at the Contractor's discretion, but always in accordance with stipulated Occupational Health and Safety requirements.
- g) The Contractor's site camp shall be adequately guarded during or outside working hours.
- h) The construction works and exposed existing services shall be adequately protected within the works area.
- i) Ensure no or limited interruption to vehicular and pedestrian traffic and works carried out be such that existing watermains, stormwater, sewer flow shall not be impeded during survey and construction activities.
- j) Further the Contractor shall note that no stockpiling of materials, plant, excavated material or any other construction related infrastructure shall be allowed in locations that may interfere with the operations of the Client and the public in general.

PS 2 ENGINEERING

7. PS 2.1 CLIENT'S DESIGN

The Contractor undertakes only construction on the basis of designs issued by the Client. The Contractor is to follow the specification, the design and construction drawings as laid out by the Client.

8. PS 2.2 DRAWINGS

The drawings are included in Volume 3 of this Contract Document based on current available information. Such drawing may be updated (based on the actual site situation uncovered during execution of the works) and re-issued during the Contract Period as required. The drawings include:

- a) Locality plans
- b) Layout drawings
- c) Longitudinal profiles, and
- d) Typical construction details
- e) Traffic Accommodation Drawings

• PS 2.2.1 Construction drawings

Upon receiving the instruction to commence with the works the Contractor shall receive 3 sets of construction drawings, of which 1 set shall be designated for as-built records and updated by the Contractor on a daily basis. The latter shall be:

- a) made available to the Project Manager or Supervisor within 24 hours on request.
- b) submitted to the Project Manager with the Contractor's request for issue of the Completion Certificate.

• PS 2.2.2 Shop drawings

Where an item to be supplied in conformance with this Contract specification has not been designed in sufficient detail by the Client's Project Manager or the Client, the Contractor shall be required to supply the Project Manager with 3 copies of detailed shop drawings prior to delivery of materials, including an electronic copy in drawing format that is compatible with the software packages (AutoCAD or DXF) used by the Project Manager and/or the Client.

NOTA BENE: Only on approval of such shop drawings or an amended version thereof, shall the Contractor proceed with the manufacturing, supply and installation of the designed item.

Client:		Contractor:	
Witness:		Witness:	

PS 2.3 INFORMATION SUPPLIED BY CLIENT

Certain information contained in these Contract Documents, or provided separately, is being offered in good faith. However, in the circumstances pertaining to the type of information supplied, no guarantee can be given that all the information is necessarily correct or representative. More specifically this applies to all material surveys and reports and similar information, the accuracy of which is necessarily subject to the limitation of testing, sampling, the natural variation, of material or formations being investigated and the measure of confidence with which conclusions can be drawn from any investigations carried out. It also applies to the positions of existing services as indicated on the drawings and to cost estimates provided.

PS 2.4 DESIGN SERVICE AND AUTHORITY MATRIX

- The Client is responsible for the design of the permanent Works as reflected in the Contract Document unless otherwise stated.
- The Contractor is responsible for the design of the temporary Works and their compatibility with their permanent Works.
- The Contractor shall supply all details, on marked up drawings, necessary to assist the Project Manager in the compilation of the as-built drawings.

PS 3 PROCUREMENT

9. PS 3.1 PREFERENTIAL PROCUREMENT PROCEDURES

The Client promotes preferential procurement. The philosophy of the process and mechanics of the points scoring system are described in section MBD 6.1, which is included in the returnable documents section T2.1.

10. PS 3.2 SUBCONTRACTING

The commitment of the Client to Government Policy concerning the empowerment of the EMEs shall be noted and adhered to by the main Contractor. It is against this background that Johannesburg Water has made provisions under this contract to ensure that the main Contractor imparts skills to local sub-contractors (who are registered with CSD and meet requirements as indicated on JW6.1) within the project area during the project implementation. This tender is subject to the subcontracting condition as described in JW6.1 of the Returnable Documents and must be adhered to by the main Contractor. The Contractor shall sub-contract 30% of the contract value.

The onus is upon the main Contractor to handle and manage the procurement process of the sub-contractors and once appointed, should be dealt with in accordance with the provisions of Clause 26 of the NEC 4 Engineering and Construction Contract (ECC4)(2017).

Potential subcontractor Scope may include but not limited to the following:

- Site clearance
- Pipe trenching and bedding preparations
- Laying of pipes (not bigger than 200 mm diameter)
- Brickwork and paving
- Construction of concrete for valve chambers
- Hand excavation
- Reinstatement of surfaces to original condition
- Supply of material and construction plant / equipment
- Fencing
- Training
- Security

Client:		Contractor:	
Witness:		Witness:	

• **PS 3.2.1 THE MINIMUM REQUIREMENTS FOR SELECTION OF THE SUB-CONTRACTORS ARE AS FOLLOWS:**

- a) Valid CIPC registration (i.e. CK, COR)
- b) SA ID copies of owners
- c) Active CIDB registration: minimum Grade 1 in the relevant category
- d) Valid CSD compliance status
- e) Valid EME affidavit
- f) COIDA certificate
- g) Company Profile including similar experience and skilled personnel CVs
- h) Health and Safety Plan

The Contractor is:

- a) To enter into contract with any sub-contractor(s) in accordance with the requirements of Clause 26 of the NEC 4 Engineering and Construction Contract (ECC4)(2017). The number of sub-contractor(s) will be determined by the main contractor depending on the Subcontracting Scope of Work and the amount of work that is to be carried out under this Contract as outlined above and in the Bill of Quantities.
- b) Required to utilise local subcontractors (or regional if he fails to find suitable subcontractors from within the project locality)
- c) Responsible for all work executed (including Quality, Contractual Liabilities) on his behalf or under his supervision and/or management by all sub-contractors.

NOTA BENE:

- **Local** subcontractors are subcontractors from within the project suburb or ward.
- **Regional** subcontractors are subcontractors from within the region as per the City of Johannesburg's demarcation of the regions.
- a) The Contractor is expected to enter into a contract with the subcontractor(s) in accordance with the requirements of Clause 26 of the NEC 4 Engineering and Construction Contract (ECC4)(2017). The Client must be supplied with a copy of the contract/agreement for records.

NOTA BENE: The Project Manager shall not negotiate directly with sub-contractors and all problems relating to programming, workmanship, etc., as they are matters between the Contractor and his sub-contractors.

In the execution of the subcontract work, the Contractor shall ensure that the Subcontractor(s) comply with all relevant legislation and regulations including, but not confined to, the Occupational Health and Safety Act. The Contractor hereby indemnifies the Client against any loss, damage, or claim for Subcontract Works set out for the Construction of the Woodmead Bulk Water Pipelines Contract arising out of the former's failure to comply with instructions issued to him in regard to these requirements.

• **PS 3.2.2 PERFORMANCE AND EXECUTION OF THE SUBCONTRACTED WORK**

The main Contractor must facilitate access to supply sufficient, suitable resources (e.g. equipment, labour, material) to execute the subcontracted portion where necessary.

The Contractor shall also ensure that the Subcontractor(s) shall execute the Subcontract Work in accordance with the Scope and Programme to the reasonable satisfaction of the Client.

• **PS 3.2.3 QUALITY OF THE SUBCONTRACT WORK**

In accordance with the requirements of Clause 26 of the NEC 4 Engineering and Construction Contract (ECC4) (2017). it is the responsibility of the Contractor to ensure that the Subcontractor shall be capable of executing the Subcontract Work efficiently and in accordance with the Scope of Work.

Client:		Contractor:	
Witness:		Witness:	

• **PS 3.2.4 LAWS AND REGULATIONS**

The Contractor shall ensure that the Subcontractor(s) comply with the paying of all amounts due in respect of his employees and himself in terms of all relevant legislation and regulations including, but not confined to, the:

- Income Tax Act,
- Compensation for Occupational Injuries and Diseases Act,
- Unemployment Insurance Fund,
- Basic Conditions of Employment Act,

• **PS 3.2.5 RESOURCES TO COMPLETE SUBCONTRACT WORK**

Although it is preferred by JW that the Contractor ensure that the Subcontractor(s) supply all required resources such as labourers, equipment, hand tools, power-driven tools if need be, which are required by him for the execution of the subcontract work, however the onus is upon the Contractor to determine the extent of resources the subcontractor (s) shall supply to ensure that the works are completed on time. The agreement between the Contractor and subcontractor (s) is the Contractor's responsibility and JW is indemnified from any agreements entered between Contractor and his Subcontractor(s).

• **PS 3.2.6 PAYMENT**

The Contractor shall ensure that sub-contractor(s) are paid within stipulated time as per the Agreement with the subcontractor (s). Failure by the Contractor to pay Sub-Contractors will then lead Johannesburg Water, not to process the next payment certificate for the Contractor.

• **PS 3.2.7 RETENTION MONIES**

The Client will deduct Retention money for the overall works including the Subcontract Work at the percentage stated in the Contract Data.

• **PS 3.2.8 RESOLUTION OF DISPUTES**

Should any dispute between the Contractor and the Subcontractor (s) arise out of the provisions of the Subcontract, or the execution of the Subcontract Work, every effort shall be made by the Parties to resolve the matter themselves without the intervention of the Client. The agreement signed between the Contractor and Sub-contractor (s) should state dispute resolution procedure and address late payment issues should it arise.

• **PS 3.2.9 APPROVAL OF THE SUBCONTRACTORS**

All the subcontractors appointed under this contract are to be approved by the Project Manager. The Contractor is to submit the names and details (company profiles, CV's and qualifications and previous experience) of the proposed subcontractor and the scope of work to be allocated to the subcontractor, to the Project Manager for approval. No subcontractor shall be appointed without approval of the Project Manager.

• **PS 3.2.10 PROVISIONAL SUM FOR LOCAL SUBCONTRACTING**

- a) The 10% of the Sub-Contracted Sum, shall be set aside for Preliminary and General Items of the Subcontractors and which will be limited to Supervision, Tools and equipment, OHS obligation, Comply to COVID 19 requirements and Environmental Management Plan obligations.
- b) For all other facilities such as Site Camp, storage of tools etc. the Subcontractors will use the Contractor's facilities.
- c) The Contractor will identify items in the Contractor's BOQ to be subcontracted and a separate BOQ for subcontracting will be prepared during work allocation and submitted before commencement as part of contractual requirements.
- d) Allowance for time related Preliminary and General is for the purpose of SMMEs to cover for items indicated on (a) above and other preparation work required by the SMMEs to successfully complete their allocated work in the allocated time frames. On every Work Package the Project Manager will determine 10% amount of the 30% overall subcontract value which will then be paid to SMMEs as 10% of every subcontract scope completed.

Client:		Contractor:	
Witness:		Witness:	

- e) The remaining 90% of the Amount mentioned in (a) above, shall be for actual work.
- f) It is the main Contractor's responsibility to make sure their offered rates are market related so as to cover for subcontract rates. Should the main Contractor's rates become less than market related and results in deficit, the main contractor must cover the difference.

11. PS 3.2.11 PAYMENT TO THE MAIN CONTRACTOR FOR MANAGEMENT OF SMMEs

Tenderers shall price a % **Rate** for the Management of SMMEs. This rate shall cover all the management costs for the main Contractor to manage local Subcontractors / SMMEs. A schedule of quantities will be prepared for each subcontract Work package to be issued and the management fee to main Contractor will be paid based on the completed subcontracted work by SMMEs as and when it is invoiced to Client.

12. PS 3.2.12 TRAINING AND SKILLS DEVELOPMENT

The Client is committed to the development of unskilled, semi-skilled and skilled labour, the Contractor shall provide formal approved training and skills development programme aimed primarily to improve the literacy and skills of site-based staff, to increase the probability of employment post the project employment.

PS4 CONSTRUCTION

13. PS 4.1 GENERAL CONDITIONS AND APPLICABLE STANDARDS

- **PS 4.1.1 GENERAL CONDITIONS**

The "Special Condition of Contract" to be read in conjunction with the "NEC 4, Engineering and Construction Contract (ECC4) (2017)."

- **PS 4.1.2 Applicable Standardized Specifications**

The Standard Specifications for all associated civil work applicable to this Contract shall be:

SANS	Description
28	: Metal ties for cavity walls (1986)
62	: Steel pipes Part 1: Pipes suitable for threading and of nominal size not exceeding 150 mm (2013)
227	: Burnt clay masonry units (2007)
282	: Bending dimensions and scheduling of steel reinforcement for concrete (2004)
523	: Limes for use in building (2007)
558	: Cast iron surface boxes and manhole and inspection covers and frames (2016)
719	: Electric welded low carbon steel pipes for aqueous fluids (large bore) (2011)
920	: Steel bars for concrete reinforcement (2005)
1024	: Welded steel fabric for reinforcement of concrete (2006)
1083	: Aggregates from natural sources - Aggregates for concrete (2006)
1090	: Aggregates from natural sources - Fine aggregates for plaster and mortar (2002)
1123	: Pipe flanges (2017)
1200 A	: General (1986)
1200 AB	: Engineer's office (1986)
1200 C	: Site clearance (1980)
1200 D	: Earthworks (1988)
1200 DB	: Earthworks (pipe trenches) (1989)

Client:		Contractor:	
Witness:		Witness:	

- 1200 DK : Gabions and pitching (1996)
- 1200 H : Structural steelwork (1990)
- 1200 L : Medium-pressure pipelines (1983)
- 1200 LB : Bedding (pipes) (1983)
- 1200 LC : Cable ducts (1981)
- 1200 LE : Stormwater drainage (1981)
- 1200 LF : Erf connection (water) (1983)
- 1200 LG : Pipe jacking (1983)
- 1283 : Modified poly(vinyl chloride) (PVC-M) pressure pipe and couplings for cold water services in underground mining (2013)
- 1476 : Fabricated flanged steel pipework (2013)
- 1491-1 : Portland cement extenders Part 1: Ground granulated blast-furnace slag (2005)
- 1491-2 : Portland cement extenders Part 2: Fly ash (2005)
- 1491-3 : Portland cement extenders Part 3: Silica fume (2005)
- 1882 : Polymer concrete surface boxes, manhole and inspection covers, gully gratings and frames (2003)
- 2001 CC1: Part CC1: Concrete works (structural)
- 50197-1 : Cement Part 1: Composition, specifications and conformity criteria for common cements
- 5831 : Presence of chlorides in aggregates
- 5861-2 : Concrete tests - Sampling of freshly mixed concrete (2006)
- 5862-1 : Concrete tests - Consistence of freshly mixed concrete - Slump test (2006)
- 5863 : Concrete tests - Compressive strength of hardened concrete (2006)
- 5864 : Concrete tests - Compressive strength of hardened concrete (2006)
- 5865 : Concrete tests - The drilling, preparation, and testing for compressive strength of cores taken from hardened concrete (1994)

Reference is made to certain provisions of:

SANS 1921-5 Construction and management requirements for works contracts: Earthworks activities which are to be performed by hand

SANS 1914-5 Targeted construction procurement: Participation of targeted labour

All the above specifications are not issued with this volume but are available at the Contractor's expense from: Standards South Africa,

These Specifications are not issued with this volume but are available at the Contractor's expense from Standards South Africa:

Client:		Contractor:	
Witness:		Witness:	

Physical Address	Postal Address	Telephone No.	Fax No.	Email Address
1 Dr Lategan Road, Groenkloof Tshwane	Private Bag X191 Tshwane 0001	012 428-7911	012 344 1568	sales@sabs.co.za

For "Workmen's Compensation Act" read "Compensation for Occupational Injuries and Diseases Act, 1993 (Act No.130 of 1993)" wherever it appears. For "Machinery and Occupational Safety Act" and "Mines and Works Act" read "Occupational Health and Safety Act, 1993 (Act 85 of 1993)" wherever they appear. For "maintenance period" read "Defect Correction Period in terms of Clause 44.2 of the NEC 4 Engineering and Construction Contract (ECC4) (2017)" wherever it appears.

• PS 4.1.3 OTHER STANDARDS

Other Standard Specifications applicable to this Contract shall be:

- ASTM C.309 Type 1 (Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete)
- City of Johannesburg Metropolitan Municipality, Public Road and Miscellaneous By-laws, Code of Practice for work in the road reserve (COP), Latest Version. NOTA BENE: Should any requirement of this COP conflict with any requirement of the standardised or particular specifications the requirements of the COP shall prevail. The COP is available at Johannesburg Roads Agency Offices, Wayleaves Department, Contact number: (011) 298 5000
- CIDB
- Occupational Health and Safety Act (1993)
- Construction Regulations (2014)

• PS 4.1.4 DISCREPANCIES BETWEEN DIFFERENT SECTIONS OF THE DOCUMENTATION

For the purpose of resolving ambiguities or inconsistencies after award of the tender, the authority of documents shall be:

- The NEC 4 Construction and Engineering contract (ECC4) (2017);
- Contract Specific Data;
- Variations to the General Conditions of Contract;
- Additional Conditions of Contract;
- The Contract Drawings.
- The Schedule of Quantities and Rates (a.k.a. the Bill of Quantities);
- Project Specifications;
- Particular Project Specifications;
- Standardized Specifications with variations, additions and omissions;

• PS 4.1.5 CERTIFICATE BY RECOGNISED BODIES

Wherever possible items and materials for construction of the Works shall comply with the relevant South African Bureau of Standards Specifications and with the British Standards where these are applicable in the absence of local standards.

The Contractor shall be responsible for the supply of all equipment, labour and materials for the Works.

Client:		Contractor:	
Witness:		Witness:	

14. PS 4.2 PARTICULAR GENERIC SPECIFICATIONS

• PS 4.2.1 MINIMUM HEALTH AND SAFETY REQUIREMENTS

This section of the specifications is to be read in conjunction with the Contract Health and Safety specifications, included as Volume 2. The following requirements shall be deemed minimum compliance requirements to ensure the health and safety of the public and workers during the execution of the Contract:

PS 4.2.1.1 ROAD SAFETY EQUIPMENT

The internal conduit survey unit shall be provided with:

- a) an amber-flashing beacon, which shall comply with and be operated in accordance with any governing road vehicle lighting regulations or similar.
- b) appropriate sized and quantity of road signs, including delineators and cones which shall be displayed at the works area in accordance with safety regulations or similar.
- c) bright coloured overalls, fluorescent over-jackets and belts for each team member for use at all working times during the day or night.

PS 4.2.1.2 Personal safety equipment

The internal conduit inspection unit shall be provided with:

- a) oxygen deficiency and gas detector apparatus, which shall be regularly serviced and operable.
- b) fresh air breathing apparatus, face mask and demand valve, with a sufficient minimum compressed air supply, determined by the duration of manhole and/or conduit entry.
- c) an approved full vertical lift safety harness.
- d) personal equipment per member:
 - i) safety helmet;
 - ii) safety boots
 - iii) sewer wading boots and
 - iv) disposable protective gloves.
- e) First Aid Kit suitable to cater for the number of team members.
- f) facilities for washing, including:
 - i) soft soap
 - ii) disinfectant and
 - iii) clean water
- g) radio equipment and cellular phone for onsite and emergency communication.
- h) fire extinguisher.

• PS 4.2.2 TRAFFIC CONTROL

A traffic control plan shall include detailed diagrams showing the location of all traffic control devices and the length of time for all lane closures, as well as location of any flaggers, as necessary.

- a) On Western Service Road, one lane with flagmen and temporary traffic signals must remain open to traffic at all times including at night. This is to be achieved by stop and go control and as directed by the Project Manager.
- b) On all other roads one lane of traffic in each direction must be maintained at all times and local streets may only be closed with prior approval of the Project Manager.
- c) A written method of handling traffic for each different phase and area of the project shall be submitted and include both vehicular and pedestrian traffic.
- d) The name and number of the Contractor representative responsible for traffic control shall be made available to solve traffic problems at each job site location.

Client:		Contractor:	
Witness:		Witness:	

• **PS 4.2.3 METRIC MEASUREMENT**

All survey recorded dimensions of infrastructure shall be in metric units, including for conduits, chambers and manholes.

• **PS 4.2.4 SITE PREPARATION**

Prior to any Works commencement the Contractor shall photograph or videograph the entire work area. One copy of which shall be given to the Project Manager and one copy shall remain with the Contractor for a period of 12 months following the issue of a Certificate of Completion. This record shall be used to establish accountability for damages during the execution of the Contract.

No alterations beyond what is required for Works are to be made. The Contractor shall confine all activities to designated work areas and to the absolute minimum required.

• **PS 4.2.5 PIPE HANDLING AND STORAGE**

Pipes shall be handled and stored in accordance with safe lifting practice. The lifting capacity of the equipment shall not be exceeded.

- a) Pipes shall be placed on timber bearers or sandbags not more than 1.5 m apart. Where pipes are stacked, timber bearers shall be placed between each layer of pipes.
- b) Plastic pipes shall be stored away from contact with chemicals or ground contaminated with chemicals.
- c) Plastic pipes shall not be stored in direct sunlight to avoid plasticization or vulcanization. Where plastic pipes are stacked, pipes shall be placed on timber spaces not more than 1.5 m apart to prevent deflection of the pipe.
- d) Care shall be taken to prevent scoring and scratching of plastic pipes.

• **PS 4.2.6 INSPECTION OF PIPES AND FITTINGS**

Pipes and fittings shall be checked for damage and flaws immediately before installation, where:

- a) Plastic pipes and fittings shall be checked for gouges, cracks, holes, flattening and indentations.
- b) Damaged or flawed pipes and fittings can only be used if approved by the Project Manager. Pipes and fittings considered unsuitable for use by the Project Manager shall be removed from the site at the Contractor's expense. The Project Manager may approve the repair of any damage where the pipe or joint may be repaired without affecting its performance.

• **PS 4.2.7 CUTTING OF PLASTIC PIPES**

Pipes shall at all times be cut square to the barrel of the pipe. For:

- a) rubber ring and solvent cement jointed pipe, the deviation from square shall not be more than 5 mm.
- b) butt or electro-fusion jointed PE pipes, the deviation from square shall not be in excess of 1 mm.
- c) Jagged edges shall be removed from pipe ends. Cut edges of rubber ring or solvent cemented plastic pipes shall be bevelled in accordance with the manufacturer's instructions.

• **PS 4.2.8 ACCEPTABILITY OF DAMAGED PIPE**

For plastic pipes, cuts or gouges that reduce the pipe wall thickness in excess of 10% is not acceptable and shall be cut out and discarded.

• **PS 4.2.9 PIPE JOINING OF HDPE PIPES**

PS 4.2.9.1 FUSION BUTT-WELDING

- a) Interpretation

This section shall cover the butt-welding of plastic pipes, which shall involve the heating of two pipe ends to fusion temperature and then subsequently joining the two ends by the application of force.

- b) Equipment

Client:		Contractor:	
Witness:		Witness:	

The basic parts of the equipment shall be:

- i) Planning Tool: used to face pipe ends.
- ii) Heating Plate: used to melt pipe ends
- iii) Frame: holds on to the pipes to be joined. It has hydraulic cylinders which apply pressure to the pipe joints.
- iv) Hydraulic unit: has the hydraulic pump, tank, pressure gauges, directional valves, pressure regulation valves.
- v) Data logger: records pertinent process data such as time, pressure and temperature. The data logger ensures that every joint is made properly.
- c) Site preparation

The technician shall ensure that the machine is situated in a dry area, before welding is commenced. The equipment shall not be exposed to rain.

No welding shall be executed during rain, unless an outdoor roofing structure is provided to protect the equipment and process from rain. The technician shall ensure that the equipment does not sit on wet ground.

- d) Pipe preparation

Pipe ends to be joined shall be dry and free from foreign particles.

- e) Pipe Welders

All pipe welders shall be SAPPMA or ISO approved.

PS 4.2.9.2 RESTRAINED JOINT COUPLINGS

- a) Pipe may be joined using non-metallic restrained type couplings. Pipe and couplings shall be designed as an integral system and shall be provided by a single manufacturer for maximum reliability and interchangeability. No external pipe-to-pipe restraining devices that clamp onto or otherwise damage the pipe surface as a result of point-loading shall be permitted.
- b) Couplings shall be designed as minimum for use at the rated pressures of the pipe with which they are utilized.

PS 4.2.9.3 ELECTROFUSION BELT JOINTING

The appearance of electrofusion belt shall meet the following requirements:

- a) The surface of the electrofusion belt shall be smooth and free from cavity, impurity or other defects that may have adverse effect on its function.
- b) The heating wire shall be well embedded into the polyethylene and shall be free from breakage and short circuit.
- c) Electrofusion belt side shall be cut properly
- d) The electrofusion belt shall be normally black, other colour is allowed when agreed upon by the Client and supplier.

The dimension and tolerance on dimension of the electrofusion belt shall comply with Table below

ID	Minimum Length L (mm)	Width W (mm)	Tolerance on width (mm)	Thickness (mm)	Tolerance on thickness (mm)	Width of heating wire mesh W1 (mm)	Tolerance on width of heating wire mesh (mm)
800	2712	300	+/-10	7	+/-2	100	+/-8
900	3026	300	+/-10	7	+/-2	100	+/-8
1000	3340	300	+/-10	7	+/-2	100	+/-8

- e) Pipe jointing procedure (Electrofusion belt)

Client:		Contractor:	
Witness:		Witness:	

1. Place two pipes butt to butt and align them to make the axes of the two pipes as close as possible.
 2. Put the electrofusion belt into the pipes at the jointing position and use electrofusion belt holder to push the electrofusion belt onto the inner wall of the pipes. The overlapping edge and the heating wire terminals shall be positioned at pipe top. The belt shall be equally shared by the two pipes in terms of length.
 3. Fill in the space at the overlapping part of the belt with profile modelling PE wedge.
 4. Use the electrofusion belt holder to push the electrofusion belt against the pipe wall and make spacing between electrofusion belt and the pipe as less as possible. All pressing shoes of the belt holder shall press and the belt uniformly and soundly.
 5. Connect the welding control box to the heating element terminal of the electrofusion belt and apply current according to pipe manufacture's technical manual. The specification for current value and the voltage applying time shall be strictly followed. During welding, the current is allowed to decrease continuously and steadily; abrupt decrease or increase of electrical current is not allowed. The surface temperature of the welding zone of the belt shall be uniform along circumference. Careful inspection shall be conducted on the joint when abnormal phenomenon take place, and then proper measures shall be taken accordingly.
 6. After welding, cool the joint down in the air for not less than 40 minutes. During cooling process the Electrofusion belt holder shall not be taken away and the joint shall not be subject to any external action. After cooling process is finished, disconnect the welding control box and move the specialty machine away.
- Hand or reciprocating saw may be used to cut the pipe off at site. The exposed steel shall be sealed off with handheld extruder or EVA welding lance after pipe cutting.

• **PS 4.2.10 LAUNCH AND RECEPTION PITS**

The required launch and receipt pits for pipe cracking shall be excavated and maintained to minimum dimensions. Said excavations shall be adequately barricaded, shored, braced and dewatered, as required, in accordance with the applicable portions of these specifications, including:

- a) Excavation adjacent to the road pavement shall be performed in a manner to adequately support these facilities.
- b) Pipe entry and receiving areas to provide a gradual entry of the pipe without stress to the pipe or joints and to allow free movement into the hole at an acceptable depth.
- c) Where possible, with regard to size and structural integrity, associated structures are to be utilised for pits for pipe cracking equipment. Alternatively, pits are to be located where possible at property connections OR branch connections OR identified localised repairs positions.
- d) Where approved by the Project Manager channelling and walls of existing associated structures may be altered by the Contractor to insert and receive pipes during operations. Where a continuous length of pipe is to be towed in, such as pipe lengths welded together or a coiled pipe, the launch pit shall be of a size to permit insertion of the continuous pipe length without bending to a smaller radius of curvature than permissible by the manufacturer.
- e) Where a continuous pipe length is to be used, the top of the pipe length to be inserted shall be protected from damage at the entry. The Project Manager shall approve the method of protection.
- f) Pits shall be reinstated and cleared of all plant, material and debris prior to moving to other sites.

15. PS 4.2.11 NO SURFACE DISTURBANCE

Pipes installed by means of bursting and pipe cracking, shall be in a manner that does not cause upheaval, settlement, cracking, movement or distortion of surface features.

Contractor to maintain close observation to detect any settlement or displacement of surface and/or adjacent facilities: In the event of settlement or displacement the Contractor is to notify the Project Manager immediately, whilst maintaining safe conditions and prevent any further damage from occurring.

16. PS 4.2.12 DAMAGE TO SERVICES OR STRUCTURES

The Contractor shall satisfy the Project Manager that pipe cracking operations shall not have a detrimental effect on adjacent services or structures.

Where the Project Manager determines that services adjacent to the existing pipe shall be damaged by pipe cracking, such services shall be exposed and protected.

Client:		Contractor:	
Witness:		Witness:	



Services or structures identified by the Project Manager, as being damaged by pipe cracking operations shall be repaired at the Contractor's expense.

17. PS 4.2.13 ENCOUNTERING OF WATER DURING OPERATIONS

The Contractor is to provide and maintain a water removal system that has sufficient capacity to remove all encountered water, during operation, in particular during pipe cracking. Such system(s) shall ensure that soil particle removal is kept at a minimum. Care of water is the Contractor's responsibility and shall not be paid for the Client.

18. PS 4.2.14 POST INSPECTION OF PIPE CRACKING TECHNOLOGY IMPLEMENTED AND ASSOCIATED WORKS

The Contractor shall inspect the pipes installed by pipe cracking methods within 7 days after fully completing works, including new installations, and property and lateral connections. Any and all damages to the Works, irrespective of the cause, where such survey is executed outside the aforementioned time span shall be repaired at the expense of the Contractor.

The survey shall capture the full extent of the rehabilitative Works, ensuring that:

- a) the full length of new installation works is captured;
- b) measurement of the installed pipe circumference is taken every 10 m and at intermittent locations where the installed pipe is deformed;
- c) all localized repair sites are captured;
- d) all associated structure connections are captured;
- e) all launch and receipt pit sites are captured; and
- f) any and all defective work is captured, i.e. pipe deformations, pipe tears, non-connected property and branch connections.

19. PS 4.2.15 TESTING OF PIPE CRACKING METHOD IMPLEMENTED AND ASSOCIATED WORKS

The Contractor shall be required to test the replacement pipe at various staged tests:

- a) First test: a tensile strength test shall be performed on minimum 10% of all site performed joints, where the pipe shall be exposed to pulling and shearing forces during installation. Similarly a compression resistant test shall be performed on minimum 1 or 10% (whichever is greater) of all site performed joints, where the pipe shall be exposed to pushing and shearing forces during installation.
- b) Second test: a pressure test, shall be performed before the pipe is tied in. The purpose of this test shall be to check the integrity of joints that have been made, and to verify that the replacement pipe has not been damaged during installation.

Additional acceptance testing following the applicable test procedures shall be performed by the Contractor, if required.

Any detects or poor workmanship shall be corrected at the Contractor's expense.

20. PS 4.2.16 ACCEPTANCE OF PIPE CRACKING METHOD IMPLEMENTED AND ASSOCIATED WORKS

The Client or Project Manager or their duly authorized representatives shall only accept pipe cracking technology implemented and associated works if the complete installed pipe length section has been pressure tested.

Additionally all test results as required for the applicable technology application shall be submitted to, and approved by, the Project Manager prior to the acceptance of the works.

21. PS 4.2.17 SITE RESTORATION

Following all Works completion, the Contractor shall disassemble all equipment and restore the site to original condition. Any noticeable surface defects, due to the executed Works, shall be repaired by the Contractor.

Client:		Contractor:	
Witness:		Witness:	

All excavations shall be backfilled and compacted to minimum density of 95% MOD ASSHTO, unless otherwise instructed by the Project Manager.

22. PS 4.2.18 WATER CHAMBERS STEP IRONS

Manhole step irons shall conform to the applicable standard SANS requirements, but shall be:

- spaced at 300 mm centres
- distanced not exceed 600 mm between the top of casting and the first step; and
- plastic or similar approved.

23. PS 4.2.19 CHAMBER BEDDING

- Precast chamber

Precast chambers bases shall be bedded on granular material or acceptable undisturbed foundation material.

- Cast-in-place chambers

Concrete bases shall be poured on granular material or acceptable undisturbed foundation material.

24. PS 4.2.20 PIPE REPLACEMENT

• PS 4.2.20.1 Valve chamber water tightness

Water chambers shall be watertight structures, including any repair or rehabilitation portions. On completion of all chamber repairs and/or rehabilitations and proper elapsed curing time for the waterproofing materials, the manholes shall be visually inspected. The inspection shall be performed at the discretion of the Project Manager or Supervisor during the warranty period following a rainfall sufficient to increase the flow in super-imposed stormwater drainage and raise the ground water table above the problem areas. All leakage problems determined by this inspection shall be corrected by the Contractor within an agreed time, to the satisfaction of the Project Manager or Supervisor, at no additional cost.

• PS 4.2.20.2 Testing

All sampling and testing of material shall be in accordance with manufacturers specifications.

• PS 4.2.20.3 Jointing of pipes and fittings

Jointing of the replacement pipe, existing and new fittings shall be:

- in accordance to manufacturer's recommendations to provide a leak proof joint;
- sufficiently strong to undergo the loading of the installation process; and
- subject to acceptance by the Project Manager prior to insertion.

• PS 4.2.20.4 Property or branch connection excavation

- Property or branch connections shall be exposed and disconnected from the existing pipe prior to commencement of bursting. Property or branch connections to be redirected to temporary water line.
- All excavations for property or branch reconnections shall be the minimum necessary to execute the operations. Care shall be taken to prevent material entering the live existing system when performing the disconnection and/or connection.

• PS 4.2.20.5 Reconnection of property and branch connections

Property connections shall not to be out of service for more than 8 hours, unless otherwise agreed in writing with the property owner or occupier. If this is not possible, temporary connections are to be made at convenient locations as approved by the Project Manager.

All connections shall be by means of approved fittings, in accordance with the manufacturer's instructions, for:

- PVC pipes and fittings, using either, solvent-cement joints, push-on joints, threaded joints, clamps, or flanged joints.

Client:		Contractor:	
Witness:		Witness:	

- b) HDPE pipe and fittings, using fusion jointing techniques, clamps or flange joints (either installing flange ended fittings, HDPE flange adapters and mechanical couplings)

All polyethylene electro-fusion fittings shall be made in accordance with an appropriate and approved specification. If applicable, the grade of polyethylene of the fitting shall be the same as the replacement pipe

NOTA BENE: *The replacement pipe shall be left for the manufacturer's recommended time, but normally not less than 4 hours, prior to service reconnections. This period shall allow for pipe shrinkage due to cooling and pipe relaxation due to the tensile stresses induced in the pipe during installation.*

• **PS 4.2.20.6 Annular gap sealing for burst pipes**

All annular gaps between the replacement pipe and the bore or existing pipe, in excess of 10 mm, shall be grouted. This compound shall be as approved by the Project Manager, but not have such rapid setting characteristics.

25. PS 4.2.21 LOCALIZED PIPE REPLACEMENT OR REPAIR

• **PS 4.2.21.1 Coupling clay and PVC or PE pipes**

The Contractor shall ensure couplings between clay and PVC or PE pipes are durable and watertight SABS approved. All metal components of couplings shall be Denso (or similar approved) wrapped to prevent corrosion.

PS 4.2.22 CONCRETE, FORMWORK AND REINFORCEMENT

NOTA BENE: All in situ concrete work (mass and reinforced) shall comply with SANS 2001 CC1 supplemented by the clauses in this section. Where: SANS 2001 CC1 and the clauses in this section are in conflict, the clauses in this section shall take precedence.

PS 4.2.22.1 Cement

Cement shall be Portland cement (or similar approved) complying with the requirements of SANS 50197-1/EN 197-1 or SANS 5831.

Samples of cement from anyone, or from every consignment, may be required by the Project Manager or Supervisor for test purposes. Cement in any consignment from which a sample may have been taken for testing shall not be used until it has been approved. Allowance shall be made for possible delay in that tests may take 10 days to carry out.

Bags of cement shall be stacked in a waterproof, solidly constructed shed with a central door and a floor rendered damp-proof with a tarpaulin. The bags of cement shall be closely stacked (but not against walls) in order to reduce air circulation in such a manner that the cement is used in the order in which it was received, i.e. first in first out.

Unless otherwise specified in these documents the use of ordinary Portland cement blended with ground granulated blast furnace slag complying with SANS 1491, or ordinary Portland Cement blended with Pulverised Fly Ash complying with SANS 50197-1/EN 197-1 will be allowed in certain instances as an alternative, after acceptance of tender offer, but only with the approval of and at the sole discretion of Project Manager. If not so specified in the documents the Contractor must demonstrate a saving in favour of the Client together with this alternative.

PS 4.2.22.2 Sand (Fine aggregate)

The fine aggregate shall comply with the requirements of SANS 1083. Other aggregates may be approved if they have a satisfactory history and/or test results.

No aggregate may be used until it has been approved. Samples having a mass of 25kg (16,5l) of the aggregate proposed to be used may be required by the Project Manager or Supervisor for test purposes. Samples having a mass of 25kg shall be forwarded every 3 months during concreting work and also if the source of supply is changed. Allowance must be made for possible delay in that the tests may take 14 days to carry out.

PS 4.2.22.3 Stone (Coarse aggregate)

The coarse aggregate shall comply with the requirements of SANS 1083. No aggregate may be used until it has been approved. Samples having a mass of 25kg (16,5l) of the aggregate it is proposed to use may be

Client:		Contractor:	
Witness:		Witness:	

required by the Project Manager or Supervisor for test purposes. Samples shall be forwarded every 3 months during concreting work and also if the source of supply is changed. Allowance must be made for possible delay in that the tests may take 14 days to carry out.

NOTA BENE: Certain fine grained sand and stone originating from the Beaufort Series and Karoo Systems which are known by reputation, local experience or tests, to exhibit excessive shrinkage when used in concrete, may be deemed unacceptable by the Project Manager or Supervisor.

- a) A certificate of proof is required from the Contractor that the aggregates are not alkali-reactive (per SANS 6245:2006). The cost of testing and certification are to be borne by the Contractor.

PS 4.2.22.4 Concrete

Concrete shall be of the classes given in the following table. The proportions of the ingredients and the nominal size of the coarse aggregate for each class shall be as laid down therein:

Class	Cement	Aggregate			Strength at 28 days (MPa)
	Part	Fine	Coarse	Size	
		Part	Part		
10/50	1	4	8	50	10
15/38	1	3	6	38	15
15/19	1	3	6	19	15
25/38	1	2	4	38	25
25/19	1	2	4	19	25
30/19	1	1 1/2	3	19	30
40/19	1	1	2	19	40

Concrete classes were renamed to match CC1 3.4.3

The strength given in the above table shall be the minimum required at 28 days. Unless otherwise specified Class 15/38 concrete shall be used for mass concrete and Class 30/19 concrete for reinforced concrete.-

Maximum concrete slumps acceptable for different types of construction concrete are as follows (unless otherwise specified)

- c) Vibrated reinforced concrete = 50 mm
- d) Un-vibrated reinforced concrete = 75 mm
- e) Mass concrete = 75 mm

When so required by the Project Manager or Supervisor, and whilst concreting is in progress, the consistency of the mixture shall be ascertained by means of the slump test as later described herein.

PS 4.2.22.5 Volume batching

Volume batching will not be permitted for strength concrete unless approved by the Structural Engineer on the Project Manager's team.

The coarse and fine aggregate shall be measured by volume and, unless otherwise directed, cement shall be measured by mass: the volume of a 50 kg bag of cement shall be taken as 33l. Suitable measuring boxes for the coarse and fine aggregates shall be provided to the approval of the Project Manager or Supervisor.

The proportions given above are approximate only, and should the Project Manager or Supervisor consider that the voids in the coarse aggregate require more or less matrix than is formed by the proportions specified, he may vary the quantities of coarse and fine aggregates to obtain the required density and workability of the concrete, provided that the proportion of cement to the total volume of the aggregate shall not be less than that specified.

When the sand is not completely dry, allowance must be made for bulking due to the moisture content. The amount of bulking shall be determined by the Contractor in the presence of the Project Manager or Supervisor.

The amount of water shall never exceed 34 litres to every bag of cement used, including the water contained in the sand.

Client:		Contractor:	
Witness:		Witness:	

Effective screens shall be provided to protect the mixing of concrete during windy weather.

PS 4.2.22.6 Weigh batching

The proportioning of the coarse and fine aggregates by mass shall be permitted, providing the method used is approved by the Project Manager or his Supervisor.

- a) All requests received by the Project Manager or Supervisor to make use of weigh batching shall be submitted to the Structural Engineer on the Project Manager's team for approval.
- b) If the weigh batching process is preferred to volume batching, the proposed mix proportions are to be equivalent to the relevant volumetric mixes as documented previously herein and be based on a minimum cement content.
- c) The following procedures must be complied with:
- d) The Contractor must timeously obtain written approval for the use of weigh batching and submit all information as set out below, with his application.
- e) The mix transformation from volume to weigh batching shall be carried out at an approved laboratory.
- f) Weigh batching equipment must be calibrated and a certificate of accuracy must be submitted before such equipment may be used. On contracts of long duration and/or requiring large quantities of concrete, new calibration certificates may be required every four months.

i) The cement to aggregate ratio by volume for the following mixes will apply

- Class 15/19 - c/a = 1:9
- Class 25/19 - c/a = 1:6
- Class 30/19 - c/a = 1:4.5
- Class 40/19 - c/a = 1:3

ii) The following cement/water ratios by mass must also be complied with:

- Class 15/19 - c/w = 1.30 to 1.35
- Class 25/19 - c/w = 1.65 to 1.80
- Class 30/19 - c/w = 1.90 to 2.05
- Class 40/19 - c/w = 2.30 to 2.50

PS 4.2.22.7 Ready mixed concrete

Any application to use ready mixed concrete shall be submitted by the Contractor at an early stage for approval by the Structural Engineer on the Project Manager's team. Only suppliers on the Client's approved list will be considered.

New applications must be submitted to the Client, well in advance.

PS 4.2.22.8 Strength concrete

The Contractor shall be responsible for the design of strength concrete and for the measurement of the constituent materials to produce concrete that complies with the specified requirements.

a) Trial mixes

The Contractor shall ensure that samples of the constituent materials of the concrete, together with evidence that they comply with the provisions, are supplied for approval in good time and provide the Project Manager or his Supervisor with:

- i) a statement from an approved independent laboratory of the results of tests; or
- ii) an authoritative and acceptable report, or record of the previous use of and experience with, the material concerned.

Client:		Contractor:	
Witness:		Witness:	

The cement, types of aggregate and their origins shall not be changed throughout the duration of the Contract without giving prior notification to the Project Manager who shall verify that the above requirements are complied with and that the important qualities of the concrete shall not be impaired.

b) Consistency

Unless otherwise indicated by the general workability of the concrete, method of transportation, conditions of placement or otherwise specified by the Project Manager, the suggested slump values, for different mixes of concrete shall be as specified in this document.

c) Workability

Ensure that the concrete is of such workability that it can be readily compacted into the corners of the formwork and around reinforcement without segregation of the materials and without excessive "bleeding" of free water at the surface.

PS 4.2.22.9 Expansion alkali-aggregate reaction

The use of some local aggregates may lead to an expansive alkali-aggregate reaction if the concrete in the structure will be exposed to continual dampness or will be subject to alternate wetting and drying.

Alkali reactive aggregates, i.e. certain granites, quartzites and Malmesbury hornfels (shale), shall not be used in conjunction with high alkali cement for concrete in any part of the works. Where a high alkali cement shall be one in which the equivalent alkali content exceeds 0,60% by mass of the cement.

If the Contractor chooses to use one of the aggregates stated above in lieu of stone as described in this document, he shall:

- a) ensure that no high alkali cement is delivered to the site. Any such high alkali cement shall be rejected and the cost of its removal and replacement with cement having an acceptable alkali content shall be borne by him.
- b) provide certificates stating the alkali content of each delivery of cement to the site, based on tests carried out at a laboratory approved by the Project Manager. The cost of testing, including sampling, transporting of samples and issuing of certificates, shall be borne by him.
- c) be entitled to use an approved brand of cement as a means of ensuring that the permissible alkali content is not exceeded. Where he shall make allowance for the higher price of such approved brand if he chooses to use this method.

PS 4.2.22.10 Pumping of concrete

The placing of concrete by pumping in any section of the works shall be subject to the written approval of the Project Manager or Supervisor. The Contractor shall furnish full details regarding the mix proportions of the concrete that he intends to place by pumping.

PS 4.2.22.11 Admixtures to concrete

The use of admixtures in concrete shall only be considered should special circumstances warrant this and only with the prior written approval of the Project Manager. The Contractor shall provide the following information:

- a) the trade name of the mixture, its source and the manufacturer's recommended method of use;
- b) typical dosage rates and possible detrimental effects of both under and over dosage; and
- c) the expected average air content of freshly mixed concrete containing an admixture which causes air to be entrained when used at the manufacturer's recommended rate of dosage.

PS 4.2.22.12 Slump test

The apparatus and the method of determination of the slump of freshly mixed concrete shall comply with SANS 5862-1.

a) Apparatus

- i) A mould in the form of a frustum of a cone and having the following nominal internal dimensions:
 - Bottom diameter : 200 mm
 - Top diameter : 100 mm

Client:		Contractor:	
Witness:		Witness:	

- Height : 300 mm

The mould shall:

- be of a metal (other than brass or aluminium) of side thickness at least 1.6 mm and shall have a smooth internal surface.
 - have suitable base plate and handles to facilitate lifting it from the test specimen in a vertical direction.
- ii) The tamping bar shall have a nominal diameter of 16 mm, a length of 600 mm and with sharp corner rounded off at one end.

b) Procedure:

The test shall be carried out in an area that is free from vibration and shocks. Ensure that the internal surfaces of the mould are free from set concrete and are clean and dry.

Place the mould with the bottom on a smooth, horizontal, rigid, non-absorbent surface and hold the mould firmly in place while it is being filled as follows:

- i) in four layers, each thickness approximately one-quarter of the height of the mould. Tamp each layer with 25 strokes uniformly spaced over the cross-section of the mould. Tamp the bottom layer throughout its depth and ensure that when tamping the second and subsequent layers the strokes penetrate into the underlying layer.
- ii) after the top layer has been tamped, strike off the concrete level so that the mould is exactly filled. Clean off any concrete that may have leaked out between the mould and the supporting base-plate surface. Remove the mould from the concrete immediately by slowly and carefully raising it in a vertical direction. This will allow the concrete to subside.

Immediately measure the slump, to the nearest 5 mm, by determining the difference between the height of the mould and the height of the specimen.

Regard the test as invalid, if a slump specimen collapses or shears off laterally, discard the result and repeat the test.

PS 4.2.22.13 Concrete cubes

The apparatus for making and testing of concrete cubes shall comply with SANS 5863.

a) Apparatus

Cubic metal moulds shall:

- be steel;
- be machined and adequately strengthened to resist distortion.
- have an internal distance between faces of 150 mm;
- be constructed to facilitate the easy removal without damage of the moulded specimen; and
- have a metal base plate which shall be attached to the mould by springs or screws.

When assembling the mould for use, the joints between the sections of the mould, the contact surfaces between the bottom of the mould and the base plate, and the internal faces of the assembled mould shall be thinly coated with a grease or oil that will prevent leakage of water through the joints and adhesion of the concrete to the mould.

The tamper must be a steel bar of length 400mm and mass 1.8kg and having a 25mm square ramming face.

b) Sampling and making cubes

Sampling shall comply with SANS 5861-2.

One set of 3 cubes shall be required for every 40m³, or part thereof, of concrete cast. The sample taken from a batch of concrete and sufficient to make 3cubes shall be placed in a tray or on a platform and mixed thoroughly.

Client:		Contractor:	
Witness:		Witness:	

The moulds shall each be filled in 3 layers of approximately 50mm thick concrete. Each layer shall be compacted with the tamping rod, with at least 35 blows to give full compaction of the concrete.

After the top layer has been compacted, strike off the surface of the concrete with a trowel, level with the top of the mould.

Any small hollows shall be filled in with additional concrete. Cement/sand slurry shall not be worked into the surface.

At this stage, the identity of each sample shall be placed on the moulded cube, by means of a label of absorbent material and not by scouring of the surface of the concrete.

c) Curing cubes on site

Cover the test cubes in their moulds with an impervious sheet or wet sacking and store indoors in a place that is free from vibration, excessive draughts, cold and direct sunlight.

After 24 hours the cubes shall be demoulded, remarked with a waterproof crayon or marker and placed in a curing tank for 7 days before being transported to the laboratory.

The Contractor shall supply the curing tank which shall incorporate a thermostat to control the water temperature at 22 to 25°C and shall be kept within a building.

d) Testing of cubes

The testing of all concrete cubes shall be done in accordance with SANS 5863 by a laboratory approved by the Project Manager.

A suitable testing machine of sufficient capacity having an accuracy and repeatability that comply with the requirements for Grade A machines of BS 1610 "Method for the load verification of testing machines" shall be used to test the compressive strength of each cube.

The Contractor is responsible for the provision of the cube moulds and for timeous delivery of the cubes to the laboratory.

PS 4.2.22.14 Concrete quality

Should the Contractor dispute any results obtained from concrete test cubes, the concrete represented by the cubes shall be considered acceptable if the Contractor, at his own cost, proves to the satisfaction of the Project Manager that the estimated actual strength of cores taken from the structure (by an approved independent testing laboratory and determined in accordance with SANS 5865 is not less than the specified strength. If the concrete fails to meet the strength criteria stipulated, the Project Manager may at his sole discretion and in addition to the options listed in SANS 1200G:

- a) accept the concrete subject to approved remedial measures being undertaken by the Contractor at his own cost; or
- b) permit the concrete to remain, subject to reduced payment for lower strength concrete.

PS 4.2.22.15 Concreting

It is essential that the Contractor representative who has charge of the construction of all concrete work, whether reinforced or not, shall be skilled in this class of work, and shall personally supervise the whole construction, paying special regard to:

- a) the quality, testing and mixing of the materials;
- b) the laying of the material in place and the thorough compaction of the concrete to ensure solidity and freedom from voids;
- c) the construction and removal of formwork; and
- d) the sizes and positions of the reinforcement.

Particular care shall be taken to work concrete against formwork and around reinforcement. Internal vibrators may be used with the approval of the Project Manager or Supervisor but external vibrators which act only on the formwork WILL NOT be permitted.

Client:		Contractor:	
Witness:		Witness:	

Concrete to be reinforced shall be deposited in such quantities as will permit of it being properly compacted around the reinforcement.

The placing of concrete shall be completed within ½ hour after mixing or within ½ hour after agitating and within 2,5 hours after mixing in the case of ready mixed concrete. Under no circumstances shall concrete be incorporated into the work after it has attained its initial set.

Care shall be taken to prevent, as far as possible, the formation of laitance or scum. Laitance is to be understood to mean the scum of strengthless and inert material which forms on the surface of concrete.

Concrete shall not be dropped into position from a height greater than 2.5m unless prior approval is obtained from the Project Manager.

If an inclined chute is used for transporting concrete, it shall be of such slope as will ensure a continuous flow of concrete without the use of an excessive quantity of water and without segregation of the aggregates. The chute must be flushed out and properly cleaned before and after each working period. All waste from flushing shall be discharged outside the formwork.

In beams, each portion of a successive layer shall be placed as soon as the concrete below has been properly worked around reinforcement and against formwork. Concreting shall be carried forward in irregular steps, that is to say, one layer shall not be completed over the whole section before the succeeding layer is commenced. Concreting of slabs and beams shall, as far as possible, be carried forward in one operation. When concreting has to be interrupted the concrete shall be left with a level, rough top surface with ends vertical. The concrete shall not be merely sloped down.

On resuming concreting, the old surface shall be roughened and all laitance thoroughly and carefully removed before any new concrete is deposited. This must be carried out by brushing the surface of the concrete while it is still green. Great care must be taken to avoid any weakness at the junction of old and new concrete and the old surface shall be coated with a thin layer of cement and sand mortar, in the same proportions as that of the adjoining concrete.

While the concrete is setting it shall not be disturbed or shaken by traffic, either on the concrete itself or upon adjoining formwork.

No holes in concrete elements shall be patched or filled in without inspection, instruction and approval of the Project Manager or Supervisor.

No concreting shall be carried out when the air temperature is below 4°C when it is rising and 8°C when it is falling.

Before concreting is commenced the Contractor shall give the Project Manager or Supervisor 24 hours notice of his intention to do so. On sites further than 200 km from the Project Manager or Supervisor, 48 hours notice must be given.

Concrete surface beds, excluding heavy industrial floors etc. shall be Class C concrete and shall be laid in suitable size panels not exceeding 20 m² in area and with the length of any panel not exceeding 4.5 m.

Where concrete beams are supported on concrete columns, the columns are to be concreted up to the underside of such concrete beams and then concreted up to the top of the beams, integral with the beams.

NOTA BENE: Any finish applied to the surface of concrete floors, is to be understood as being additional to the thickness of the concrete described or shown on the drawings.

PS 4.2.22.16 Curing of concrete

After the concrete has been placed, all exposed surfaces shall be kept continuously damp-by methods as may be approved by the Project Manager or Supervisor, such as covering with approved building paper, or by means of wet canvas, wet sacks, wet sand, by continuous hosing or ponding with water. Minimum curing periods shall be as per SANS 2001-CC1 Table 8.

PS 4.2.22.17 Concrete lintels (cast in-situ)

Concrete lintels cast in-situ shall be of Class E concrete, reinforced with steel reinforcement as well as of depths specified in the table hereunder. Each lintel shall be the full thickness of walls into which they are cast and 450 mm longer than width of openings.

Client:		Contractor:	
Witness:		Witness:	

Clear or daylight span	Depth in brick courses	Reinforcement
< 1m	3	Nil
$\geq 1\text{m} \leq 1.5\text{m}$	3	One 12mm diameter mild steel rod, 40mm up from bottom, for each half brick width of soffit.
$> 1.5\text{m} \leq 2\text{m}$	4	One 16mm diameter mild steel rod, 40mm up from bottom, for each half brick width of soffit.
> 2m	To detail	To detail.

PS 4.2.22.18 Building on concrete footings and beams

No brickwork, stone walling or other structure shall be built on concrete footings until at least 3 days after placement of the concrete in the case of mass concrete footings and after 7 days in the case of reinforced concrete footings or as may otherwise be directed by the Project Manager or Supervisor.

No brickwork, stone walling or other structure shall be built on reinforced concrete beams or similar members until the formwork and all propping or supports have been removed.

PS 4.2.22.19 Slip joints between concrete and brickwork

Slip joints shall be provided between brickwork and concrete slabs and beams by levelling up and trowelling smooth the bearing surfaces of brickwork with 3:1 cement mortar and covering the bearings before the concrete is cast, with two layers of one side smooth tempered hardboard, with the smooth sides in contact.

The ends and sides of beams and edges of concrete slabs shall be separated from the brickwork with 13 mm thick bitumen impregnated softboard or expanded polyethylene strips placed vertically against the brickwork before the concrete is cast.

Similar slip joints shall be provided between brickwork and concrete lintels cast in situ, but without softboard or expanded polyethylene strips at ends.

PS 4.2.22.20 Movement joints

All movement joints are to be filled in with approved bitumen impregnated softboard or expanded polyethylene strip unless otherwise specified or detailed on drawings. Form similar movement joints where pathways adjoin structures externally.

PS 4.2.22.21 Cutting, punching or hacking concrete

No reinforced concrete shall be cut or hacked without the approval of the Project Manager or Supervisor.

PS 4.2.22.22 Forming key to concrete for plaster and other finishes

Where rough formwork has been used, surfaces of concrete to receive plaster and other finishes, shall, immediately after the formwork has been removed, be well wetted and wire brushed whilst the concrete is still green and then slushed over with 2:1 cement grout to form a key for the finish, all to the approval of the Project Manager or Supervisor. The slushing is to be allowed to set hard before the finish is applied.

Where smooth formwork is used, surfaces of the concrete to receive plaster and other finishes shall be hacked, on the distinct understanding that hacking of concrete shall be at no extra cost.

Surfaces of concrete receiving plaster or other finishes shall not be plastered or finished until the Project Manager or Supervisor has signified his opinion that the surfaces are suitable to receive plaster or other finishes.

PS 4.2.22.23 Sleeves pieces

Where it is necessary to leave plugs or holes in beams, slabs or any other reinforced concrete, all such plugs or holes must be situated in positions approved by the Project Manager or Supervisor before concreting. Where it is necessary to carry pipes, bolts, wires or any other fittings through reinforced concrete members, approved pipe sleeves must be provided and placed in position before concreting.

All necessary bolts, plugs, brackets, cramps, etc. shall be cast into the concrete as the work proceeds.

Client:		Contractor:	
Witness:		Witness:	

PS 4.2.22.24 Ties

Where brickwork abuts against concrete, the brickwork is to be tied to the concrete with galvanized hoop-iron ties 1.6 mm thick by 3 mm wide and approximately 600 mm long to every third course of brickwork with one end of each tie cast approximately 150 mm deep into the concrete. Where such fixing is impossible, i.e. where steel formwork is used, the ties are to be gun-nailed against concrete with steel nails not less than 38 mm long.

PS 4.2.22.25 Bagged finish to concrete

Concrete surfaces to receive bagged finish shall be prepared by removing sharp projections and making good defects with 3:1 cement mortar. Finish by rubbing over the whole area with wet rough sacking and cement grout to obtain an even surface.

PS 4.2.22.26 Power floated finish

Power floated finish to floors or slabs means that surfaces shall be floated mechanically to a smooth and even finish before the concrete has set. Small areas inaccessible to the machine are to be floated by hand. Under no circumstances is cement mortar to be added while floating the concrete.

PS 4.2.22.27 "No-fines" concrete

"No-fines" concrete, for grading flat concrete roofs and the like to falls, shall be in the proportion of 12 parts 19 iron cubical stone to 1 part cement mixed with 20l water per bag of cement and be laid to falls of not less than 15 mm per linear metre for mastic asphalt and not less than 20 mm per linear metre for sheet roof covering. For heavy load applications special mix designs may be required.

a) Fillets against upstands

Form triangular fillets, size 75 x 75mm, in corners with walls, kerbs, etc. neatly mitred at angles, stopped where necessary and finished smooth ready to receive waterproofing.

b) To raised floors, bases and other

"No-fines" concrete for raised floors, bases, etc. shall be in the proportions specified. Finish smooth with 3:1 sand/cement screed to receive waterproofing.

PS 4.2.22.28 Cellular concrete

Cellular concrete, for grading flat concrete roofs and the like to falls, shall be laid in situ in required layers; the bottom layer having a density of 400 kg/m³, dressed to falls by varying the thickness, and a 20 mm thick top layer having a density of 960 kg/m³.

PS 4.2.22.29 Formwork

Formwork shall include all shuttering, casing and centring of material required for the laying and forming of concrete floors, slabs, beams, lintels, walls, steps, columns, piers, pilasters and any other concrete work requiring moulds or forms and shall embrace all cleats, battens, fillets, wedges, struts, trestles, braces, props, shores and other requirements of material for keeping all in correct position. All materials used for formwork must be suitable and substantial and all joints must be tight enough to prevent leakage of liquid matrix.

All formwork must be designed by the Contractor and if requested to do so, he must submit fully detailed and dimensioned working drawings to the Project Manager or Supervisor for checking purposes. Acceptance of the proposals shall not relieve the Contractor of his responsibility for the safety and stability thereof nor for any loss or damage arising out of defective design, materials and/or workmanship.

The formwork must be so constructed that its partial removal can be carried out to the satisfaction of the Project Manager or Supervisor and in such stages as are required by the working conditions. As far as possible, wedges and clamps must be used in preference to nails. All formwork in its various sections for floors, beams, etc. must be so arranged that the whole may be raised or lowered either independently or together with other sections by means of wedges or other approved methods.

Immediately before concreting is begun, the formwork in contact with the concrete must be thoroughly cleaned, wetted and kept damp whilst the concrete is being placed.

Great care must be taken to keep the formwork wedged up to its correct height and this must be checked by taking levels immediately before concreting is commenced and immediately after it has been completed.

Client:		Contractor:	
Witness:		Witness:	

All beams shall have a camber of 6 mm to every 3 m of length.

The minimum periods that the formwork to the various parts of the structure is to remain in position after concreting shall be as stated in SANS 2001-CC1 Table 2.

When determining the stripping time for formwork the weather shall be considered to be "normal" when the temperature is above 18°C and "cold" when the temperature is between 5°C and 10 °C, these being the average daily temperatures of the atmosphere adjacent to the concrete. When the average daily temperature lies between the above values for "normal" and "cold" weather the minimum period for stripping of formwork shall be determined by the Project Manager or Supervisor.

Notwithstanding the above minimum periods, formwork may be struck immediately, once the concrete in the various parts of the concrete work has attained the crushing strengths required by the Project Manager or Supervisor. The crushing strengths must be determined by proper tests, which shall be carried out by the Contractor.

No formwork of any nature shall be struck, either after the elapse of the minimum periods stated in the above table or on the attainment of the required crushing strengths of the concrete, without the prior consent of the Project Manager or Supervisor. Such consent shall not absolve the Contractor of his responsibility for the safety of the works.

In structures having either in whole or in part, two or more reinforced concrete floors, props shall be provided under the soffits of any beam or slab of any floor which is being used to support the formwork and wet concrete of the floor above, all to the approval of the Project Manager or Supervisor. The props shall not be removed until the formwork supporting the concrete of the floor above has been struck.

Under no circumstances shall steel formwork be oiled where concrete is to receive plaster.

PS 4.2.22.30 Surface finishes of formed surfaces

Surface finishes are defined per SANS 2001-CC1 Table 3.

PS 4.2.22.31 Reinforcement rods

a) Mild steel

Mild steel shall comply with the requirements of SANS 920, Type A or B.

b) High tensile steel

High tensile steel shall comply with the requirements of SANS 920, Type C or D.

PS 4.2.22.32 Concrete reinforcement

a) Rod reinforcement

Bending and hooking of rods shall be done in accordance with SANS 282. Rods shall be bent cold in an effective bending machine, or properly designed rod-bender using a steady pressure and not by hammering.

Diameters, lengths and positions of rods as shown on the drawings must be strictly adhered to. Joints in rods in beams, stairs, etc. will be permitted only where shown on drawings.

Before being placed in position, the rods shall be thoroughly cleaned of all grease, dirt, bituminous material, scale and loose rust.

All distribution rods shall be straight and shall extend at least 150mm into beams or other support. Unless otherwise shown on the drawings, all joints in reinforcing rods shall be lapped 40 times the diameter of the rod. The laps shall be securely tied with 1.25mm diameter annealed mild steel binding wire.

Reinforcement for piles, column footings, columns and walls shall be tied at every intersection, or as directed or shown on drawings, with similar binding wire. Reinforcement in beams shall be tied at alternate intersections in a diamond pattern, unless circumstances demand every intersection.

Great care must be taken to retain the reinforcement in its correct position during the entire period of concreting. Blocks of fine concrete, size approximately 40 x 40mm, or plastic spacers, shall be provided on the formwork to soffits of beams to ensure that the rods are retained in position and that the correct concrete covering to the main reinforcing rods is provided. The blocks shall be of thickness required and shall be placed under the main reinforcing rods at approximately 600 mm centres.

Client:		Contractor:	
Witness:		Witness:	

Reinforcement in the top of slabs and the like shall be retained in position by means of cradles (stools), formed of steel reinforcing rod as follows:

- a) R10 for height range 100-300 mm and maximum width of 300 mm.
- b) R12 for height range 310-500 mm and maximum width of 45 mm.

Recommended spacing of supports for horizontal bars in slabs:

- not further than 600 mm apart (cradles ± 1000 mm c/c in both directions) for bar diameters up to 12 mm.
- not further than 1,000 mm apart (cradles ± 1500 mm c/c in both directions) for bar diameters of 16 mm and over.

Stools are to be placed on the bottom layer of reinforcement, securely retained in position and with correct concrete cover as specified. Cradles are to be securely wired to the slab reinforcement with binding wire. Beam rods in different layers shall be separated by means of steel spacer bars of suitable diameters and lengths.

Double mats in concrete walls shall be kept in their respective positions by means of suitable steel clips.

Recommended spacing of supports for vertical bars in walls:

- 1,000 mm centres in both directions for bars up to 12 mm diameter; and
- 1,500 mm centres in both directions for bars of 16 mm diameter and over.

Supports can be spaced more closely by the design Project Manager, depending upon the circumstances.

All stirrups shall be properly fastened to the rods to retain their relative positions during the entire period of concreting.

Welding of main rods will not be permitted unless approval has been given by the

Project Manager or Supervisor. Spot welding in lieu of wiring may be used to secure rods and stirrups in position.

The concrete covering the main reinforcement, unless otherwise specified, shall not be less than that stated in SANS 2001-CC1 Table 3.

In cases not included in the above table the cover shall be not less than 25 mm. Depending on the condition of exposure and fire resistance requirements, concrete cover can be varied by the Project Manager but in no case shall the concrete cover be less than the diameter of the rod to be covered.

The cover shall be measured from the face of the concrete to the outside of main reinforcement nearest the face of the concrete, and shall exclude plaster and similar finishing materials.

Three samples of each diameter of reinforcing rods, each approximately 600 mm long, must be taken from each consignment of rods of similar diameter, for testing. If any sample is found unsatisfactory, the whole consignment of rods from which the samples were taken shall be rejected.

Top reinforcement in cantilever slabs to be kept in position with a first row of stools or chairs

300 mm from the beam or support, and thereafter at a maximum of 40 bar diameters under each bar.

The cover blocks, spacers, bars and stools or chairs are to be placed and/or wired in position by the steel fixer.

Welded steel fabric reinforcement

All welded steel fabric reinforcement shall comply with the requirements of SANS 1024. The preferred dimensions are as follows:

Fabric Reference number	Nominal pitch of wires	Nominal diameter of wires		Nominal mass*	
	Longitudinal (mm)	Cross (mm)	Longitudinal (mm)	Cross (mm)	kg/m ²

Client:		Contractor:	
Witness:		Witness:	

617	200	200	10.0	10.0	6.17
500	200	200	9.0	9.0	5.00
395	200	200	8.0	8.0	3.95
311	200	200	7.1	7.1	3.11
245	200	200	6.3	6.3	2.45
193	200	200	5.6	5.6	1.93
100	200	200	4.0	4.0	1.00
772	100	200	10.0	7.1	7.72
655	100	200	9.0	7.1	6.55
517	100	200	8.0	6.3	5.17
433	100	200	7.1	6.3	4.33
341	100	200	6.3	5.6	3.41
289	100	200	5.6	5.6	2.89
278	100	300	6.3	4.0	2.78
226	100	300	5.6	4.0	2.26
133	100	300	4.0	4.0	1.33

*These mass values are based on the wires having mass of 0,00785 kg/mm² per metre of length.

The actual mass of the fabric should not differ from the nominal value by more than 6%.

PS 4.2.23 PRECAST CONCRETE

PS 4.2.23.1 Materials

Cement, water, aggregates and reinforcement shall be as described under the concrete section.

PS 4.2.23.2 Concrete, formwork and reinforcement

Concrete shall be as described under the applicable concrete section(s). Unless otherwise specified a 30 MPa/19mm strength concrete shall be used but with coarse aggregate of an appropriate size.

PS 4.2.23.3 Mould units

The whole of this work is to be carried out by a specialist, who has appropriately skilled workers in this class of work.

All materials and finishes are to be to the approval of the Project Manager or Supervisor.

The moulds are to be properly constructed in the best and most up to date practice, made up in suitable sections with all necessary reinforcement, cramps, bands, bolts, etc. for fastening together and are to be constructed so that castings can be easily removed and the moulds re-used without distorting.

Those sections of the moulds which will produce the finished faces of the units are to be specially prepared, perfectly smooth, except where the finish is of exposed aggregate, true to shape and coated with a suitable solution which will prevent units adhering to the moulds, while not in any way discolouring the finished surfaces.

All cast units are to be properly cured and no units are to be fixed or built in until 28 days after casting.

Units are to be properly protected from the elements while curing and are to be kept wet for at least 10 days after casting by frequent spraying with clean water.

Form all necessary checking's, mortices, lugs, etc. for cramps and dowels when casting.

PS 4.2.23.4 Terrazzo blocks

Precast terrazzo work shall be generally as prescribed for precast concrete above. The coarse aggregate of the mix of which blocks are to be formed shall be of 10 mm stone. The finish to exposed faces shall be 10 mm thick.

Client:		Contractor:	
Witness:		Witness:	

PS 4.2.23.5 Smooth finish

Where described as "finished smooth from the mould" such surfaces shall have a layer composed of 1 part (volume) cement and 4 parts (volume) clean fine sand, packed against the faces of the mould before placing the concrete backing. The concrete backing shall be deposited into the moulds in a wet state (not dry pressed) whilst the facing is still wet.

Projections shall be rubbed off and faces shall be of even colour and free from blemishes, cracks and other imperfections. Salient angles shall be arris rounded.

PS 4.2.23.6 Sizes

Sizes given are approximate; the Contractor shall be responsible for ascertaining the exact sizes based on actual measurements.

PS 4.2.23.7 Reinforcement

Unspecified reinforcement required for manufacturing, handling and erection purposes and for reinforcing projecting and other unwieldy portions of blocks shall be provided by the Contractor at his discretion, but such action shall be highlighted to the Project Manager.

PS 4.2.23.8 Bedding, joint and pointing

Blocks shall be bedded and jointed solidly in cement mortar composed of 3 parts (volume) of sand and 1 part (volume) of cement and shall be pointed with slightly keyed joints.

PS 4.2.24 MASONRY

(Including brickwork and stone masonry)

NOTA BENE: Where sizes in descriptions are given in brick units, "one brick" shall represent the length and "half brick" the width of a brick.

PS 4.2.24.1 Lime

Lime shall be hydrated bedding mortar lime in accordance with the requirements of SANS 523.

PS 4.2.24.2 Cement

Cement shall be as specified in the concrete section.

PS 4.2.24.3 Sand

Sand shall comply with the requirements of SANS 1090, unless specialist advice is obtained. A sample of 25 kg must be delivered to an approved laboratory for testing purposes.

PS 4.2.24.4 Burnt clay bricks

- Burnt clay bricks shall comply with the requirements of SANS 227 and shall be equal in all respects to the selected samples.
- Clay bricks for foundations shall be as described in (a) above, but extra hard burnt.
- Where bricks with holes are used, the holes in such bricks must only be filled in solid with mortar where specifically specified.
- All bricks that do not carry the SABS Mark, must be tested by an approved laboratory.

PS 4.2.24.5 Firebricks

Firebricks shall be of well burnt refractory fireclay, resistant to spalling and cracking and of same size as ordinary bricks.

PS 4.2.24.6 Local stone

Local stone shall be from an approved quarry, free from defects and to the satisfaction of the Project Manager or Supervisor.

Client:		Contractor:	
Witness:		Witness:	

PS 4.2.24.7 Freestone

All freestone shall be the best and most durable of its kind, free from vents, loose beds, oxide veins and other imperfections to the satisfaction of the Project Manager or Supervisor and shall be set on its natural quarry bed.

PS 4.2.24.8 Mortar tests

a) Sampling

The frequency of sampling will be decided by the Project Manager or Supervisor. Sufficient mortar shall be taken from each of the points of laying to prepare a composite sample to make a set of three mortar cubes.

b) Moulding

Cube moulds with a nominal size of 100 mm, that comply with SANS 5863 must be used.

Fill each mould with mortar in three equal layers and compact each layer by means of a tamper. The tamper must be made of hard wood with a flat tamping surface with nominal dimensions of 50 x 25 mm and shaped to provide a round stem of approximately 25 mm diameter and long enough to afford sufficient hand grip. Immerse the tamper in water for 15 minutes before use.

Each layer of mortar must be compacted by means of 8 evenly spaced pressing strokes of the tamper. After the final layer has been tamped, the excess mortar must be struck off level with the top edges of the moulds.

c) Curing

Cover the test cubes (in their moulds) with an impervious sheet followed by wet matting, sacks or similar material, and store them in a place free from vibration, excessive draughts and direct sunlight.

After 24 hours mark each cube so that it can be identified. After 48 hours the cubes shall be removed from their moulds and placed into water in a curing tank at 22 to 25 °C for a minimum period of 7 days before they are transferred to the approved testing laboratory. Ensure that loss of moisture is prevented during transportation and that they are well protected against damage.

d) Testing of cubes

The testing of all mortar cubes will be done by a laboratory approved by the Project Manager and in accordance with SANS 5863.

26. PS 4.2.25 PLASTERING

• PS 4.2.25.1 Lime

Lime shall be hydrated plaster lime complying with the requirements of SANS 523.

• PS 4.2.25.2 Cement

Cement shall be as specified.

• PS 4.2.25.3 Sand

Sand for plaster shall be as specified.

• PS 4.2.25.4 Form key to concrete for plaster finish

All surfaces of concrete receiving plaster or similar finishes shall be well wetted and wire brushed immediately after the formwork has been removed and slushed over with 2:1 cement grout to form key for the finish, all to the approval of the Project Manager or Supervisor. The slushing shall be allowed to set hard before any finish is applied

Where smooth formwork has been used, particular care shall be taken in forming the key for plaster as described in applicable concrete specifications.

• PS 4.2.25.5 Lime plaster

a) One coat work on walls

Client:		Contractor:	
Witness:		Witness:	

Lime plaster for 1 coat work on walls shall be composed of 4 parts (volume) of sand and 1 part (volume) of lime. The material shall be mixed dry until of uniform colour, water shall then be added and the mixture turned over until the ingredients are thoroughly mixed.

Lime plaster not used on the day it is mixed, shall be kept moist until required for use by covering with wet sacks or by other approved means.

b) Two coat work on walls

The rendering coat shall be of compo plaster well scratched over to form key for the setting coat. The setting coat shall be composed of 1 part hydrated putty plaster lime, complying with the requirements of SANS 523 and 1 part fine washed sand, to which retarded hemi-hydrate hardwall finishing gypsum plaster shall be added in the proportion of 1 part of gypsum plaster to 4 parts of sand, all proportioned by volume.

The gypsum plaster shall not be added to the mixture until the setting coat is to be applied and shall then be thoroughly incorporated into the mixture and used immediately.

c) Two coat work on metal lathing

The rendering coat shall be of compo plaster to which sisal shall be added in the proportion of 4 kg of sisal to 1 m³ of plaster. The rendering coat shall be well scratched over to form a key for the setting coat.

• **PS 4.2.25.6 Compo plaster**

Compo plaster shall be composed of 10 parts (volume) of sand, depending on the quality of the sand available, 1 part (volume) lime and 1 part (volume) cement.

The lime and sand shall be mixed dry until of uniform colour and then mixed wet. Approximately ½ hour before use, add the cement and any additional water as may be required and remix until thoroughly mixed.

Compo plaster shall be produced in such quantities as can be used whilst remaining workable as no compo plaster that has become unworkable shall be used in any way.

• **PS 4.2.25.7 Cement plaster, one coat work on brickwork:**

Cement plaster for 1 coat work on brickwork shall be composed of 4 parts of sand to 1 part of cement for internal work and 5 parts of sand to 1 part of cement for external work, all measured by volume, and mixed as described for cement mortar above.

• **PS 4.2.25.8 Thickness of plaster**

Plaster on walls shall be not less than 12 mm or more than 20 mm in thickness and plaster on concrete ceilings and beams shall not be less than 9 mm or more than 16 mm in thickness.

• **PS 4.2.25.9 Application of plaster**

Walls shall be well wetted before plastering is commenced.

The surfaces of plastered walls internally shall be steel trowelled to a smooth, even and true finish, unless otherwise specified.

All external plaster shall be finished to a true and even surface with a wood float, unless otherwise specified. All plaster surfaces shall be free from blemish.

Plaster shall be returned into reveals and soffits of openings and all angles shall be true and straight with salient angles slightly rounded.

The rendering coat of plaster in two coat work shall be approved by the Project Manager or Supervisor before the setting coat is applied and notice shall be given to him when the plaster is ready for inspection.

All cracks, blisters and other defects shall be cut out, made good and the whole left perfect at completion.

• **PS 4.2.25.10 Granolithic finish**

Granolithic finish to floors, treads of steps, thresholds and similar horizontal surfaces shall be not less than 25mm thick, composed of 2 parts (volume) granite, or other approved hard stone chippings, or approved

Client:		Contractor:	
Witness:		Witness:	

hard coarse sharp washed granitic or quartzitic river sand, graded up to a maximum size of 5mm, 1/6 part clean pit sand screened through a 2.4mm mesh sieve and 1 part (volume) of cement, and hand or mechanically steel trowelled to a true and smooth surface.

The material must test between 30 and 35 MPa. No dry cement powder or grout shall be applied to the surface.

The granolithic shall be laid before the concrete subfloor has matured otherwise the exposed surface of the concrete shall be thoroughly cleaned with a wire brush and a coat of neat cement grout applied immediately before the granolithic is laid.

The granolithic shall be laid in panels not exceeding 20 m² in area and joined to lines of panels with V-joints as directed. The length of any panel shall not exceed 4.5 m and wherever possible the joints between the panels shall coincide with any joints in the concrete sub-floor.

Where granolithic is to be tinted, it shall be laid in two thicknesses in one operation, the lower thickness being brought up to within 6 mm of the finished level and the upper thickness, into which the requisite quantity of approved colouring material has been mixed, shall be laid. NO DUSTING OF COLOURING MATERIAL SHALL BE ALLOWED.

Granolithic finish to stair risers, sides of kerbs and other vertical surfaces shall be not less than 12 mm thick.

Exposed salient angles of granolithic shall be neatly rounded to approximately 20 mm radius.

All granolithic work shall be carried out by experienced workmen and shall be protected from injury caused by rain or other extremes of weather for 12 hours after being laid, and against drying out too rapidly whilst hardening by covering with wet sacks or other suitable material and shall be protected from other injury and discoloration during the progress of the remaining work.

Edges of granolithic floors adjoining other floor finishes, edges of margins, etc. shall be true and sharp, all protected by fixing temporary wood strips which shall remain in position until laying of the adjoining flooring material is commenced.

• **PS 4.2.25.11 Reedings to steps and upper surfaces**

The treads of steps and upper surfaces of external thresholds finished with granolithic or sand-cement finish shall be rendered non-slip by reeding same near front edge for a width of 100 mm and stopped 100 mm from ends.

• **PS 4.2.25.12 Polishing of granolithic**

All tinted granolithic finishes to floors, steps, thresholds, skirting, etc. shall at completion of all other work be twice polished with wax floor polish of an approved type.

• **PS 4.2.25.13 Screeding to floors**

Concrete sub-floors finished with wood mosaic, semi-flexible tiles and fully flexible vinyl sheeting and tiles and similar finishes shall be screeded with 1:3 (cement: sand) cement plaster of thickness required, but in no case less than 12mm, all steel trowelled to true and smooth surfaces. The sand used in the plaster shall be of such fineness as will allow for the screed being trowelled to a surface suitable to receive the finishes.

The screeding shall be laid before the concrete sub-floors have matured, otherwise the exposed surfaces of the concrete shall be thoroughly cleaned with a wire brush and a coat of neat cement grout applied immediately before the screeding is laid.

The screeding shall be laid in good time, but no finishes are to be laid if the screed exceeds 70% moisture content when measured with a hygrometer.

No traffic shall pass over nor shall any building operations take place on the screeding unless a proper protective covering is first provided.

NOTA BENE: A similar process shall be applicable where manholes or chambers are screeded.

• **PS 4.2.25.14 Sand-cement finish**

Sand-cement finish to treads of steps, thresholds, etc. shall be of 1:2 (cement: sand) cement plaster not less than 20 mm thick and steel trowelled to true and smooth surfaces. Finishes to risers of steps, sides of kerbs

Client:		Contractor:	
Witness:		Witness:	

and other vertical surfaces shall be not less than 12 mm thick. Exposed salient angles shall be neatly rounded to approximately 20mm radius.

• **PS 4.2.25.15 Natural aggregate concrete floor hardener**

a) Definition

All natural aggregate hardeners for concrete floors shall consist of a factory prepared blend of clean, properly graded and oven dried natural aggregate, Portland cement and chemical aids, all suitable for monolithic application to the surface of newly placed concrete. Where required the hardener may contain certain compatible pigments for tinted floors.

b) Quality testing

i) Sampling:

A minimum of 1% of every 5 tons of production shall be sampled and factory tested for water demand, compressive strength and proportioning.

ii) Compressive strength and water demand

Mix with sufficient water to give a slump of 20 to 25 mm in a 35 x 90 x 75 mm high slump cone filled in three layers; tamping each layer with 15 strokes of a 16 mm diameter rod, shall give the following minimum compressive strengths when tested in a 70 mm mortar cube vibrated for 3 mm on a vibrating table and stored in a curing room or tank at 22 to 25°C and not less than 90% humidity:

- at 7 days : 50 MPa
- at 28 days: 70 MPa

iii) Test records:

Each quality test record shall be so referenced that the batch numbers on bags of the product may be traced back to the relevant quality control report. Such reports shall be available for inspection by the Project Manager or Supervisor for up to 1 year after manufacture.

c) Curing

As an integral part of this hardener, a membrane curing compound, which must be both compatible with the floor hardener offered and comply with the ASTM C.309 Type 1 specification for moisture retention, shall be used.

• **PS 4.2.25.16 Ferrous aggregate concrete floor hardener**

The ferrous aggregate hardener for concrete floors shall be a factory prepared blend of clean, properly graded ferrous metal aggregate, Portland cement and chemical aids for application and hardening, ready to apply as a dry shake to the surface of newly placed concrete before finishing.

The ferrous aggregate shall be guaranteed to be free of matter deleterious to concrete, such as oil and non-ferrous particles and shall be treated for rust inhibition. Where required it may contain compatible pigments for tinted floors.

27. PS 4.2.26 GENERAL PRODUCT REQUIREMENTS

• **PS 4.2.26.1 Local content**

Preference shall be given to materials fully manufactured in South Africa with South African raw materials.

• **PS 4.2.26.2 Site service**

The manufacturer shall be expected to supply samples free of any other additional charge, and the services of a qualified technical representative on all of the building sites pertaining to the particular contract in order to train the placing team in the correct application methods of the product during initial placing upon 1 week's notice.

Circumstances may necessitate follow-up inspections.

Client:		Contractor:	
Witness:		Witness:	

• **PS 4.2.26.3 Shelf life**

The shelf life of the offered product shall be stated and the expiry date displayed on each bag. The Contractor shall ensure that the product supplied will survive the Contract Period, or replace the product at his cost.

• **PS 4.2.26.4 References**

The Contractor shall submit names and locations of projects in South Africa where the offered product has been in successful use for a period of at least 5 years under similar conditions and at similar rates. The Contractor shall:

- i) make arrangements with the project owners for access for such visits, if the Project Manager or Supervisor wish to inspect such reference project sites.
- ii) provide an acceptable alternative at the same accepted financial rate of the original proposed product, should the Project Manager or Supervisor find the product unacceptable.

• **PS 4.2.26.5 Approved products**

Only products that have been tested and which have been approved by the SABS shall qualify.

• **PS 4.2.26.6 Application rates**

As specified by the manufacturer.

• **PS 4.2.26.7 Control testing**

The Contractor shall be required to conduct control testing as and when requested by the Project Manager or Supervisor, proving the quality of the product used.

28. PS 4.2.27 SPECIFIC WORK-RELATED INSTRUCTIONS

• **PS 4.2.27.1 Contractor's responsibility**

The Contractor shall be held responsible for damage to street or road surfaces, kerbing, stormwater drainage channels (gutters), existing utilities, etc. that result from his negligence during any survey. The Contractor shall repair, at his cost, any damage resulting there from, which shall be subject to approval by the owner of such asset and the Project Manager or Supervisor.

• **PS 4.2.27.2 No disturbance**

The Contractor shall be required to perform Works at all conduits with limited and approved disturbance to the existing service provision. Should the Contractor decide to use a stringing method to survey the conduit, the stringing lines shall not be left in the conduit for more than 5 days or without consent of the Project Manager or Supervisor.

• **PS 4.2.27.3 Immediate danger**

All obstructions, cracks, irregularities must be fully surveyed and documented. The Contractor must inform the Project Manager immediately of any obstruction encountered, locations of hazardous atmosphere, or conduits that are in immediate danger of structural failure. Where possible:

- a) the survey shall be done from the opposite side, whilst appropriate health and safety measures are adhered to, so that the extent of the danger can be assessed.
- b) the position shall be clearly and accurately marked, to allow operations and maintenance to easily locate the position.

29. PS 4.3 PLANT AND MATERIALS

The Contractor is required to provide all plant and materials necessary to carry out the works as specified and required. No additional allowances other than those already specified in the Schedule of Rates shall be allowed for with respect to plant and materials.

Client:		Contractor:	
Witness:		Witness:	

30. PS 4.4 ENGAGEMENT OF LABOUR

• PS 4.4.1 Provision of a Temporary Workforce for the Contract

The Contractor shall have regard for the stipulation laid down for all Labour-Intensive projects that he employs labour from the local community through the Labour Desk that has been established for this purpose.

The Labour Desk shall assist in identifying available local labour and, where available, semi-skilled labour as well as local sub-Contractors. The Labour Desk shall also assist and advise regarding conditions of employment, minimum wages, disputes and disciplinary procedures.

The workforce that is employed on site shall consist of local labour where applicable, except for approved key staff, to the extent that is compatible with the requirements of Clause 24 of the NEC 4 Engineering and Construction Contract (ECC4) (2017).

The Occupational Health and Safety Act must be adhered to with reference to the safety of any employee irrespective of whether such employee is employed by the Contractor or by a local sub-contractor (s). Furthermore, a contract of employment must be signed between the Contractor and each of his employees and sub-contractors and between such sub-Contractors, and each of the sub-contractor's employees with clear reference to the following conditions:

- The minimum agreed wage rate per hour in respect of labourers;
- The agreed pay rate per unit of production where applicable;
- UIF and WCA payments;
- Minimum working hours per day;
- Start and end times of a daily shift;
- Lunch break times;

Company Policy regarding the following:

- Rain time
- No work no pay - sick, absent
- Disciplinary policy
- Grievance policy
- Method of payment
- Workers' clothing and safety equipment to be issued.
- The Contractor is required to show these items to the Project Manager for approval before construction commences.

• PS 4.4.2 Transportation of labourers

The labour employed on this Contract shall be local labour from the nearest local community. Transportation should be provided for the labourers from Site Office to where they are working and back to the Site Office.

• PS 4.4.3 Minimum wage for local labour

Contractor to comply with the latest Government Gazette: Labour Relations Act, 1995 as set out by the Bargaining Council for Civil Engineering Industry.

• PS 4.4.4 Training

The Contractor will be expected to provide formal and approved training for the labourers. In this regard the labourers will be attending training for five days and the labourers should receive their full salary while on training. **The Contractor is expected to have allowed for this in his rates elsewhere.**

Client:		Contractor:	
Witness:		Witness:	

• **PS 4.4.5 Labour Returns**

The Contractor will be required to submit his payment certificate together with monthly labour returns including copies of certified IDs, individual contracts, proof of payment, timesheets and training returns. **No payment certificate will be processed if correct labour returns are not submitted.**

31. PS 4.5 EXISTING SERVICES

• **PS 4.5.1 Known services**

Existing known services, both underground and overhead, are indicated on the drawings, but the positions of existing services on the drawings are not guaranteed nor does the Client or the Project Manager accept any liability in this regard.

• **PS 4.5.2 Treatment of existing services**

The Contractor must liaise with all relevant local authorities to satisfy himself that all relevant services have been located. At the commencement of the contract, the Contractor must hand excavate a distance 0,5 metre on each side of the located service to expose it. The exposed service shall be identified and recorded on a drawing.

A copy of the drawing with all known services shall be submitted to the Project Manager before construction can commence in any road reserve. Once the exposed service is identified and recorded the excavation must immediately be backfilled. Re-excavation by hand at construction stage will not be measured in addition to normal trench excavation.

The Contractor shall retain full responsibility for establishing the exact positions of the various services in advance of any construction work. No allowance for delays or disruption shall be entertained unless the Contractor complies fully with the provisions of this clause regarding the establishment of the exact positions of the various services in advance of any construction work.

• **PS 4.5.3 Use of detection equipment for the location of underground services**

The Contractor is responsible to provide his own equipment in order to determine the location of existing services, and shall locate and expose existing services by hand.

• **PS 4.5.4 Damage to existing services**

The Contractor:

- a) must make provision for the possible existence of numerous services within and in close proximity to the work areas;
- b) shall take necessary steps to protect any existing services whatsoever against damage which may arise as a result his operations on site. Adequacy in terms of protection of existing services shall be at the discretion of the Project Manager. The Contractor is to make good the protection of and any breakages to existing services;
- c) must inform the relevant service provider immediately (within 2 hours of the incident) such that procedures for the re-instatement of the service can be effected, should he damage or break an existing service (whether known or unknown);
- d) shall bear the cost of the repair of damages to any service, the possible existence of which could reasonably have been ascertained by him in good time.

Under no circumstance is the Contractor to alter or in any way interfere with existing works or underground services unless authorised by the Project Manager.

NOTA BENE: Drawings indicating other existing services in the vicinity of the Works are not guaranteed as being accurate, as all other services may not have been recorded or properly recorded. It shall remain the responsibility of the Contractor to perform preoperational work, to locate existing services in advance of the commencement of the Works.

• **PS 4.5.5 Relocation of existing services**

This contract includes work relating to the moving and reinstating of existing services that may be affected by the construction of the works.

Client:		Contractor:	
Witness:		Witness:	

The Project Manager will, in the contract documents, provide information regarding the location of existing utility services, but the Project Manager does not accept responsibility for the accuracy of this information.

The Contractor shall check and determine on the site the positions of any services shown on the drawings. This shall be done by visual inspections, using detecting apparatus, and by making excavations to expose the position of the service at critical points. This shall also be done where no services are shown on the drawings but where such services are nevertheless believed to be present. The positions of all services that have been detected shall be marked carefully and then drawn in on the drawings. These services will then be defined as known services. The Contractor shall take all reasonable precautions not to damage the services during the search, when the onus shall rest with him to prove that, in the event of damage being done to such services during the search, it was not his fault that they had been damaged.

The Contractor will be held responsible for any damage caused to known services. The contractor shall take all reasonable precautions to protect existing services during construction and during the relocation of such services. Where protective measures involve the construction of permanent work, the contractor shall execute the work in accordance with the Project Manager's Project Manager instructions, and payment shall be made as provided in the project specifications.

All pipes, cables, conduits or other known services of any nature whatsoever damaged as a result of the contractor's operations shall be repaired and reinstated forthwith by the Contractor or by the authority concerned, all at the expense of the contractor and to the satisfaction of the Project Manager Project Manager. It shall be clearly understood that, in certain instances, existing services can be relocated only after the contractor has advanced sufficiently on or has completed certain sections of earthworks or certain structures.

Whenever services are encountered which interfere with the execution of the works and which require to be moved and relocated, the Contractor shall advise the Project Manager Project Manager, who will determine the extent of the work, if any, to be undertaken by the Contractor in moving, relocating and reinstating or protecting such services.

Any work required to be undertaken by the Contractor in protecting, moving and relocating the services for which no provision has been made in the contract documents, or for which there are no appropriate tender rates, will be classed as a variation, as provided in the general conditions of contract.

The Contractor shall work in close co-operation with private owners or public authorities controlling services which have to be protected, moved or relocated. Details regarding the state of negotiations concluded between the employer and the owner at the time of tendering in respect of the time when either the owner is prepared to start moving such services or when the contractor is required to or will be allowed to start moving the services, and the duration of such operations, will either be stated in the tender documents or be made available to tenderers. Should the owners of services refuse to co-operate with the Contractor in a reasonable manner in connection with the protection or moving of services belonging to them, the Contractor shall refer the matter to the Project Manager Project Manager.

When the Contractor details the programme of work, the Contractor shall, in consultation with the Project Manager Project Manager, clearly indicate when the proposed start is and conclude the moving of each service or when the Contractor will require the owner to start with and conclude the moving of each service. Should it thereafter, through delays on the part of the employer or the owner of the service to be moved, be impossible to adhere to the programme of work, such programme shall be suitably amended by the Contractor in consultation with the Project Manager so as to limit, in so far as possible, the extent of any damages or delays. Should it be impossible to limit entirely the damages or delays resulting from the amendments necessary to the programme of work, the Contractor shall be reimbursed for any additional costs incurred or damages suffered by the Contractor.

32. PS 4.6 SITE ESTABLISHMENT, FACILITIES AVAILABLE AND REQUIRED

• PS 4.6.1 General

The Contractor shall be required to set-up an individual construction camp. The size and functionality of the site camp shall be in relation to the individual Contracts. It is, however, expected that the Contractor would have made themselves aware on whether one or multiple site camps are required for the execution of the complete Works.

Client:		Contractor:	
Witness:		Witness:	

The Contractor shall price accordingly and state so in their proposal. For the camp/s, the following shall apply:

- a) The Contractor shall make arrangements with the relevant authority for a suitable site to establish a construction camp, storage, works offices, workshop/s, kitchen, and shelters for security personnel.
- b) The Contractor shall note that only security personnel shall be permitted to remain in the campsite overnight.
- c) Ablution facilities shall be provided for men and women separately. One toilet per twenty workers shall be provided. Such facilities shall at all times be maintained in a clean and hygienic condition. Toilets shall be screened from public view and their use shall be enforced.
- d) Covered accommodation shall be provided for perishable or corrodible materials, fittings and the like and shall be adequate and suitable for their purpose. In the case of cement stores, they shall be well ventilated, weatherproof and waterproof with appropriate floors to keep the materials dry and freely aerated.
- e) All such accommodation shall be subject to the approval of the Project Manager who shall have free access thereto at all times.
- f) Temporary buildings and fencing are to be safe, neat and presentable and the surrounding areas must at all times be kept in a neat, clean and orderly condition for the duration of the Works.
- g) It shall be the Contractor's responsibility to ensure that they are in compliance with all relevant laws and regulations as well as tribal requirements.
- h) Source of water supply: It will be the responsibility of the Contractor to make his own arrangements for the supply of water. Potable water is available in the area and the Contractor is to make the necessary arrangements for the provision of a metered point of supply with the Client. The rates tendered by the Contractor in the Bill of Quantities shall be deemed to include full compensation for the procurement, transport, storage (where necessary), supply and application of water and for all the work necessary and incidental thereto for the various items of work where water is required for the purposes of the contract. The Client does not guarantee the availability, sufficiency or continuity of any supply and no claims in this regard will be considered.
- i) The Contractor is to be aware that this Contract is to be carried close to a built up environment and that, as such, excessive dust creation will be considered unacceptable by the local residents. The Contractor is to make provision for regular watering of the works in order to alleviate dust creation. During dry weather, or during periods when dust is created by the construction process, the Contractor will be required to water the works a minimum of twice a day, or as specified by the Project Manager. This is a requirement over and above the normal requirement for watering of the works.
- j) Source of power supply: It will be the responsibility of the Contractor to make his own arrangements for the supply of electricity. The rates tendered by the Contractor in the Bill of Quantities shall be deemed to include full compensation for the procurement and supply of powers to the works. The Client does not guarantee the availability, sufficiency or continuity of any supply and no claims in this regard will be considered.
- k) Contractor's camp: A suitable site for the Contractors camp will be identified prior to Commencement by the Contractor. The Contractor is to make the necessary arrangements for any approvals and payment of services to the Municipality where applicable. The camp site shall be kept clean and tidy, and at the completion of the contract shall be restored to its original condition at the Contractor's own cost, and to the satisfaction of the Project Manager. In order to facilitate compliance with the Conditions of Contract and the Specification, the Contractor may establish storage accommodation, works offices, workshops, mess-rooms, kitchens, shelters for watchmen, latrines, ablutions and the like in such positions and under such conditions as may be agreed by the Project Manager and indicated in the Addendum to the EMP.

Temporary buildings and fencing are to be neat and presentable and the surrounding areas must at all times be kept in a neat, clean and orderly condition.

The Contractor shall not make any excavation without written permission of the Project Manager.

Covered accommodation for perishable or corrodible materials, fittings and the like shall be adequate and suitable for their purpose, and, particularly in the case of cement stores, shall be well ventilated, weatherproof and waterproof with floors raised off the ground, so as to keep the materials perfectly dry and freely aerated.

Client:		Contractor:	
Witness:		Witness:	

All such accommodation shall be subject to the approval of the Project Manager who shall have free access there at all times.

In addition to the above, the Contractor shall provide one toilet per 20 workmen. Portable toilet facilities shall be made available to workers of both male and female genders, the number provided to be in proportion to the ratio of the sexes. The toilets shall be located in the vicinity of the work site, shall be screened from public view and the use thereof shall be enforced. The Contractor shall, where applicable, make the necessary arrangements for the regular removal of night soil.

The Contractor may not house members of his permanent staff except for a security guard at the site and is to make the necessary arrangements for the transport of his staff members to and from the site on a daily basis. As the Contractor's Camp may be located in close proximity to a residential area, attention to noise levels, particularly after hours, will be essential.

• **PS 4.6.2 Site facilities required for Project Manager**

Site facilities required for Project Manager and others: The requirements of the Project Manager's Site Establishment are detailed in Project Specification PSA and PSAB.

The Contractor shall provide the following office facilities at his main site camp for the Project Manager, Supervisor and others:

- Two offices for the Supervisor and assistants.
- Temporary office accommodation to suit his own requirements.
- Covered parking facilities for three (3) cars for the Supervisor and assistants.

A cell phone will be required for the sole use of the Supervisor. The Contractor shall be responsible for the payment of calls related to the Contract made by the Supervisor, on this mobile phone, during the course of the Contract. Wi-fi and/or a mobile router with sufficient data shall be provided on site and be available for the use of the Supervisor and Project Manager's team at all times.

33. PS 4.7 SITE USAGE

• **PS 4.7.1 Work on private or state property**

At no point shall the working area utilised by the Contractor exceed the area 10 m on either side of the pipelines, spoil sites and the direct access roads to these. Encroachment onto the roadway shall only be allowed where it is inevitable in order to construct the pipeline and encroachment shall be limited to areas and widths authorised in writing by the Project Manager or Supervisor. The Contractor shall, throughout the Contract, take adequate precautions to protect all existing services from damage whether or not they have been pointed out to him.

Shallow sewer connections are to be found at the rear of the mid-block latrines. Particular care shall be exercised when excavating behind these structures. Underground electric cables are to be found on all erven at depths of between 75 and 1000 mm. Typically, these cables are at a distance of up to 1200 mm parallel to the erf boundaries and perpendicular to the common boundaries where they connect to the houses. Cables may also be encountered along the boundary behind the latrines. Particular care should be exercised when excavating in the vicinity of these cables.

The Contractor shall, as soon as is practically possible, inform the Project Manager of any damages to services and shall not repair any such damage unless instructed to do so. The Contractor shall be responsible for making good, at his own cost and to the satisfaction of the Project Manager, all damage caused by him to buildings and other improvements to properties.

Should the Contractor consider that damage to buildings and structures is unavoidable in the execution of any portion of the Works, he shall obtain the approval of the Project Manager before proceeding with the work. Where damage is noticed before commencement of work on that erf, this should be reported to the Project Manager in order to prevent a possible liability claim from the owner.

• **PS 4.7.2 Site safety and precautions against nuisance**

The Works are to be conducted in an urban area where high volumes of pedestrian and vehicular traffic may prevail. The watching, barricading, lighting and traffic control on site shall be carried out in strict compliance with these specifications. The Contractor shall ensure that all safety measures are strictly adhered to. The

Client:		Contractor:	
Witness:		Witness:	

Contractor shall ensure that excavations on sidewalks within the road reserves or within the erven, do not at any time present a safety hazard to pedestrians. All excavations that remain open overnight are to be adequately protected.

The Contractor shall provide all safety materials and equipment necessary for barricading and safeguarding the excavations. The safety of staff and labour involved with the Works and the security of installations, plant and equipment is of major concern and need special attention during the execution of the Works.

Plant used on the Works shall be as efficiently silenced as possible and noisy operations will be permitted only between the hours of 07:00 and 17:30. Any work outside normal hours will be permitted only on the written authority of the Project Manager. Wherever excavations or loading of material is liable to form dust, an effective method of spraying water over the excavated area and loaded material shall be instilled. Any rock or debris falling from trucks on the roads shall be removed immediately. Precautions shall be taken to prevent fouling of public roads or private surfaces. The Project Manager may order the Contractor to broom off and clean roads or surfaces where debris may constitute a danger to the public or a nuisance to the owners.

• **PS 4.7.3 Work on live water mains**

Every effort will be made by the Johannesburg Water to furnish the Contractor with all available information regarding existing reticulation systems. Such information is given in good faith. Actual conditions in the field may, however, vary from the records upon which information is based. The Contractor must allow in his programme for delays when working on live mains and, as far as possible, such work should not be on the critical path of any programme and every effort must be made to have alternative work available.

• **PS 4.7.4 Flushing and cleaning of water mains**

On satisfactory completion of work, the mains shall be flushed with potable water supplied by the Contractor. The Contractor shall ensure that the water used for flushing is disposed of in an approved manner without damage, nuisance or injury to person or property. The Contractor shall allow in his rates for all costs associated with the flushing of water mains and communications pipes, including the cost of the water used. If, in the opinion of the Project Manager, foreign material has entered or remained in pipelines, the Contractor shall arrange for the water mains to be cleaned. The cost of cleaning including the cost of water used, shall be borne by the Contractor.

• **PS 4.7.5 Work outside normal working hours**

No work will be permitted outside normal hours and none working days. The Contractor may only work outside normal hours under the following circumstances.

- When work is unavoidable and necessary to save life or property or for the safety of the Works.
- On receipt of written permission subject to the conditions laid down by the Project Manager.

Such work shall be undertaken solely at the discretion of the Project Manager who shall, from time to time, issue advance orders in writing to the Contractor detailing the work to be undertaken. Work undertaken, as ordered, outside normal working hours shall be measured and paid for at the rates applicable to each and every item carried out as scheduled.

Normal working hours shall be defined as between 07:00 and 17:30 Mondays to Fridays and also 07:00 to 13:00 on Saturdays.

Where the Works are conducted within the road surface, the contractor's operations will be restricted to out-of-peak traffic periods (typically 09:00 to 15:00) or as determined by the Traffic Department. The Contractor shall co-ordinate his activities in such a manner that only minor operations that are non-disruptive to traffic are carried out during peak traffic periods in these areas.

Should the Contractor choose to work outside normal working hours without having been ordered to do so by the Project Manager, permission will not be unreasonably withheld but all additional costs arising out of such work shall be entirely to the Contractor's account.

34. PS 4.8 PERMITS AND WAYLEAVES

The Contractor will be required to obtain permits and wayleaves from all the applicable service providers within the jurisdiction of the CoJ, thus including the following services: roads and stormwater (JRA), bulk

Client:		Contractor:	
Witness:		Witness:	

water supply (Rand Water), electricity (Eskom and City Power), gas (Egoli Gas), telecommunications (Telkom), water and sewer (Johannesburg Water) and the like.

The Client will assist the Contractor to obtain clearance from the various departments with services that are likely to be affected by the Contract. It is, however, the Contractor's responsibility to obtain final permit and wayleave approval according to applicable procedures and specifications. In the case of JRA, this will be as per the CoJ COP. Further, a processing fee per wayleave will be payable to cover the cost of processing and approval of the JRA wayleave applications, which will be borne by the Contractor.

All associated costs to obtain permits and way-leaves as required for the execution of the works, where such affect other services, shall be deemed to have been included in the scheduled rates for SANS 1200A or SANS 1200AA or SANS 1200AB where pricing provision for such items have been allowed for in the pricing schedules, alternatively it shall be deemed to be included in the various scheduled activity rates or prices provided by the Contractor.

35. PS 4.9 ALTERATIONS, ADDITIONS, EXTENSIONS AND MODIFICATIONS TO EXISTING WORKS

The Contractor shall, within 20 working days or 10 % of the construction period after taking possession of the site (whichever is the lesser), satisfy himself that the dimensional accuracy, alignment, levels and setting out of existing structures or components thereof are compatible with the proposed works, and notify the Client of any areas of dissatisfaction.

The Contractor shall, on becoming aware of a defect in existing works which will have an impact on the current works, notify the Client of such a defect without delay.

The water mains of the existing network may have to be modified slightly to facilitate the connection of the new water main installation.

36. PS 4.10 INSPECTION OF ADJOINING STRUCTURES, SERVICES, BUILDINGS AND PROPERTIES

The Contractor shall, before commencing with works which have the potential to damage surrounding structures, services, buildings or property, arrange an inspection with the owners of such structures, services, buildings and property and representatives of local or controlling authorities, as appropriate, to determine the condition of buildings, structures, services, paved surfaces, roads, kerbs, channels and the like, that the works could affect, and document their current condition in sufficient detail to enable disturbances or damage which might be caused by the works to be evaluated. The Contractor shall furnish the Client with copies of all such documentation and shall be held responsible for any disturbance and damage to such structures, services, buildings and property arising from the performance of the contract as well as any costs involved in refuting or processing such claims.

37. PS 4.11 WATER, SANITATION AND ELECTRICITY FOR CONSTRUCTION PURPOSES

• PS 4.11.1 Water

The Contractor shall make his own arrangements with the Client to obtain a potable water metered standpipe connection for which at least 14 days' notice shall be given. The size of the connection provided will be as specified in the Water and Sanitation By-laws.

The Contractor may only draw water from fire hydrants through means of a legal, Client owned, potable water metered standpipe. Failure to use such Client owned potable water metered standpipes, or using illegal, non-Client owned equipment for purposes of drawing water from fire hydrants, will result in the Contractor having to pay an account to the Client, for an amount determined by the Client

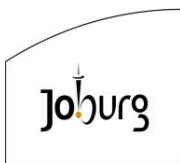
The potable water metered standpipe(s) must be made available to the Client's water inspectors for purposes of reading and inspection, and failure to do so, will result in the immediate withdrawal of such potable water metered standpipe(s). The onus is on the Contractor to return such potable water metered standpipe(s) if they are found to be defective (not registering consumption). Failure to do so will result in an account being levied, payable to and determined by the Client. Claims for delays caused where standpipe(s) are withdrawn and/or replaced will not be considered.

The current water tariffs applicable to the Contract are available from the Client.

• PS 4.11.2 Sewer

The Contractor shall provide, maintain, move to positions as required and finally remove proper sanitary accommodation at each work front. Sanitary accommodation shall be properly screened and its use strictly enforced. The Contractor shall comply with the Client's Sanitation General By-Laws Section 19(1) and 19(3).

Client:		Contractor:	
Witness:		Witness:	



The situation of sanitary accommodation prescribed in terms of the Sanitary General By-Laws shall be approved by the Project Manager as being convenient for the person for whose use it is intended. The sanitary accommodation provided must be adequately ventilated, properly disinfected and kept in a thoroughly clean condition at all times.

The Contractor shall bear all costs associated with the provision of sanitary accommodation. Compensation for these costs will be made under the relevant item in the Schedule of Rates.

- **PS 4.11.3 Electricity**

The Contractor shall make arrangements with the relevant authority for the supply and distribution of electricity for purposes of this Contract, the cost of which shall be deemed to be included in the rates inserted in the Schedule of Rates.

Electricity used for carrying out of the works in accordance with these Specifications will not be subject to measurement or payment.

38. PS 4.12 SURVEY CONTROL AND SETTING OUT OF THE WORKS

The Contractor is to confirm the levels and coordinates of all benchmarks prior to commencing with construction.

The Contractor shall, prior to the ordering of pipe fittings, set out the works strictly according to the Project Manager's construction drawings and/or site instructions.

The Contractor shall record the setting out of the works in an approved format and order all required pipe fittings accordingly.

Client:		Contractor:	
Witness:		Witness:	

PS 5 MANAGEMENT OF THE WORKS

39. PS 5.1 PLANNING AND PROGRAMMING

• PS 5.1.1 Work plan

Seven days prior to commencing with any part of the Works, the Contractor shall submit to the Project Manager, for review and approval, a work plan detailing the procedure and schedule to be used to execute such works, detailing and substantiating any deviation from the originally proposed approach. Further, the work plan shall include a:

- a) time frame;
- b) description of all equipment and tools to be used;
- c) list of personnel and their qualifications and experience (including back-up personnel in the event that an individual is unavailable);
- d) list of sub-contractors, schedule of work activity;
- e) safety plan (clearly highlighting any potentially hazardous substances to be used);
- f) traffic control plan (if applicable);
- g) an environmental protection plan; and
- h) contingency plans for possible problems.

The approval given by the Project Manager shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as prescribed under this Contract.

Work plan shall be comprehensive, realistic and based on actual working conditions. Further it shall form the various sub-sections of the overall Contract programme and plan.

NOTA BENE: No works shall be allowed to commence without an approved work plan.

• PS 5.1.2 Planning

The Contractor shall ensure that he:

- a) is well informed with regard to the Client's overall maintenance programme and make resources available as required to efficiently complete this Contract; and
- b) delivers goods and services timeously to meet the Client's prevalent performance standards and where applicable to not unnecessarily delay any other contractors, service providers and suppliers.

• PS 5.1.3 Programming

In order to ensure a clear understanding, at the inception of the Contract, of the programming and documentation format requirements, the Contractor shall appoint a project programmer/ planner for liaison during the Contract. The Contractor shall for the Contract Period provide and regularly update (maximum monthly) a Contract Programme.

The programme shall at minimum contain:

- a) Time Scale (minimum):
 - i) Days, where the period does not exceed three months. Weeks, where the project period exceeds three months.
 - ii) Months, where the period does not exceed one year.
 - iii) Years, where the project period exceeds one year.
- b) Tasks: Where phases or stages are anticipated, this shall be the highest level of division and all tasks related to the successful accomplishment of that phase of the area shall be grouped. Resources allocation and task dependency shall be indicated.
- c) Start and Finish Dates: All tasks shall have specific start and finish dates.

Client:		Contractor:	
Witness:		Witness:	

- d) Critical Path: All tasks forming the programme line that will establish any delays in the overall Contract Period shall be clearly indicated and an indication of their sensitivity characteristics shall be provided.
- e) Progress Tracking: The Contractor shall be required to periodically indicate progress per task graphically and on a percentage basis.
- f) Non-working Time: All South African public holidays, weekends and the local traditional annual builder's break shall be incorporated in the programme.

No deviation from the approved sequence of construction shall be accepted without prior written approval.

The programme shall not be in the form of a bar chart only, but shall show clearly the anticipated quantities of work to be performed each month, together with the manner in which the listed plant is to be used, as well as the anticipated earnings for the various sections of work.

NOTA BENE: A Contract programme shall be submitted to the Project Manager no later than 21 days after Contract Date.

The Contractor shall provide the Project Manager with a method statement indicating the manner and sequence in which he intends to construct the works, for each work area, with the program. In the method statement the Contractor must address at least the following items:

- a) sequence of the works for the relevant works area;
- b) target dates for the tasks identified in sequence of the works for the relevant works area;
- c) materials requirements;
- d) construction plant to be used;
- e) services affecting construction; and
- f) any factors that could affect construction progress after commencement.

The method statement must be approved by the Project Manager before commencement of the specific work item. In order to minimize the impact on traffic, pedestrians and business the Contractor will be required to segment the works in such a manner that no portion of the works is more than one day ahead of the following position. These segments of the works shall be clearly defined in the Contractor's method statement for each work area.

If, during the progress of the work, the quantities of work performed per month fall below those shown on the program or if the sequence of operations is altered, or if the program is deviated from in any other way, the Contractor shall, within one week after being notified by the Project Manager, submit a revised program.

If the program is to be revised by reason of the Contractor falling behind his program, he shall produce a revised program showing the modifications to the original program necessary to ensure completion of the Works or any part thereof within the time for completion. Any proposal to increase the rate of work must be accompanied by positive steps to increase production by providing more labour and plant on the Site, or by using the available labour and plant in a more efficient manner.

Failure on the part of the Contractor to submit or to work according to the program or revised program shall be sufficient reason for the Client to take steps as provided for in the Contract Data.

The approval by the Project Manager of any program shall have no contractual significance other than that the Project Manager would be satisfied if the work is carried out in accordance to such program and that the Contractor undertakes to carry out the work in accordance with the program. It shall not limit the right of the Project Manager to instruct the Contractor to vary the program should circumstances make this necessary.

40. PS 5.2 SEQUENCES OF THE WORKS

Notwithstanding any changes that the Project Manager deems necessary the sequences should include the following:

- Mobilisation, project planning and control and communications to stakeholders (including affected private property owners, general public, etc.)
- Site clearance for the affected areas
- Traffic control and temporary signage during construction

Client:		Contractor:	
Witness:		Witness:	

- Exposing existing services
- Excavation, trench preparation and compaction
- Supply, bedding and laying of pipes
- Provision and installation of valves and specials
- Backfilling (blanket layers and top layers including compaction)
- Trenchless installations
- Construction of valve chambers
- Reinstatement of paved and other areas where affected
- Pressure testing of pipeline sections
- Clearing of the site, including removal of spoil material and environmental rehabilitation
- Site hand over

41. PS 5.3 SOFTWARE APPLICATIONS FOR PROGRAMMING

The construction programme shall be completed in Microsoft ® Project Standard 2007 or compatible software. The construction programme and updated versions thereof shall be made electronically available to the Project Manager.

42. PS 5.4 METHODS AND PROCEDURES

The Contractor shall submit to the Project Manager, within a period stated in the Contract Data, a detailed construction programme, detailing the date of commencement and completion of the work activities, dates, duration and extent of traffic accommodation interruption water supply to affected consumers. The detailed programme shall be based on the preliminary programme submitted with the tender and shall make an allowance for the following:

- Normal working hours shall be defined as between 07:00 and 17:30 Mondays to Fridays and also 07:00 to 13:00 on Saturdays.
- Where the Works are conducted within the road surface, the contractor's operations will be restricted to out-of-peak traffic periods (typically 09:00 to 15:00) or as determined by the Traffic Department. The Contractor shall co-ordinate his activities in such a manner that only minor operations that are non-disruptive to traffic are carried out during peak traffic periods in these areas.
- No work outside working hours will be allowed. Should the Contractor wish to work outside normal working hours written permission shall be obtained from the Project Manager and all additional costs arising out of such work shall be entirely to the Contractor's account.
- Only one side of the street may be affected by the construction at any one time.
- The Project Manager may require that the construction of certain road crossings be done outside normal working hours.

The Project Manager shall provide the Contractor with drawings and details of the Works that need to be done.

Once a detailed programme has been approved, the Contractor shall not deviate from the planned operations.

Pipeline and associated valves and fittings:

- The existing pipes will be left in place and remain operational until such time that it is switched over to the new pipeline.
- The connection of the new pipe will be done by the Contractor under strict monitoring by the Project Manager and in consultation with Johannesburg Water.
- Extreme care should be taken not to break or damage the existing pipelines. If this should happen and the existing pipe is damaged during the course of installing the new pipeline, then the relevant Depot Manager must be notified. The trench will have to be drained by the Contractor after the Depot has turned the water supply off. All assistance must be given by the Contractor to the Depot in repairing the damaged pipe.
- The new pipelines will be laid as indicated on the drawings supplied.

Client:		Contractor:	
Witness:		Witness:	

Fire valves and fittings:

- New valves and fittings are to be supplied and installed on all the new pipelines.

General

- The Contractor will arrange for the warning of the public of any shutdown of supply necessary in his/her opinion for the proper execution of the Works.
- All disconnections and reconnections, connections to the existing mains, closing and opening of valves and the disruption of water supply must be liaised with the relevant Depot Manager at least 7 working days prior to the action.
- The disruption of supply and the duration of disruption of the supply to the consumers are to be kept to a minimum. Consumers are to be informed of any disruptions as described later in this specification.
- Any claims from the property owners and/or the community will be considered and evaluated by the Client. Should the Client find a valid claim but found that the Contractor has neglected his responsibilities and/or duties, which lead to the claim, the Contractor will be responsible for settling the claim.

43. PS 5.5 QUALITY PLANS AND CONTROL

The onus to produce work that conforms in quality and accuracy of detail to the requirements of the specifications and drawings rests with the Contractor, and the Contractor shall, at his own expense, institute a quality-control system and provide experienced personnel, together with all transport, instruments and equipment to ensure adequate supervision and positive control of the works at all times.

The cost of supervision and process control will be deemed to be included in the rates tendered for the related items of work.

On completion and submission of every part of the Works to the Project Manager for examination, the Contractor shall furnish the Project Manager with proof of quality in the form of a data pack containing measurements, levels and all compaction and hydraulic test results to indicate compliance with the scope of work.

44. PS 5.6 ACCOMMODATION OF TRAFFIC ON PUBLIC ROADS OCCUPIED BY THE CONTRACTOR

• PS 5.6.1 Accommodation of traffic

The Contractor shall ensure the safe accommodation of traffic at all areas where the work may impact traffic and shall provide all delineators, watching, lighting, signs and barricades required by the road authorities, and in accordance with the South African Road Traffic Signs Manual.

• PS 5.6.2 Access to properties

Adequate access shall at all times be maintained to public and private properties unless otherwise arranged and approved. Details of the proposed means of access shall be submitted before any such access is restricted. Claims arising from impeded access shall be the responsibility of the Contractor.

At least 7 days before commencing any work affecting access to a property, the Project Manager and the occupier/owner of each such property shall be notified of the Contractor's intention to commence work, the date of commencement, expected duration and arrangements which will be made regarding maintenance of access.

• PS 5.6.3 Transport Department requirements

The Contractor shall provide a structurally sound and safe bridge with side rails across dangerous excavations crossing sidewalks to allow pedestrians safe access to such sidewalk. Associated costs for the provision of pedestrian access to sidewalks shall be deemed to have been included under the various excavations or combined activity rates and/or prices in the pricing schedules.

• PS 5.6.4 Foxhole Steel Plate Cover

The Contractor shall provide a structurally sound foxhole cover which can handle heavy traffic loading. The foxhole cover should cover the foxhole fully and provide protection to the edge of the pipe from any damage. The foxhole cover should also allow traffic to drive over the foxhole outside working hours.

Client:		Contractor:	
Witness:		Witness:	

45. PS 5.7 OTHER CONTRACTORS ON SITE

There may be other Contractors working within the same area. As such, the Contractor is required to make adequate allowances for such possibilities. No claims with respect to works being carried out by other Contractors shall be entertained by the Client.

46. PS 5.8 TESTING, COMPLETION, COMMISSIONING AND CORRECTION OF DEFECTS

The onus is on the Contractor to produce goods and services which shall conform in quality and in accuracy of detail to the requirements hereinafter specified. The Contractor must clearly understand that it is not the duty of the Project Manager or his Supervisor to act as foreman or surveyor on the Works.

The Contractor shall, at his own expense, provide experienced Construction Manager/Site Agents, foremen and surveyors together with all transport, instruments and equipment for supervising, checking and controlling the work.

The act of passing any completed work or accepting materials or goods for payment by the Project Manager shall not be construed as signifying approval or acceptance thereof. Failure on the part of the Project Manager to reject any defective work or material or goods shall not in any way relieve the Contractor of his obligations under the Contract, nor prevent later rejection when such work or material is discovered.

The Contractor shall, when submitting any work to the Project Manager for examination, satisfy himself by testing, measurement and otherwise as may be necessary that the work does in fact meet with the requirements of the Specifications. This information shall be submitted with the Contractor's request for examination and the Project Manager shall be authorised to decide on the number and type of tests, measurements, etc. required to enable him to judge the quality of the work. The submission of this information shall in no way diminish the authority of the Project Manager to conduct such tests as he may consider necessary in order to determine the quality of the work performed by the Contractor, nor shall he be bound to take account of the Contractor's tests, measurements, etc. should he consider these to be either incorrect or not representative.

Quality control and completion tests shall be in accordance with the relevant standard and amended specifications and additional specifications.

47. PS 5.9 RECORDING OF WEATHER AND ABNORMAL RAINFALL

If during the time for completion of the works abnormal rainfall or wet conditions occur, then the Contractor may notify a compensation event in accordance with Z13 of the Contract data. Only the algebraic sum of all monthly totals for V for the period under consideration is taken into account in assessing the compensation event. The value of V is calculated in accordance with the formula given below for each calendar month or part thereof.

$$V = (Nw - Nn) + ((Rw - Rn)/X)$$

V	Extension of time in calendar days in respect of the calendar month under consideration.
Nw	Actual number of days during the calendar month on which a rainfall of Y mm or more has been recorded.
Nn	Average number of days, as derived from existing rainfall records, on which a rainfall of Y mm or more has been recorded for the calendar month.
Rw	Actual rainfall in mm recorded for the calendar month under consideration.
Rn	Average rainfall in mm for the calendar month as derived from existing rainfall records.

For purposes of the contract Nn, Rn, X and Y shall have those values assigned to them in the Appendix and/or the Specification.

Client:		Contractor:	
Witness:		Witness:	

The algebraic sum of all monthly totals for the period under consideration, shall be used in assessment of the compensation event. Where V needs to be calculated for part of a month, it is to be calculated using pro rata values of Nn and Rn.

This formula does not take account of flood damage that could cause further or concurrent delays and will be treated separately as far as compensation events is concerned.

The factor (Nw-Nn) shall be considered to represent a fair allowance for variations from the average number of days during which rainfall exceeds Y mm. The factor (Rw-Rn)/X shall be considered to represent a fair allowance for variations from the average in the number of days during which the rainfall did not exceed Y mm but wet conditions prevented or disrupted work.

INFORMATION SOURCE: South African Weather Service
Pretoria, Tel.: 082 233 8484

Y= 10 mm/24 hour day

X= 20 mm

Table 5.1: Statistical rainfall

STATISTICAL INFORMATION: JOHANNESBURG BOTANICAL GARDENS: 1993-2022		
Month	RAINFALL	
	Nn = Actual number of days during the calendar months in which a rainfall of more than Y-mm has been received	Rn Average monthly rainfall
January	4.5	129.7
February	3.2	105.5
March	2.7	95.7
April	0.9	29.7
May	0.5	18.2
June	0.0	4.7
July	0.1	2.7
August	0.1	4.4
September	0.3	11.9
October	2.0	68.4
November	3.1	86.7
December	4.2	117.7
TOTAL	21.6	675.4

The Contractor shall be permitted to take his own rainfall measurements on site subject to the Project Manager's approval, but access to the measuring gauge(s) shall be under the Project Manager or Supervisor's control. The Contractor is to provide and install all the necessary equipment for accurately measuring the rainfall as well as to provide, erect and maintain a security fence plus gate, padlock and keys at each measuring station, all at his own cost.

48. PS 5.10 FORMAT OF COMMUNICATIONS

The Contractor and Client shall follow the communication protocol through the Project Manager and Contractor's representatives. Communication media applicable shall be site meetings, telephone, fax, letter and email.

49. PS 5.11 KEY PERSONNEL

The key role players involved or associated with the contract are listed below with references made to the NEC 4 Engineering & Construction Contract (ECC4) (2017).

Client:		Contractor:	
Witness:		Witness:	

- The Client (Clause 11.2(13))
- The Project Manager (Clause 14)
- The Supervisor (Clause 14)
- The Contractor (Clause 11.2(13))
- The Contractor's Construction Manager (Clause 24.1)
- Responsible person in terms of the OHS Act (Clause 24.1)

On appointment in terms of the new Construction Regulations 2014, the Contractor will be required to appoint a Construction Manager and Safety Officer who are registered with SACPCMP.

50. PS 5.12 MANAGEMENT MEETINGS

Monthly site meetings shall be arranged and facilitated by the Project Manager or Supervisor. Senior Contractor management staff attendance shall be compulsory.

The Contractor shall be required to provide reporting with regard to project progress, resources (human, plant and equipment), community issues, environmental and health and safety aspects.

51. PS 5.13 FORMS FOR CONTRACT ADMINISTRATION

The Contractor shall maintain a file which shall contain project information related to project progress, resources (human, plant and equipment), community issues, environmental, health and safety aspects, penalties imposed, compensation events notified and outcomes, disputes and resolutions, payment and variations.

52. PS 5.14 DAILY RECORDS

The Contractor shall keep daily site records as required by the Client or Project Manager and as specified herein. Daily records shall include, labour, plant, materials, rainfall, environmental issues, health and safety issues, daily diary and the like. Such records is the property of the Client and shall be made available to the Client or his representative within 24 hours from being requested to do so.

53. PS 5.15 BONDS AND GUARANTEES

In addition to Clause 83 of the NEC 4 Engineering & Construction Contract (ECC4) (2017), the Contractor shall provide the Performance Bond (Form of Guarantee) for the due and punctual fulfilment and completion of all the Contractor's obligations under the Contract. No compensation event or neither any variation of the Contract, nor the determination of the Contract by the Client shall in any way impair or diminish or terminate any liability to the Client under and by virtue of such Guarantee.

Should the Contractor, when notified of the acceptance of his offer, fail to provide an approved Performance Bond within the stated period, then the Client may, at his sole discretion:

- Grant the Contractor a further reasonable period in which to provide the bond; or
- Withdraw his acceptance of the tender in which case the Contract shall be deemed to be void, but without prejudice to the Client's rights to recover whatever damages he may have suffered by virtue of the Contractor's failure to fulfil his obligations.

54. PS 5.16 PAYMENT CERTIFICATES, EPWP STATS AND SMME REPORTS

Measurements will be done continuously between the Project Manager, Supervisor or their assistants and the Contractor on dates and times agreed on. Dates must be arranged by these parties. The progress of the following items will be recorded hereunder:

- The Contractor will provide a certificate with quantities to the Project Manager before or on the 20th of every month.
- If any material on site is claimed, proof of ownership must be provided either by means of the necessary receipts or a letter from the supplier stating that ownership has been transferred to the Contractor upon delivery.

Client:		Contractor:	
Witness:		Witness:	

- After the payment certificate has been approved by Project Manager, the Contractor must issue a VAT invoice. The certificate will then be ready for handing in.
- Payment certificates must be completed monthly and submitted to the Project Manager before or on the **20th** of each month. The payment certificate shall be accompanied by the monthly EPWP stats, copies of individual contracts, certified copies of individual IDs, Timesheets and proof of payment. The Contractor will also be required to submit monthly SMME reports, which include Sub-Contracting Agreement, Company documents, Proof of Payment including all labour returns for the SMMEs.
- The Contractor shall note that payment shall only be made for Works activities successfully (delivering the end result) executed, complying with the quality requirements and provided to the Project Manager or Supervisor.
- The Contractor will be required to submit his payment certificate together with monthly labour returns including copies of certified IDs, individual contracts, proof of payment and timesheets. In addition, the Contractor will also be required to submit monthly SMME reports, which include Sub-Contracting Agreement, Company documents, Proof of Payment including all labour returns for the SMMEs.
- **No payment certificate will be processed if correct labour returns are not submitted.**

Client:		Contractor:	
Witness:		Witness:	

PS 6 FEATURES REQUIRING SPECIAL ATTENTION

55. PS 6.1 SECURITY

The Contractor shall be responsible to provide security on site(s):

- a) as he deems necessary. The Client shall not be held responsible for any loss or damage(s) suffered by the Contractor, his plant, equipment, materials, subcontractors or employees as a result of a security incident of any nature.
- b) which have been identified, by the Project Manager and/or Client, as potential high risk areas requiring security during site visits for the duration of the contract. The Contractor shall arrange that the security meet with the Project Manager and/or Client representative at a convenient and safe location and thereafter escort to the necessary areas.

56. PS 6.2 OPERATION OF VALVES

Only employees of the Client are permitted to operate primary and secondary water mains valves.

57. PS 6.3 WORK OUTSIDE NORMAL WORKING HOURS

The Contractor is permitted to work outside of normal working hours only upon obtaining written permission from the Project Manager. It is anticipated that all switch-over work (tying new infrastructure into existing) will be completed during hours that will minimise the effect on the supply of water to affected communities.

58. PS 6.4 SANITARY FACILITIES

The Contractor is required to supply adequate sanitary facilities for employees, visitors, the Project Manager and Client.

59. PS 6.5 COMMUNITY LIAISON AND COMMUNITY RELATIONS

For the purpose of this project a Community Liaison Officers will be required; who shall be required to inform the community with regards to Contractor's activities in particular where such activities may affect the service provision to the affected community (See PS 6.6).

60. PS 6.6 NOTICES AND WARNING TO CONSUMERS

The Contractor shall ensure he maintains service (water and/or sanitation) provision at all times whilst executing the works where:

- a) The maximum amount of time of no service shall be 8 hours for any property. Any service disruption longer than 8 hours shall be temporary bypassed by methodologies approved by the Project Manager or Supervisor.
- b) A Public Notification Program shall be implemented, requiring at minimum that the Contractor shall deliver written notices to each domestic and non-domestic customer affected by the works, 48 hours before commencement of the works, including providing:
 - i) a summary of work to be completed;
 - ii) the time and duration of service interruption; and
 - iii) a local telephone number to contact the Contractor for inquiries or complaints. All complaints received shall be addressed and resolved within the standard Client response times and a summary of such complaints and associated actions shall be presented to the Project Manager or Supervisor on a monthly basis.

61. PS 6.7 CONTINUITY OF SERVICE SUPPLY TO CUSTOMERS

The activities of the Contractor shall not unreasonably interfere with the service supply to customer and be executed outside the agreed and notice time frames.

Where the Contractor cannot reasonably re-establish services within times agreed and notice timeframes he shall proceed to contact the affected customer and make alternative arrangements that shall be acceptable to the customer and the Project Manager.

Client:		Contractor:	
Witness:		Witness:	

The associated costs of any customer claim arising from a lack of service provision due to the Contractor's negligence or his disregard for the Client's SOP or his disregard for the conditions of this Contract, whilst executing activities as per this Contract, shall be solely for his account. The Client's shall have the right to make equivalent monetary deductions from monies owed to the Contractor or from his Guarantee under this Contract and any other active contract(s) with the Client.

62. PS 6.8 CONDITIONS AND PROCEDURES FOR SERVICE AGENCIES

The Contractor shall comply with the conditions and procedures of the various affected service agencies, as mandated in their associated wayleaves.

63. PS 6.9 REINSTATEMENT OF ASPHALT BY JOHANNESBURG ROADS AGENCY (JRA)

The JRA shall be given first preference to provide and execute all the reinstatement of asphalt at places where excavation is within the roadway. The Contractor shall make other adequate arrangements where the JRA:

- a) indicated that it will not, for whatever reason, be able to perform such asphalt resurfacing; and
- b) is the cause of delays, where in particular the Contractor shall note that the Client shall not be liable of any additional extension of time related cost obligations to the Contractor, as he shall be deemed have agreed adequate conditions with the JRA and allowed delays on the part of the Client.

64. PS 6.10 GENERIC LABOUR-INTENSIVE SPECIFICATIONS

EPWP guidelines shall not be applicable to this Contract, although it is expected that the Contractor execute the majority portion of the works utilising local labour. The Contractor will be required to submit monthly labour returns, including individual contracts, certified ID copies, Timesheets and proof of payment.

65. PS 6.11 CAUSES FOR REJECTION

Causes for rejection shall include, but not be limited to, not complying to the Client's requirements and/or specifications and the intended purpose for this Contract, thus:

- a) poor data (including: photographs, recording, prints and reports) and data management;
- b) inaccurate surveys, with regard to linear meterage of manhole length;
- c) poor quality of survey information;
- d) silt, grease, and debris remaining in conduits after cleaning; and
- e) poor quality construction and remedial works:
 - i) Cracks in any concrete works or pre-cast units shall be cause for rejection.
 - ii) honeycombed or patched areas in any concrete works or pre-cast units in excess of 0.02 m² shall be cause for rejection.

66. PS 6.12 PROTECTION AGAINST WATER AND STORMS

The Contractor shall be responsible for the full adequate protection of the works against damage due to storms, rain, floods, stormwater, subsoil water and seepage from whatever source. The Contractor shall take over the site where the works has to be executed at the beginning of the Contract Period and the full risk and cost of dealing with all water shall be borne by the Contractor.

The Contractor shall also provide all necessary pipe work, pumps and other appliances necessary for adequate dewatering of all excavations and shall maintain these in good condition and provide adequate standby equipment to ensure that no disruption of work will ensue as a result of possible breakdown of equipment.

67. PS 6.13 INFORMATION SUPPLIED BY THE PROJECT MANAGER

Certain information included in this document or supplied separately is presented in good faith and no guarantees can be given regarding the accuracy or representativeness thereof. This pertains more specifically to all soil tests, material results and similar information that are necessarily subject to limitations in the test methods and sampling. Natural variations in materials and formations also influence the applicability of certain conclusions.

Client:		Contractor:	
Witness:		Witness:	



The Client can therefore not accept any responsibility for the accuracy of any information or for any damage resulting from the fact that the information later proved wrong or not representative. If the Contractor chooses to rely on the information he does so at his own risk.

68. PS 6.14 INDEMNITY CERTIFICATE

The Contractor must, on completion of the Works, obtain certificates from all authorities concerned stating that they are satisfied with the condition of all borrow pits, detours, access roads and spoil material on their properties. The certificates must be handed over to the Project Manager before the maintenance period starts. The certificates will not exempt the Contractor from any obligations concerning the backfill of trenches, finishing off of borrow pits, access roads, detours etc. This work must still be carried out to the satisfaction of both the Client and the Project Manager.

69. PS 6.15 RETURN OF MATERIALS

All old valves, valve covers, meter boxes and all pipework that can be reused shall be returned by the Contractor to the Johannesburg Water Depot or as directed by the Project Manager. The Contractor shall obtain the signature of the Superintendent acknowledging receipt of materials returned. The Contractor shall determine the condition of the materials.

70. PS 6.16 POLITICAL AND COMMUNITY UNREST

The Contractor shall notify the Client or its duly Authorized Representative/s of any unrest situation and shall indicate all active Contract sites affected.

71. PS 6.17 WATER FOR TESTING

All water for pipe pressure testing shall be paid by the Contractor through a legal Johannesburg Water connection.

Client:		Contractor:	
Witness:		Witness:	

PS 7 HEALTH AND SAFETY SPECIFICATION FOR CONSTRUCTION WORK

The Occupational Health and Safety Specification of the Client's is bound in Volume 2 of these contract documents. Volume 2 forms an integral part of the Contract Specification and, in particular, shall be a part of the HEALTH AND SAFETY SPECIFICATION FOR CONSTRUCTION WORK.

In terms of Construction Regulation 5 (1) (b) of the Construction Regulations 2014, the Client is required to compile an occupational health and safety specification for any intended project and to provide the specification to prospective tenderers.

The objective of this specification is to ensure that the principal Contractor entering into a contract with the Client achieves and maintains an acceptable level of occupational health and safety performance.

The specification provides the requirements that the principal Contractor and other Contractors shall comply with in order to reduce the risks associated with the contract work, and that may lead to incidents causing injury and/or ill health, to a level as low as reasonably practicable and possible.

The Contractor, appointed by the Client in terms of Construction Regulation 5 (1) (k), is required to prepare an occupational health and safety plan.

This plan has to be prepared in terms of Construction Regulation 7 (1) as well as the Client's occupational health and safety specification. In terms of Construction Regulation 7 (1) (L), the Client and the Principal Contractor are required to agree on the occupational health and safety plan before any work may commence.

The principal Contractor's health and safety plan must follow the framework in Volume 2, as a minimum.

72. PS 7.1 BARRICADING OF TRENCHES

The Contractor shall ascertain himself of the nature, volume, stability, depth and possible safety risks of the excavations, before any decision with regards to the method of excavation is made.

Allowance for hand excavation has been made for the location of services. Extreme caution shall be taken when excavating along the route of the new pipe for existing services. Any damages and or repairs to the existing services will be for the Contractor's account.

The length of open excavation must always not exceed 100 m

Adequately protected by a barrier or fence comprising fluorescent orange plastic netting of height at least 1 000mm and as close to the excavation as practicable and:

- Provided with notice boards marked "CLOSED" at each end of closed or partially closed roads,
- The barrier or fence (at least 1m high) shall be suitably wrapped with reflective red and white danger tape or provided with flashing orange lights, placed at 15m intervals along the barricading at night.
- Where the depth of an excavation or the nature of the material excavated renders the sides of the excavation liable to movement that might endanger the works or the workers engaged on the excavation,
- the sides of the excavation shall be supported by suitable timber or other sheeting adequately strutted and braced, all properly assembled and of sufficient strength and stiffness to prevent movement in the materials supported, or, alternatively,
- the slope of the excavated face or faces shall be reduced so that any danger to the works or workers is removed.

Any cavities formed by the fall of rock or earth due to rain, flooding, insufficient timbering, or other causes, shall be adequately filled.

The Contractor shall so maintain borrow pits that they do not become a danger to persons or livestock.

Trenches may not be left open during the builder's holidays or for any shutdown period exceeding 5 calendar days. Should the Contractor not comply with this requirement without the written approval of the Project Manager; the Project Manager shall have the open trenches closed by others at the expense of the Contractor. Furthermore, all further opening-up of the backfilled excavation and dealing with the excavated material and subsequent making good will all be to the Contractor's cost.

Client:		Contractor:	
Witness:		Witness:	

73. PS 7.2 PRECAUTION AGAINST POLLUTION AND CONTAMINATION

The Contractor shall take all necessary steps and precautions to prevent pollution of the surrounding area by his employees in any way. Any debris falling from construction vehicles and plant shall be removed immediately.

Every care is to be taken to avoid possible contamination of the mains during construction. Pipes are not to be stacked in the streets or gutters. On completion of a section, all loose material and foreign bodies are to be removed. The open ends of the new pipeline are to be protected by watertight caps, to the satisfaction of the Project Manager, to prevent the entrance of groundwater and foreign bodies until such time as these sections are connected to the live mains.

Sterilising chemicals shall be supplied by the Contractor for sterilizing all new water mains. All new lines are to be thoroughly flushed. All sterilisation shall be done at 10 mg/l free chlorine for 12 hours. The Contractor shall give due notice to The Client of his intention.

74. PS 7.3 OPERATIONS UNDER LIVE CONDITIONS

Prior to the execution of any operation under live conditions, the Contractor shall liaise with the relevant Depot Manager, at least 7 working days in advance, in this regard. At least one representative of the Depot shall be present during the execution of such operation. These operations will include disconnection and reconnection to the existing Sewer/ Storm water main and Water storage tank at the works.

PS 8 ENVIRONMENTAL MANAGEMENT

Tendering Contractors are to adhere to the mitigation measures listed in the EMP (refer to Volume 2: Occupational Health and Safety Specification and Environmental Management Plan for Capital Investment Projects). Environmental mitigation measures are actions needed to align a project implementation phase with environmental control principles, where potential impacts to the natural and social environment are prevented, minimised or remediated. Environmental safeguarding is governed by various sets of legislation, with the most noteworthy for this project constituting the National Environmental Management Act (No. 107 of 1998) and the National Water Act (No. 36 of 1998). (Confirm with Joyce Ngobele of the Environmental Section)

PS 9 VALVES

- a) Wedge type gate valves: Shall be used for and valves from sizes 200 mm and above and the valves must be as per SANS 664. (All valves greater than and equal to 300 mm should be geared).
- b) Resilient seal gate valves: for valves sizes up to and including 150 mm;
- c) Air release valves: single chamber, double orifice with integral anti-shock device.
- d) Hytrol valves: can be piped as PRV's, pressure sustaining valves, level control valves, flow control valves etc. Other designs must be pre-approved;
- e) Butterfly valves: may be used in restricted areas upon approval by Divisional Manager: Development Control/Design Manager CAPEX. Strictly not allowed in the reticulation.
- f) Reflux valves: non-return valves must be approved by Divisional Manager Development Control/Design Manager CAPEX.

Types used:

- Weighted type: used essentially in pump stations and on reservoirs and in town installations;
- Double-door damper type: used on pumping mains;
- g) Above ground hydrants: All new installations to be above ground. Underground hydrants only to be used if approved by Divisional Manager: Development Control/ Design Manager: CAPEX.

All valves are required to have 70% local content.

Client:		Contractor:	
Witness:		Witness:	

PS 10 DOMESTIC WATER METER

Preferred Type of Meter to be Used by Johannesburg Water

Sizes (Nom Dia)	Customer Type / End Use	Approved Meter Type	Class	Strainer Required
15	Domestic	Multi-jet or volumetric (Plastic Bodied) Above ground Existing Areas	C	No
15	Domestic	Concentric Multi-jet or volumetric (Plastic Bodied) Above ground New Areas	C	No

75. PS 10.1 DOMESTIC METER BOXES

All domestic water meters must be fitted into a proprietary meter box the above ground configuration

76. PS 10.2 ABOVE GROUND METER BOXES

Above ground meter boxes are to be installed in new areas and existing areas.

Meters and related plastic components in above ground installations must be protected from direct sunlight and from freezing where freezing is considered a danger.

Client:		Contractor:	
Witness:		Witness:	

PORTION B: VARIATIONS AND ADDITIONS TO THE STANDARDISED SPECIFICATIONS

The following variations and additions to the SANS 1200 and SANS 2001 Standardized Specifications referred to in Portion A apply to this Contract.

The prefix PS indicates an amendment to SANS 1200 or SANS 2001. The letters and numbers following these prefixes respectively indicate the relevant Standardized Specification and clause numbers in SANS 1200. e.g. PSA refers to SANS 1200A

PSA GENERAL

PSA 2 INTERPRETATIONS

PSA 2.3 DEFINITIONS

a) General

ADD THE FOLLOWING DEFINITIONS:

“General conditions: The General Conditions of Contract specified for use with this Contract and the Contract Data as applicable.

Specified: As specified in the standardized specifications, the Drawings or the Project Specifications. Specifications shall have the corresponding meaning.”

c) Measurement and payment

REPLACE THE DEFINITIONS FOR “fixed charge”, “time-related charge” AND “value-related charge” WITH THE FOLLOWING:

“Fixed charge: A charge that is not subject to adjustment on account of variations in the value of the Contract Price or the time allowed in the Contract for the completion of the work.

Time-related charge: A charge, the amount of which varies in accordance with the Time for Completion of the work, adjusted in accordance with the provisions of the Contract.

Value-related charge: A charge, the amount of which varies pro rata with the final value of the measured work executed and valued in accordance with the provisions of the Contract.”

PSA 3 MATERIALS

PSA 3.1 QUALITY

ADD THE FOLLOWING:

"All manufactured materials supplied shall be new materials unless the contrary is specified. All materials specified to be in accordance with SANS Specifications shall bear the SANS mark, where such a mark is available for the type of product."

ADD THE FOLLOWING SUB-CLAUSE TO CLAUSE 3:

PSA 3.3 ORDERING OF MATERIALS

The quantities set out in the Schedule of Quantities have been carefully determined from calculations based on data available at the time and should therefore be considered to be approximate quantities only. Before ordering materials of any kind the Contractor shall check with the Project Manager whether or not the scope of the work for which the materials are required is likely to change substantially. No liability or responsibility whatsoever shall be attached to the Client for materials ordered by the Contractor except when ordered in accordance with written confirmation issued by the Project Manager.”

PSA 4 PLANT

PSA 4.1 SILENCING OF PLANT

REPLACE THE CONTENTS OF SUBCLAUSE 4.1 WITH THE FOLLOWING:

Client:		Contractor:	
Witness:		Witness:	

"The Contractor's attention is drawn to the applicable regulations pertaining to noise and hearing conservation, framed under the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) as amended.

The Contractor shall at all times and at his own cost, be responsible for implementing all necessary steps to ensure full compliance with such regulations, including but not restricted to the provision and use of suitable and effective silencing devices for pneumatic tools and other plant which would otherwise cause a noise level in excess of that specified in the said regulations.

Where appropriate, the Contractor shall further, by means of temporary barriers, effectively isolate the source of such noise in order to comply with the said regulations."

PSA 4.2 CONTRACTOR'S OFFICES, STORES AND SERVICES

ADD THE FOLLOWING PARAGRAPH BEFORE THE EXISTING FIRST PARAGRAPH IN SUBCLAUSE 4.2:

"The Contractor's buildings, sheds and other facilities erected or utilised on the Site for the purposes of the Contract shall be fenced off and shall contain all offices, stores, workshops, testing laboratories, toilet facilities, etc. as may be required by the Contractor. The facilities shall always be kept in a neat and orderly condition.

No personnel may reside on the Site. Only night-watchmen may be on the Site after hours."

DELETE "AND FIRST-AID SERVICES" IN THE SECOND PARAGRAPH OF SUBCLAUSE 4.2 AND ADD THE FOLLOWING:

"The Contractor shall provide on the Site and in close proximity to the actual locations where the work is being executed, one toilet per 20 workers, which toilets shall be effectively screened from public view and their use enforced. Such toilets shall be relocated from time to time as the location of the work being executed changes, so as to ensure that easy access to the toilets is maintained."

PSA 5 CONSTRUCTION

PSA 5.1 SURVEY

PSA 5.1.2 Preservation and replacement of survey beacons and pegs subject to the Land Survey Act

DELETE THE WORDS "in the vicinity of boundaries" IN THE SECOND SENTENCE OF SUBCLAUSE 5.1.2 AND REPLACE THE WORDS "under the direction of" IN THE SAME SENTENCE WITH "in consultation and liaison with."

ADD THE FOLLOWING AFTER THE SECOND SENTENCE OF SUBCLAUSE 5.1.2:

"The Contractor and the Project Manager shall record on the said list, their concurrence or disagreement (as the case may be) regarding the completeness and accuracy of the details recorded therein."

REPLACE THE THIRD SENTENCE OF SUBCLAUSE 5.1.2 WITH THE FOLLOWING:

"At the completion of the Contract, the Contractor shall expose all pegs that were listed at the commencement of the construction as being in order and the Contractor shall arrange with a registered Land Surveyor for the checking of the positions of all such pegs and the replacement of those that the Land Surveyor's check reveals have become disturbed or damaged. The Contractor shall, as a precedent to the issue of the Certificate of Completion, provide to the Project Manager, a certificate from the registered Land Surveyor, certifying that all the pegs listed at the commencement of construction in accordance with the provisions of this clause, have been checked and that those found to have been disturbed, damaged or destroyed have been replaced in their correct positions, all in accordance with the provisions of the said Act.

The costs of all checking, replacement and certification as aforesaid shall be entirely for the Contractor's account. This, with the provisions always that the Contractor shall not be held liable for the cost of replacement of pegs which:

Client:		Contractor:	
Witness:		Witness:	

- (a) cannot reasonably be re-established in their original positions by reason of the finished dimensions of the permanent works, and
- (b) the contractor can prove beyond reasonable doubt to the satisfaction of the Project Manager, were disturbed, damaged or destroyed by others beyond his control."

PSA 5.3 PROTECTION OF STRUCTURES

REPLACE "Machinery and Occupational Safety Act, 1983 (Act No 6 of 1983)" *WITH* "Occupational Health and Safety Act, 1993 (Act No 85 of 1993), as amended," *AND INSERT THE FOLLOWING AFTER* "(Act No. 27 of 1956)": "as amended."

PSA 5.4 PROTECTION OF OVERHEAD AND UNDERGROUND SERVICES

REPLACE THE HEADING AND THE CONTENTS OF SUBCLAUSE 5.4 WITH THE FOLLOWING:

PSA 5.4 LOCATION AND PROTECTION OF EXISTING SERVICES

PSA 5.4.1 Location of existing services

Before commencing with any work in an area, the Contractor shall ascertain the presence and actual position of all services which can reasonably be expected by an experienced and competent Contractor to be present on, under, over or within the Site.

Without in any way limiting his liability in terms of the Conditions of Contract in relation to damage to property and interference with services, the Contractor shall, in collaboration with the Project Manager, obtain the most up-to-date plans as are available, showing the positions of services existing in the area where he intends to work. Neither the Client nor the Project Manager offers any warranty as to the accuracy or completeness of such plans and because services can often not be reliably located from plans, the Contractor shall ascertain the actual location of services depicted on such plans by means of careful inspection of the Site.

Thereafter, the Contractor shall, by the use of appropriate methodologies, carefully expose the services at such positions as are agreed to by the Project Manager, for the purposes of verifying the exact location and position of the services. Where the exposure of existing services involves excavation to expose underground services, the further requirements of subclauses 4.4 and 5.1.2.2 of SANS 1200 D (as amended) shall apply.

The aforesaid procedure shall also be followed in respect of services not shown on the plans but which may reasonably be anticipated by an experienced Contractor to be present or potentially present on the site.

All services, the positions of which have been determined as aforesaid at the critical points, shall henceforth be designated as 'known services' and their positions shall be indicated by the Contractor on a separate set of drawings, a copy of which shall be furnished to the Project Manager without delay.

As soon as any service which has not been identified and located as described above is encountered on, under, over or within the site, it shall henceforth be deemed to be a known service and the aforesaid provisions pertaining to locating, verifying and recording its position on the balance of the site shall apply. The Contractor shall notify the Project Manager immediately when any such service is encountered or discovered on the Site.

Whilst he is in possession of the Site, the Contractor shall be liable for all loss of or damage as may occur to:

- (a) known services, anywhere along the entire lengths of their routes, as may reasonably be deduced from the actual locations at which their positions were verified as aforesaid, due cognizance being taken of such deviations in line and level which may reasonably be anticipated, and
- (b) any other service which ought reasonably to have been a known service in accordance with the provisions of this clause.

The Contractor shall also be liable for consequential damage in regard to (a) and (b), whether caused directly by the Contractor's operations or by the lack of proper protection.

No separate payment will be made to the Contractor in respect of any costs incurred in preparing and submitting to the Project Manager the Drawings as aforesaid. These costs shall be deemed included in the Contractor's other tendered rates and prices included in the Contract.

Client:		Contractor:	
Witness:		Witness:	

Payment to the Contractor in respect of exposing services at the positions agreed by the Project Manager and as described above will be made under the payment items (if any) as may be provided for in the respective sections of the specifications pertaining to the type of work involved.

PSA 5.4.2 Protection during construction

The Contractor shall take all reasonable precautions and arrange its operations in such a manner as to prevent damage occurring to all known services during the period which the Contractor has occupation and/or possession of the Site.

Services left exposed shall be suitably protected from damage and in such a manner as will eliminate any danger arising there from to the public and/or workmen, all in accordance with the requirements of the prevailing legislation and related regulations.

Unless otherwise instructed by the Project Manager, no services shall be left exposed after its exact position has been determined and all excavations carried out for the purpose of exposing underground services shall be promptly backfilled and compacted. In roadways, the requirements of Subclause 5.9 of SANS 1200 DB should be observed. In other areas compaction is to be to 90% modified AASHTO density.

PSA 5.4.3 Alterations and repairs to existing services

Unless the contrary is clearly specified in the Contract or ordered by the Project Manager, the Contractor shall not carry out alterations to existing services. When any such alterations become necessary, the Contractor shall promptly inform the Project Manager, who will either make arrangements for such work to be executed by the owner of the service or instruct the Contractor to make such arrangements himself.

Should damage occur to any existing services, the Contractor shall immediately inform the Project Manager, or when this is not possible, the relevant authority, and obtain instructions as to who should carry out repairs. In urgent cases, the Contractor shall take appropriate steps to minimize damage to and interruption of the service. No repairs of telecommunication cables or electric power lines and cables shall be attempted by the Contractor.

The following list of contact telephone numbers is provided for:

Service	Authority	Contact Details	Contact Number
Johannesburg (depo, Water, Sewer)	Zandfontein depot manager	T.. Dombo	011 386 1000
Communication	Telkom	J. Tshabalala	(011) 301-9052
Communication	MTN	P. Esterhuizen	072 291 1137
Communication	Liquid Telecom	A. Motswai	012 745 0044
Electricity	Eskom	S.Manenzhe D. Shikwambana	082 675 3560 083 372 6311
Municipal Electricity	City Power	D. Oliver	(011) 490-7195
Municipal Road	Johannesburg Roads Agency (JRA)	J. Montero	(011) 298-5000
Gas	Sasol	B. van der Heuvel	(011) 617-8261
Gas	Egoli Gas	Egoli Gas	011 356 5000
Bulk Water	Rand Water	I. Davids	(011) 682-0911
Provincial Road	Gautrans (GDRT)	J. Olivier	(012) 310-2200
Railway	Transnet		
Fibre	Dark Fibre Africa	P. Maepane	069 975 1422
Fibre	Openserve	Openserve	011 234 5552
Fibre	MTC	L. Fischer	076 068 2562

PSA 5.7 **SAFETY**

REPLACE THE CONTENTS OF SUBCLAUSE 5.7 WITH THE FOLLOWING:

Client:		Contractor:	
Witness:		Witness:	

"Pursuant to the provisions of the Conditions of Contract, and without in any way limiting the Contractor's obligations thereunder, the Contractor shall at his own expense (except only where specific provision (if any) is made in the Contract for the reimbursement to the Contractor in respect of particular items), provide the following:

- (a) Provide to its Employees on the site of the works, all safety materials, clothing and equipment necessary to ensure full compliance with the provisions of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) as amended (hereinafter referred to as the Act) at all times, and shall institute appropriate and effective measures to ensure the proper usage of such safety materials, clothing and equipment at all times;
- (b) Provide, install and maintain all barricades, safety signage and other measures to ensure the safety of workmen and all persons in, on and around the site, as well as the general public;
- (c) Implement on the site of the works, such procedures and systems and keep all records as may be required to ensure compliance with the requirements of the Act at all times;
- (d) Implement all necessary measures so as to ensure compliance with the Act by all subcontractors engaged by the Contractor and their employees engaged on the works;
- (e) Full compliance with all other requirements pertaining to safety as may be specified in the Contract.

The Client and the Project Manager shall be entitled, although not obliged, to make such inspections on the site as they shall deem appropriate, for the purpose of verifying the Contractor's compliance with the requirements of the Act. For this purpose, the Contractor shall grant full access to the site of all parts of the site and shall co-operate fully in such inspections and shall make available for inspection all such documents and records as the Project Manager or Supervisor may reasonably require.

Where any such investigations reveal, or where it comes to the Project Manager's attention that the Contractor is in any way in breach of the requirements of the Act or is failing to comply with the provisions of this clause, the Project Manager shall, in accordance with the provisions Clause 34 in the Conditions of Contract, be entitled to stop work or any part thereof until such time as the Contractor has demonstrated to the satisfaction of the Project Manager, that such breach has been rectified.

The Contractor shall have no grounds for a compensation event if the work or any part thereof is stopped by the Project Manager in terms of this clause, and the Contractor shall remain fully liable in respect of the payment of delay damages for late completion in accordance with the provisions of Clause X7 in the Conditions of Contract should the Contractor fail to complete the Works on or before the specified due completion date in consequence work stopped.

PSA 6 TOLERANCES

ADD THE FOLLOWING SUBCLAUSE TO CLAUSE 6:

PSA 6.4 USE OF TOLERANCES

No guarantee is given that the full specified tolerances will be available independently of each other, and the Contractor is cautioned that the liberal or full use of any one or more of the tolerances may deprive him of the full or any use of tolerances relating to other aspects of the work.

Except where the contrary is specified, or when clearly not applicable, all quantities for measurement and payment shall be determined from the 'authorised' dimensions. These are specified dimensions or those shown on the drawings or, if changed, as finally prescribed by the Project Manager, without any allowance for the specified tolerances. Except if otherwise specified all measurements for determining quantities for payment will be based on the 'authorised' dimensions.

If work is constructed in accordance with the 'authorised' dimensions plus or minus the tolerances allowed, the calculation of quantities will be based on the 'authorised' dimensions, regardless of the actual dimensions to which the work has been constructed.

When the work is not constructed in accordance with the 'authorised' dimensions plus or minus the tolerances allowed, the Project Manager may nevertheless, at his sole discretion, accept the work for payment. In such cases no payment shall be made for quantities of work or material in excess of those calculated for the 'authorised' dimensions, and where the actual dimensions are less than the 'authorised'

Client:		Contractor:	
Witness:		Witness:	

dimensions minus the tolerance allowed, quantities for payment shall be calculated based on the actual dimensions as constructed."

PSA 7 TESTING

PSA 7.2 APPROVED LABORATORIES

REPLACE THE CONTENTS OF SUBCLAUSE 7.2 WITH THE FOLLOWING:

"Unless otherwise specified in the relevant specification or elsewhere in the Project Specification, the following shall be deemed to be approved laboratories in which design work, or testing required in terms of a specification for the purposes of acceptance by the Project Manager of the quality of materials used and/or workmanship achieved, may be carried out:

- (a) Any testing laboratory certified by the South African National Accreditation Systems (SANAS) in respect of the nature and type of testing to be undertaken for the purposes of the Contract;
- (b) Any testing laboratory owned, managed or operated by the Client or the Project Manager;
- (c) Any testing laboratory established and operated on the Site by or on behalf of the Client or the Project Manager;
- (d) Any other laboratory that the Project Manager approves in his absolute discretion."

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.1 MEASUREMENT

PSA 8.1.2 Preliminary and General Item or Section

PSA 8.1.2.1 Contents

REPLACE THE LAST SENTENCE OF SUBCLAUSE 8.1.2.1(b) WITH THE FOLLOWING:

"Separate items will be scheduled to cover the fixed, value-related and time-related components of the Contractor's preliminary and general costs."

PSA 8.1.2.2 Tendered sums

REPLACE THE CONTENTS OF THIS SUBCLAUSE WITH THE FOLLOWING:

"Except only where specific provision is made in the Specifications and/or the Bill of Quantities for separate compensation for any of these items, the Contractor's tendered sums under the payment items of PSA 8.3 and PSA 8.4 shall collectively cover all charges for:

- Risks, costs and obligations in terms of the Conditions of Contract and of this standardized specification
- Head-office, site overheads and supervision
- Profit and financing costs,
- Providing such facilities on site as may be required by the Contractor for the proper performance of the Contract and for its personnel, including, but without limitation, providing offices, storage facilities, workshops, ablutions, services such as water, electricity, sewage and rubbish disposal, access roads and all other facilities required, as well as for the maintenance and removal on completion of the works of these facilities and cleaning-up of the site of the Contractor's establishment and reinstatement to not less than its original condition,
- Providing the facilities for the Project Manager and his staff as specified in the Contract and their removal from the site on completion of the Contract."

PSA 8.2 PAYMENT

PSA 8.2.1 Fixed-charge and Value-related Items

REPLACE THE CONTENTS OF SUBCLAUSE 8.2.1 WITH THE FOLLOWING:

Client:		Contractor:	
Witness:		Witness:	

PSA 8.2.1.1 Fixed-charge Items

Payment of fixed charges in respect of item 8.3.1 will be made as follows:

- (a) EIGHTY PER CENT (80%) of the sum tendered will be paid when the facilities have been provided and approved;
- (b) The remaining TWENTY PER CENT (20%) will be paid when the works have been completed, the facilities have been removed and the site of the Contractor's establishment has been cleared and cleaned to the satisfaction of the Project Manager.

No adjustment will be made to the sum tendered in respect of item 8.3.1 should the value of the works finally executed or the time for completion vary in any way from that specified in the tender."

PSA 8.2.1.2 Value-related Items

Payment for the sum tendered under item 8.3.2 will be made in three separate instalments as follows:

- (a) The first instalment, which is 40% of the sum, will be paid when the Contractor has fulfilled all his obligations to date under this specification, the General Conditions of Contract and the Contract Data, and when the value of work certified for payment, excluding materials on site and payments for preliminary and general items, is equal to not less than 5% of the total value of the work listed in the Schedule of Quantities.
- (b) The second instalment, which is 40% of the sum, will be made when the amount certified for payment, including retention moneys but excluding this second instalment, exceeds 50% of the tender sum.
- (c) The final payment, which is 20% of the sum, will be made when the works have been certified as completed and the Contractor has fulfilled all his obligations to date under this Specification, the General Conditions of Contract and the Contract Data.

Should the value of the measured work finally completed be more or less than the tender sum, the sum tendered under item 8.3.2 will be adjusted up or down in accordance with the provisions of Clause 56 of the NEC 4 Engineering and Construction Contract (ECC4) (2017), and this adjustment will be applied to the third instalment."

PSA 8.2.2 Time-related Items

REPLACE THE CONTENTS OF SUBCLAUSE 8.2.2 WITH THE FOLLOWING:

"Subject to the provisions of sub clauses 8.2.3 and 8.2.4, payment under item 8.4.1 (time-related item) will be made monthly in equal amounts, calculated by dividing the sum tendered for the item by the tendered contract period in months, provided always that the total of the monthly amounts so paid for the item is not out of proportion to the value of the progress of the Works as a whole."

PSA 8.3 SCHEDULED FIXED-CHARGE AND VALUE-RELATED ITEMS

PSA 8.3.1 Contractual Requirements

ADD THE FOLLOWING AT THE END OF THE EXISTING CLAUSE(S):

"The Contractor shall provide a lowest-level composition of the sum to the Project Manager when requested to do so."

PSA 8.3.2 Establishment of Facilities on the Site

PSA 8.3.2.1 Facilities for Engineer

ADD THE FOLLOWING NEW SUBITEMS TO CLAUSE 8.3.2.1

- d) JW ISD team office (2 No.) Unit : Sum
- e) CLO's office (1 No.) Unit : Sum
- f) Meeting Room (1 No.) Unit : Sum
- g) Latrine Facilities (1 No.) Unit : Sum
- h) Parking (3 No.) Unit : Sum
- i) Communication Unit : Sum

Client:		Contractor:	
Witness:		Witness:	



j) Survey equipment, assistants and material Unit : Sum

k) Computer facilities Unit : Sum

ADD THE FOLLOWING NEW SUBCLAUSE TO CLAUSE 8.3.2.1

The sums shall include the complete costs for the provision of the facilities required by the Project Manager (as listed) to site, the erection (establishment) on site and the removal upon Contract completion. The sums tendered shall include full compensation for all relevant fixed-charge preliminary and general charges as described in subclause PSA 8.1.2.2. Payment will be made as described in subclause PSA 8.2.1.1.

PSA 8.3.2.2 Facilities for Contractor

ADD THE FOLLOWING NEW SUB TO CLAUSE 8.3.2.2

Rates shall include the complete costs for the provision of the Contractor's facilities (as listed) to site, the erection (establishment) on site and the removal upon Contract completion. The sums tendered shall include full compensation for all relevant fixed-charge preliminary and general charges as described in subclause PSA 8.1.2.2. Payment will be made as described in subclause PSA 8.2.1.1.

PSA 8.3.3 Other Fixed-charge obligations

ADD THE FOLLOWING AT THE END OF THE EXISTING CLAUSE(S):

"The Contractor shall provide a lowest-level composition of the sum to the Project Manager when requested to do so."

PSA 8.3.5 Additional Contractual Obligations

PSA 8.3.5.1 Notice and warning to consumers.....Unit : Sum

The sum shall cover the full compensation and cost of supply and delivery of the notices and warnings to customers at least 7 days before a shutdown is to take place in each section of work.

PSA 8.3.5.2 Compile Health and Safety Plan.....Unit: Sum

The rate shall include the complete cost for the provision of resources (human and equipment), communication, transportation and travelling, documentation of activities and reporting activities required to compile a Health and Safety Plan as per the Health and Safety Specifications contained in Volume 2, and approval of such plan thereof. Remuneration shall be a lump sum. The compiled plan shall include for all sub-contractor and SMMEs.

PSA 8.3.5.3 EMP Obligations Unit: Sum

The sum shall cover the full compensation and all fixed costs for compliance with the requirements of the Client's Environmental Management Plan as provided in Volume 2 of these contract documents.

PSA 8.3.5.4 Provision of Photographic Records.....Unit: Sum

The sum shall cover the full compensation for the Contractor to take pictures of the site conditions, roadway conditions, sidewalks and customers driveways and lawns BEFORE constructions and again AFTER construction and reinstatement. The photographic record should be stored safe and with utilise an accurate reference system to allow it to be used for reference when there are disputes pertaining to original condition of surfaces before construction.

PSA 8.4 SCHEDULED TIME-RELATED ITEMS

PSA 8.4.1 Contractual Requirements

ADD THE FOLLOWING AT THE END OF THE EXISTING CLAUSE(S):

"The Contractor shall provide a lowest-level composition of the sum to the Project Manager when requested to do so."

PSA 8.4.2 Operation and Maintenance of Facilities on Site, for Duration of Construction, except where otherwise stated

PSA 8.4.2.1 Facilities for Engineer

ADD THE FOLLOWING NEW SUBITEMS TO CLAUSE 8.4.2.1

Client:		Contractor:	
Witness:		Witness:	

e) JW ISD team office (2 No.)	Unit : Sum
f) CLO's office (1 No.)	Unit : Sum
g) Meeting Room (1 No.)	Unit : Sum
h) Latrine Facilities (1 No.)	Unit : Sum
i) Parking (3 No.)	Unit : Sum
j) Communication	Unit : Sum
k) Computer facilities	Unit : Sum

PSA 8.4.2.2 Facilities for Contractor

ADD THE FOLLOWING NEW SUBITEMS TO CLAUSE 8.4.2.2

a) Offices and storage sheds.....	Unit : Sum
b) Workshops	Unit : Sum
e) Ablution and latrine facilities	Unit : Sum
f) Tools and equipment	Unit : Sum
g) Water supplies, electric power and communications	Unit : Sum
h) Dealing with water (See 5.5)	Unit : Sum
i) Access to site (See 5.8)	Unit : Sum
j) Plant	Unit : Sum

PSA 8.4.3 Supervision for duration of Construction

ADD THE FOLLOWING TO THIS SUB-CLAUSE:

"The Contractor shall provide a lowest-level composition of the sum to the Project Manager when requested to do so."

PSA 8.4.4 Company and head office overhead costs for duration of the Contract

ADD THE FOLLOWING TO THIS SUB-CLAUSE:

"The Contractor shall provide a lowest-level composition of the sum to the Project Manager when requested to do so."

PSA 8.4.5 Other Time-related obligations

ADD THE FOLLOWING TO THIS SUB-CLAUSE:

"The Contractor shall provide a lowest-level composition of the sum to the Project Manager when requested to do so."

ADD THE FOLLOWING NEW SUBCLAUSES TO CLAUSE 8.4.

PSA 8.4.6 Additional Obligations

PSA 8.4.6.1 Implementation of Health and Safety Plan Unit: Sum

The rate shall include the complete cost for the provision of resources (human and equipment), communication, transportation and travelling, documentation of activities and reporting activities required to fully comply with the implementation and maintenance of the Health and Safety Plan. Remuneration shall be on a monthly basis for services rendered, by dividing the total sum tendered by the construction duration. The compiled plan shall include for all sub-contractor and SMMEs.

PSA 8.4.6.2 Full-time OHS Officer Unit: Sum

The rate shall include the wages and salary that is to be paid to the safety officer/s, whose responsibility it is to ensure that all activities required fully comply with the Health and Safety Plan as per the Health and Safety Specifications contained in Volume 2 for the duration of the Contract and any applicable overheads.

Client:		Contractor:	
Witness:		Witness:	

The OHS Officer shall meet the requirements as set out in Part B1 of the Functionality Criteria of the Tender Data. The rate shall be on a monthly basis for services rendered, by dividing the total sum tendered by the construction duration.

PSA 8.4.6.3 Provide protective safety clothing Unit: Sum

The rate shall cover the cost for the duration of the Contract to provide safety helmets, safety shoes, safety vests, overalls, ear protection, eye protection, gloves, gumboots and any other required safety equipment.

PSA 8.4.6.4 EMP Obligations Unit: Sum

The sum shall cover the full compensation and all-time related costs for the duration of the contract, for compliance with Client's Environmental Management Plan as provided in Volume 2 of these contract documents.

PSA 8.4.6.5 Full-time Environmental Representative Unit: Sum

The sum shall cover the salary for a full time Environmental Representative for the duration of the contract, including any overheads. The Environmental Representative must hold a Senior Certificate (Matric) and one of the following qualifications:

- National Diploma in Environmental Management or
- BA/BSc Environmental Management or Science or
- ISO 14001:2015 (Introduction; Implementation and Auditing/Certificate in Environmental law) or
- National Certificate in Environmental Management

PSA 8.4.6.6 On-site security Unit: Sum

The rate shall cover the cost to provide 24 hour security for staff, materials and plant for the duration of the Contract. (See PS6.1). The Contractor may employ an independent service provider and the rate shall cover said service including all overheads associated with that service.

PSA 8.4.6.7 On-site security at Office Park during electrical fence construction Unit: Sum

The rate shall cover the cost to provide 24-hour security for the 51 150m² Office Park located at Woodmead EXT.15 during the period that a new temporary electrical fence will be constructed. Allowance should be made to provide 5 day and night security guards for the duration of constructing the temporary electrical fence. The Contractor may employ an independent service provider and the rate shall cover the said service including all overheads associated with that service.

PSA 8.4.6.8 Electrical Safety Officer (ESO) Unit: Sum

The cost shall cover the salary for a full-time Electrical Safety Officer (ESO) for the duration of the contract, including any overheads and equipment required by the ESO to carry out his duties. The ESO shall meet the requirements as set out in the Section 3.8 "Guideline on the electrical co-ordination of pipelines and power lines (Unique identifier 240-66418968)" included in Volume 4 of the Tender Document and below.

Prior to any work commencing an Electrical Safety Officer (ESO) shall be appointed by the Contractor. The ESO shall:

- a) be the designated electrical safety officer for the project,
- b) have completed Eskom's ORHVS responsible person training course,
- c) be authorised by a ORHVS authorised person (GMR2.1) to work without constant supervision in a power line servitude,
- d) have completed the SAECC Electrical Safety Officer training course,
- e) have experience in the supervision and management of temporary mitigation measures during pipeline construction, and
- f) be furnished with the authority and equipment required to implement and maintain safe working conditions,
- g) keep a record of any non-compliance and advise the construction manager and the project safety officer.

Client:		Contractor:	
Witness:		Witness:	

PSA 8.4.6.9 Advertising on the Billboard Unit: Prov Sum

The cost shall cover the advertising cost on the 72 meter long by 6 meters high steel billboard for a period of not more than 3 Months during the temporary removal and reinvestment of the billboard situated at corner Woodlands Drive and Woodmead Drive, Woodmead, Sandton, Johannesburg only. The payment shall be made as agreed with the project manager to the owner or affected parties.

a) Overheads, charges and profits on above..... Unit: %

PSA 8.4.6.10 Temporary Removal and reinstatement of billboard Unit: Prov Sum

The Project Manager shall set aside an amount as a Provisional Sum for the temporary removal and permanent reinstatement of the billboard. The amount shall cover the cost related to the temporary removal and permanent reinstatement of the steel billboard, posts, members, signage, including removal, loading, transportation, off-loading, storing, additional or new material required for reinstatement, labour and safety requirements connection and disconnection of all electrical equipment and cables including demolishing and reinstating of concrete foundation.

The amount shall include the cost related to providing as-built drawings, designing the concrete foundations, steel frame design and verification and all electrical as per the specifications and regulatory standards by a professional Engineer. The billboard is 6-meters-high by 70-meters-long and lights powered by solar.

PSA 8.5 SUMS STATED PROVISIONALLY BY THE ENGINEER

REPLACE THE CONTENTS OF SUBCLAUSE 8.5 WITH THE FOLLOWING:

- "a) Community Liaison Officer (CLO and CSO)..... Unit : Prov Sum
- b) Overheads, charges and profits on above..... Unit : %
- c) Alteration to existing services by authorities Unit : Prov Sum
- d) Overheads, charges and profits on above..... Unit : %
- e) Reinstatement of asphalt by JRA Unit : Prov Sum
- f) Overheads, charges and profits on above..... Unit : %
- g) Training Unit : Prov Sum
- h) Overheads, charges and profits on above..... Unit : %
- i) Temporary protection of services Unit : Prov Sum
- j) Overheads, charges and profits on above..... Unit : %
- k) Relocation of endangered plant species Unit : Prov Sum
- l) Overheads, charges and profits on above..... Unit : %
- m) Provision of OHS Mentorship Unit : Prov Sum
- n) Overheads, charges and profits on above..... Unit : %
- o) Internships Unit : Prov Sum
- p) Overheads, charges and profits on above..... Unit : %
- q) Social Consultant Unit : Prov Sum
- r) Overheads, charges and profits on above..... Unit : %
- s) 10% Preliminary and General Items for SMMEs Unit : Prov Sum

The Contractor shall be reimbursed under subitems (a), (c), (e), (g), (i), (k), (m), (o), (q) and (s) in substitution of the respective Provisional Sums allowed in the Schedule of Quantities, the amounts actually paid or payable by the Contractor to the respective items.

The Contractor shall be paid under subitems (b), (d), (f), (h), (j), (l), (n), (p) (r) where the unit of measurement was specified as being a percentage, the respective percentage, as stated by the Contractor in is tender, of the

Client:		Contractor:	
Witness:		Witness:	

amount certified by the Projects Manager for payment under the related subitem (a), (c), (e), (g), (i), (k), (m), (o), (q) or (s).

Provided always that where the Contractor has failed for any reason to insert a percentage or sum (as applicable) for subitem (b), (d), (f), (h), (j), (l), (n), (p) (r) in its tender, the Contractor will be paid an amount equal to SEVEN AND ONE HALF PER CENT (7,5%) of the amount actually certified by the Project Manager for payment under subitem (a), (c), (e), (g), (i), (k), (m) (o) or (q).

The percentage or sum (as applicable) paid under subitem (b), (d), (f), (h), (j), (l), (n), (p) and (r) as aforesaid, shall be deemed to include for full and final compensation to the Contractor for all costs as may be incurred and all charges and profits associated with the engagement, supervision, administration and management of the item required of him in fulfilling his obligations in respect of that subitem."

PSA 8.6 PRIME COST ITEMS

REPLACE THE CONTENTS OF SUBCLAUSE 8.6 WITH THE FOLLOWING:

- "a) Additional tests required by the Project Manager Unit : Sum
b) Overheads, charges and profits on above..... Unit : %

Subitems (a) and (b) will be provided in the Schedule of Quantities.

The Contractor shall be reimbursed under subitem(s) (a) in substitution of the respective Prime Cost Sums included in the Contract, the actual price(s) paid or payable by him in respect of the goods, materials or services supplied, but excluding any charges for the Contractor's labour, profit, carriage, establishment or other charges related to such goods, services or materials.

The Contractor shall be paid under subitem (b), the respective percentage, as stated by the Contractor in his tender, of the amount certified by the Project Manager for payment under the related subitem (a). The percentages tendered by the Contractor for each respective subitem (b) included in the Schedule of Quantities shall be deemed to be in full and final compensation to the Contractor in respect of any charge by the Contractor for labour, carriage profit, establishment and for any other charges related to the goods, services or materials supplied under the related subitem (a).

If the Contractor shall have omitted within his tender to insert a tendered percentage under subitem (b), or tendered a zero percentage, the Contractor's tendered rate for subitem (b) shall be deemed to be zero and the Contractor shall not be entitled to any payment under subitem (b).

The Contractor shall be responsible for both the cost of normal testing as described in the Standard Specifications, Particular Specifications and Project Specifications and for the cost of any additional test that indicates that the specifications have not been complied with."

PSA 8.7 DAYWORKS

ADD THE FOLLOWING NEW CLAUSES:

PSA 8.7.1 Scope

This section covers the method of measurement and payment for work carried out on a day work basis.

PSA 8.7.1.1 General Requirements

Work will be classified as day work only if the Project Manager considers no other rate in the Bill of Quantities appropriate for payment purposes.

An instruction regarding all work to be carried out under day work in terms of the Short Schedule of Cost Component (SSCC) of the NEC 4 Engineering & Construction Contract (ECC4) (2017) will be issued at the discretion of the Project Manager. Some or all of the items priced under day work in the Bill of Quantities may possibly not be required for this Contract.

Before ordering any material, the Contractor shall submit quotations to the Project Manager for his approval, and shall submit such receipts or vouchers to the Project Manager as may be necessary for proving the amount claimed.

Client:		Contractor:	
Witness:		Witness:	

The Contractor shall, during the continuance carried out on a daywork basis, deliver each day to the Project Manager or Supervisor, a list of the exact occupation and time of all workmen and foremen employed on such work and a statement showing the description and quantity of all materials and construction equipment used therefor. If correct and agreed upon by the Project Manager or Supervisor and the Contractor, the Project Manager or Supervisor shall sign the copies of the list and return it to the Contractor.

PSA 8.7.1.2 Measurement and Payment - Day works

The day work rates submitted for vehicles and construction equipment, in the Bill of Quantities shall be a hire charge for the use of the vehicle and driver or constructional plant/equipment and operator (excluding VAT) and shall apply only to vehicles and construction equipment approved in writing by the Project Manager. The rate shall include for maintenance, fuels and oils and other operating costs, establishment, insurance and other contingency costs relating to the running of the vehicle, plant or equipment.

Where there is ambiguity between the power developed at the flywheel and mass of a machine, the power shall govern the measurement category.

The Contractor and the Project Manager will agree on the method of recording the working hours prior to the commencement of the work. Any long period of idling at any one time which in the opinion of the Project Manager or Supervisor is beyond that required for normal operating conditions will not be paid for as working time. Non-working hours for any reason shall not be measured for payment.

The fee percentage allowed for overheads etc. as per Clause 11.2(10) & 52.1 of the NEC 4 Engineering & Construction Contract (ECC4) (2017) shall include full compensation for all administrative costs, supervision, overheads, liabilities and obligations related to the running of the vehicles, constructional plant and equipment. The tendered fee percentage shall also include for profit and shall be subject to the Contract Price Adjustment factor laid down in the Contract Data.

PSA 8.8 TEMPORARY WORKS (See 8.1.2.1(d))

PSA 8.8.4 Existing Services (see 5.4)

AMEND THE SUB CLAUSE AS FOLLOWS:

a) Supply or hire of Ground Penetrating Radar equipment Unit: Sum

The sum shall cover the cost for the supply, operation and/or hire of specialist equipment for detection of underground services using ground penetrating radar technology for the full length of all pipelines routes, across the trench width and up to trench invert levels.

b) Excavation by hand to expose existing services in all types of materials Unit: m³

The rate shall cover the cost for removal of premix or other surfacing where necessary, excavating in all materials, shoring, backfilling, compaction and reinstatement of surfaces except for asphalt.

ADD THE FOLLOWING SUBCLAUSE TO CLAUSE 8.8:

PSA 8.8.7 Temporary Plastic Barrier Fence Unit: m

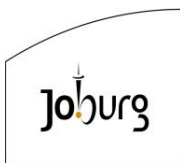
The rate shall cover the cost of supplying, erecting, maintaining and dismantling of a temporary orange plastic barrier mesh fence of 1.2 m high with a tensile strength of 130 g/m². The rate shall include provision of sufficient 2 m long y-standards for erection of the fence.

ADD THE FOLLOWING SUBCLAUSE TO CLAUSE 8:

PSA 8.9 PAYMENT TO THE MAIN CONTRACTOR FOR THE MANAGEMENT OF SMMEs, BASED ON THE PROVISIONAL VALUE OF WORKS TO BE SUBCONTRACTED Unit: %

Tenderers shall price a % Rate for the Management of SMMEs. This rate shall cover all the management costs for the main Contractor to manage local Subcontractors / SMMEs. A schedule of quantities will be prepared for each subcontract Work package to be issued and the management fee to main Contractor will be paid based on the completed subcontracted work by SMMEs as and when it is invoiced to Client.

Client:		Contractor:	
Witness:		Witness:	



PSAB ENGINEER'S OFFICE

PSAB 3 MATERIALS

PSAB 3.1 NAMEBOARDS

DELETE THE ENTIRE CLAUSE AND REPLACE WITH:

"The name board shall be of either tempered hardboard at least 12 mm thick or steel sheeting so braced on the reverse side as to prevent warping or buckling and shall be mounted on two or more firmly planted poles as necessary. The quality of the paint shall conform to SANS Standard Specification CKS 193. The colour of the paint shall conform to SANS 1091-1975 colour F11, strong blue. The Client's SOC Ltd logo shall be in colour. The height of the larger name board shall be 2400 mm and the width 4800 mm, whilst the height of the smaller name board shall be 800 mm and the width 1600 mm" Contract nameboards shall be manufactured as per drawings JW14358-16941-T-017-S01-00-TMS & JW14358-16941-T-017-S02-00-TMS.

PSAB 3.2 OFFICE BUILDING(S)

Delete this sub-clause entirely and re-title the sub-clause "FACILITIES FOR THE PROJECT MANAGER"

Add the following sub-clause.

PSAB 3.2.1 Office Building(s)

The Contractor shall provide, furnish and equip one or more offices (as scheduled) for the use of the Project Manager. Each office shall be weatherproof.

Each office shall consist of one room with a floor area of at least 15 m² and a ceiling height of at least 2.5 m.

Each office shall be air conditioned, shall have a wooden boarded floor that is at least 150 mm above the ground, and shall be provided with a ceiling and a lining to the walls, or equivalent insulation, with an acceptable type of door with a secure lock, and two opening windows of glazed area at least 3 m². Each office shall be well ventilated and shall be so insulated as to provide comfortable working conditions.

The office building shall be painted with an approved paint after erection and the paintwork shall be maintained during the contract period.

Each door shall be provided with a lock and two keys.

The sitting of all offices shall be to the Project Manager's satisfaction and shall be decided upon in consultation with him/her and confirmed in writing before erection.

All accommodation shall include the provision of access roads where required, fresh clean portable water and sewerage, which will be considered as part and parcel of the accommodation provided and will not be paid for separately.

The Site Office shall be fenced using diamond wire mesh right round with access gate.

All accommodation shall meet the approval of the Project Manager.

The offices shall comply with the following requirements.

Dimensions	Boardroom	Project Manager's Office
Minimum floor area	28 m ²	15 m ²
Minimum window area	4.0 m ²	3.0 m ²
Minimum window area opening	2.4 m ²	1.5 m ²
Minimum clear height	2.5 m	2.5 m
Shaded parking for vehicles		3

Furniture and Equipment

Project Manager's shall be equipped with the following:

- i) Office desk with a surface area of at least 1.5m² with at least 3 drawers one of which can be locked.

Client:		Contractor:	
Witness:		Witness:	

- ii) Two office chairs.
- iii) a lockable upright steel cabinet with three shelves or a steel filing cabinet with four drawers
- iv) Refrigerator
- v) Printer
- vi) Sufficient racks and hangers for hanging contract drawings. The hangers shall be of the "Barhold" type, with one hanger to five drawings.
- vii) 1 x Double 80-watt fluorescent light fittings complete with ballast and tubes.

The Boardroom shall be equipped with the following:

- i) Conference table large enough to accommodate twelve people and have an area of at least 15 m².
- ii) Fifteen office chairs
- iii) 2 x Double 80-watt fluorescent light fittings complete with ballast and tubes.

The Contractor shall also supply a toilet for the exclusive use of the Project Manager.

The Contractor must provide basic survey instruments: dumpy level, tripod stand and staff.

On completion of the Works, ownership of the buildings, furnishings and equipment shall revert to the Contractor who shall remove them from the Site.

PSAB 3.3 CARPORT

ADD THE FOLLOWING NEW CLAUSE:

The Contractor shall construct the number of carports as scheduled in the Bill of Quantities, for the sole use of the Project Manager and his staff. Each carport shall be constructed so that the vehicle parked under it is always protected against the direct rays of the sun. The carport area shall be at least 20 m² and the floor shall be covered with a layer of crushed stone to alleviate dusty and muddy conditions. The carport(s) shall be positioned so as to provide easy and convenient access to the Project Manager's office."

PSAB 4 PLANT

PSAB 4.1 TELEPHONE

REPLACE SUBCLAUSE 4.1 OF SANS 1200 AB WITH THE FOLLOWING:

"The Contractor shall arrange for the provision of a suitable cellular phone, approved by the Project Manager, and airtime and data bundles per month for the Project Manager's Representative. The Contractor at the tendered rates under the relevant scheduled item shall recover the associated charges and telephone calls and data bundles associated with the contract.

ADD THE FOLLOWING NEW CLAUSES:

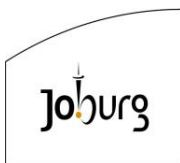
PSAB 4.2 SURVEY EQUIPMENT

ADD THE FOLLOWING NEW CLAUSE:

The Contractor shall provide onsite and make available for the exclusive use of the Project Manager and his staff, the survey equipment listed below:

- a) A tacheometer capable of reading to 20 seconds of arc.
- b) An automatic level.
- c) A 4 m telescopic levelling staff.
- d) Four ranging rods.
- e) A 30m steel, or equivalent, tape.

Client:		Contractor:	
Witness:		Witness:	



All survey equipment provided by the Contractor shall be in good condition, properly calibrated and fit for the purpose and shall be available at all times when such is reasonably required by the Project Manager and his staff for the purposes of the Contract.”

The contractor shall make two survey assistants to the Project Manager and his staff at all times when such is reasonably required.

PSAB 4.3 COMPUTER FACILITIES

The Contractor shall, for the duration of the Contract, provide the computer equipment complete with printer, including 3G connection or wifi together with the software specified hereunder, for the exclusive use of the Project Manager and his staff:

- a) 1 laptop
- b) 1 printer

The laptop shall comply with the following minimum specifications:

Lenovo Thinkpad T540P Intel Core i7-4700MQ, 32GB, 1TB, DVD+-RW DL, 15.6FHD (1920X1080), NVIDIA 1GB, 3

WAR: 3 Year on-site Warranty upgrade

Mem: Lenovo 32GB DDR3L 1600 (PC3-1280D) 50 DIMM Memory

Dock: Thinkpad Pro Dock-65W-South Africa

Printers shall, unless otherwise approved by the Project Manager, be Samsung SCX-4600 Colour Laser Printer Series or equivalent compatible.

All computer hardware shall be provided complete with the requisite connecting cables and all interfacing devices and software necessary for its efficient operation as an integral system.

The following software shall be properly installed on the computer, and the original license agreements and disks shall be provided to the Project Manager for safekeeping:

- Microsoft Windows 7 / 10 / 11
- MS-Office 2013 / MS Office 365
- MS Projects 2010 / 2019

All computer equipment provided shall be kept fully serviceable at all times by the Contractor. The Contractor shall have any defective equipment repaired or replaced at his own cost within 12 hours after notification by the Project Manager’s staff.

The Contractor shall further provide at his own cost, all paper and black ink cartridges and other consumables reasonably required by the Project Manager.”

PSAB 5 CONSTRUCTION

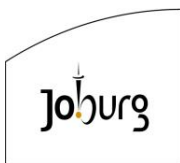
ADD THE FOLLOWING NEW SUBCLAUSES TO CLAUSE 5 OF SANS 1200 AB:

PSAB 5.6 SURVEY EQUIPMENT

All survey equipment provided by the Contractor shall be kept fully serviceable at all times by the Contractor. The Contractor shall have any defective equipment repaired or replaced at his own cost within 12 hours after notification by the Project Manager’s staff.

Where required by the Project Manager, the Contractor shall, at his own cost, promptly arrange for the recalibration of survey equipment provided.”

Client:		Contractor:	
Witness:		Witness:	



PSC **SITE CLEARANCE**

PSC 3 **MATERIALS**

PSC 3.1 **DISPOSAL OF MATERIALS**

ADD THE FOLLOWING:

"The Contractor shall obtain his own dumping sites for the disposal of material and all transport costs shall be included in the rates tendered for site clearance."

PSC 5 **CONSTRUCTION**

PSC 5.1 **AREAS TO BE CLEARED AND GRUBBED**

ADD THE FOLLOWING:

"Small diameter pipeline (DN 200 and smaller) routes shall be cleared to a distance of 1,0 m on each side of the pipeline centre line and large diameter pipeline (DN 250 up to DN 1500) routes shall be cleared to a distance of 1,5 m on each side of the pipeline centre line. Route pegs or markers shall not be destroyed or damaged during clearing operations."

PSC 5.2 **CUTTING OF TREES**

PSC 5.2.3 **Preservation of trees**

PSC 5.2.3.2 **Individual trees**

REPLACE THE LAST SENTENCE WITH THE FOLLOWING:

"An amount of R 10 000.00 will be deducted from moneys due to the Contractor as a penalty for every tree that is damaged or removed unnecessarily."

PSC 5.5 **RECLEARING OF VEGETATION**

ADD THE FOLLOWING:

"When areas have to be recleared on the written instructions of the Project Manager, such reclearing shall be carried out at the Contractor's own cost and the Contractor is therefore advised not to clear the areas too soon."

PSC 8 **MEASUREMENT AND PAYMENT**

PSC 8.2 **SCHEDULED ITEMS**

PSC 8.2.1 **Clear and grub**

REPLACE THE FIRST LINE WITH THE FOLLOWING:

"The area designated by the Project Manager to be cleared and grubbed will be measured in square metre to the nearest square metre or,"

PSC 8.2.5 **Take down existing fences**

REPLACE ITEM 8.2.5 WITH THE FOLLOWING:

PSC 8.2.5 **Take down existing fences, guardrails and masonry walls**

- a) Guardrails Unit: m
b) Diamond mesh fencing Unit: m
c) Steel palisade fencing Unit: m
d) Clearview fencing Unit: m
e) 110 mm masonry wall Unit: m
f) 220 mm masonry wall Unit: m

Client:		Contractor:	
Witness:		Witness:	

g) Masonry columns Unit: m³

The unit of measurement shall be the metre or kilometre of fence taken down and removed from the site.

The rate shall cover the cost of taking down the complete guardrail, fence or masonry wall (fence or wall height up to 2.4 m) as scheduled and removing all guardrail, fence and wall material from the site and disposing, filling of holes, levelling ground surfaces and cleaning the site as well as providing a 1.8 m high diamond mesh temporary fence during construction.”

ADD THE FOLLOWING ITEMS:

“PSC 8.2.11 Temporary fencing or hoarding

a) 1.8 m High Diamond mesh fencing Unit: m

The unit of measurement shall be the linear metre of fence or hoarding supplied and erected, and in the case of temporary fencing for maintaining and removing on completion of the works or part of the works.

The tendered rate shall include full compensation for the cost of supplying and erecting the complete fence as specified or scheduled and in the case of temporary fencing for taking down the fences, removing from the site, filling of holes, levelling ground surfaces and cleaning the site.

Seventy per cent (70%) of the tendered rate shall be payable on completion and approval of the temporary fences, and the remaining thirty per cent (30%) on completion of the removal of the fences.

PSC 8.2.12 Removal of man-made surfaces and kerbing

In general the rates shall cover all plant, labour, material, saw cutting (asphalt and concrete), breaking up, lifting, loading, transportation, off-loading surfacing and storing (where applicable) or disposing (where applicable).

a) Road materials with Asphalt ≤ 50mm thick Unit : m²

The rate shall include saw cutting the asphalt neatly to prevent uneven breaks and removal of base, sub-base and subgrades layers up to 800mm deep.

b) Road materials with Asphalt > 50 ≤ 100mm thick Unit : m²

The rate shall include saw cutting the asphalt neatly to prevent uneven breaks and removal of base, sub-base and subgrades layers up to 800mm deep.

c) Interlocking concrete segmental paving blocks, Class 2.6/40MPa (all colours) Unit : m²

d) Concrete paving blocks, Class 2.6/40MPa (various sizes) Unit : m²

e) Brick paving Unit : m²

f) Unreinforced concrete ≤ 75mm thick Unit : m²

g) Reinforced concrete ≤ 75mm thick Unit : m²

h) Garden, lawns and grassing Unit : m²

i) All types of Kerbing including concrete gutter Unit: m

PSC 8.2.13 Backfilling and reinstatement of man-made surfaces re-using removed materials

The rate shall include loading, transporting and re-instatement complete with 150 mm Sub-base (C4) stabilised and compacted to 93% MOD AASHTO density, laying bricks, pre-cast units or concrete segmental paving on 20 mm river sand bedding, jointing sand (plaster sand) and mortar infill between edge restraint and blocks .

a) Interlocking concrete segmental paving blocks, Class 2.6/40MPa (all colours) Unit : m²

b) Concrete paving blocks, Class 2.6/40MPa (various sizes) Unit : m²

c) Brick paving Unit : m²

d) Kerbing (all types of kerbing) Unit : m

Client:		Contractor:	
Witness:		Witness:	

PSC 8.2.14 Take down and re-erect existing fences and guardrails

- a) Guardrails Unit: m or km
b) Diamond mesh fencing Unit: m or km
c) Steel palisade fencing Unit: m or km
d) Clearview fencing Unit: m or km

The unit of measurement shall be the metre or kilometre of fence taken down and removed from the site.

The rate shall cover the cost of taking down the complete guard rail or fence (fence height up to 2.4 m) as scheduled, storing all fence and guardrail material, transport, reinstating the fence or guardrail, levelling ground surfaces and cleaning the site as well as providing temporary fence during construction where required."

PSC 8.2.15 Reinstatement of existing masonry walls, steel fences and guard rails and dry stack precast block retaining wall using new materials

PSC 8.2.15.1 Face brick walls

- a) 110mm wall Unit: m²
b) 220mm wall Unit: m²
c) Masonry columns Unit: m³

The rate shall cover the cost of reinstating existing face brick walls and columns including plant, labour, material, on-loading, transporting, off-loading and cleaning.

PSC 8.2.15.2 Plastered walls

- a) 110mm wall Unit: m²
b) 220mm wall Unit: m²
c) Masonry columns Unit: m³

The rate shall cover the cost of reinstating existing plastered masonry walls and columns and painting the walls/columns with two coats of paint including plant, labour, material, on-loading, transporting, off-loading and cleaning.

PSC 8.2.15.3 Steel fences

- a) Diamond mesh fencing Unit: m²
b) Steel Palisade fencing Unit: m²
c) Clearview fencing Unit: m²

The rate shall cover the cost of reinstating existing diamond mesh, steel palisade or Clearview fences (including any gates) with new materials, including plant, labour, material, on-loading, transporting, off-loading and cleaning.

PSC 8.2.15.4 Guardrails Unit: m

The rate shall cover the cost of reinstating existing guard rails with new materials, including plant, labour, material, on-loading, transporting, off-loading and cleaning.

PSC 8.2.16 Protection of trees Unit: No

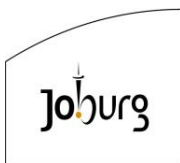
The rate shall cover the cost related to the protection of trees.

PSC 8.2.17 Demolishing existing valve chambers

The rates shall cover all plant, labour, material, saw cutting concrete where applicable, breaking up, lifting, loading, transportation, off-loading and disposing of materials.

- a) Unreinforced concrete Unit : m³
b) Reinforced concrete Unit : m³
c) 220 mm Brick wall Unit : m²

Client:		Contractor:	
Witness:		Witness:	



PSC 8.2.18 Temporary removal and reinstatement of precast concrete slabs Unit: No

The rate shall cover the cost related to the temporary removal of precast concrete slabs weighing up to 3 ton, storing on site and returning the precast concrete slabs to the original position, including plant, labour, tools and slings, transport, on-loading and off-loading.

PSC 8.2.19 Temporary removal and reinstatement of precast concrete bunkers Unit: No

The rate shall cover the cost related to the temporary removal of precast concrete bunkers weighing up to 3 ton, storing on site and returning the precast concrete bunkers to the original position, including plant, labour, tools and slings, transport, on-loading and off-loading.

PSC 8.2.20 Temporary disconnection and reconnection of cathodic protection cabling inside precast concrete bunkers Unit: No

The rate shall cover the cost related to the temporary disconnection and reconnection of all cathodic protection and AC mitigation cabling inside a precast concrete bunker by a specialist cathodic protection contractor, including plant, labour, tools, transport, on-loading and off-loading as well as taking precaution when working in the vicinity of the bunker to not damage any sleeves, tubes and cabling.

PSC 8.2.21 Temporary removal and reinstatement of electrical infrastructure

The rate shall cover the cost related to the temporary removal, and reinstatement of electrical poles, streetlights and traffic signals, including excavation, loading, transportation, off-loading, storing, safety requirements and disconnection and reconnection of all cables.

- a) Electrical Poles Unit : No
- b) Streetlights Unit : No
- c) Traffic Signals Unit : No

PSC 8.2.22 Temporary removal and reinstatement of electrical fencing

The rate shall cover the cost related to the temporary removal, and reinstatement of electrical fences, electrical posts and signage, including removal, loading, transportation, off-loading, storing, additional or new material required for reinstatement, safety requirements and disconnection and reconnection of all electrical fences.

The rate shall include the cost related to providing a detailed specification and an Electric Fence certificate of completion in accordance with Section 12 to 16 in the Regulation Gazette No 9509, Vol. 549, published in Pretoria 25th March 2011, No. 34154 and related SANS standards issued by a person competent to do so.

- a) Wall top mounted Unit : m
- b) Free standing (fence height up to 3 meter) Unit : m
- c) Add-On Fence attached to palisade fence (fence height up to 3 meter) Unit : m

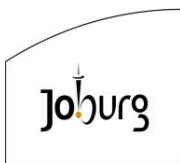
PSC 8.2.23 Temporary electrical fencing

The rate shall cover the cost related to the provision of temporary electrical fences, electrical posts and signage, including all material, loading, transportation, installation, removal, off-loading, disposing, safety requirements and connection and disconnection of all electrical fences.

The rate shall include the cost related to providing a detailed specification and an Electric Fence certificate of completion in accordance with Section 12 to 16 in the Regulation Gazette No 9509, Vol. 549, published in Pretoria 25th March 2011, No. 34154 and related SANS standards issued by a person competent to do so.

- a) Wall top mounted Unit : m
- b) Free standing (fence height up to 3 meter) Unit : m

Client:		Contractor:	
Witness:		Witness:	



PSC 8.2.24 Construction of dry stack precast block retaining wall Unit: m²

The are shall be measured from the width of the dry stack precast block retaining wall multiplied by the height as measured perpendicular to the ground.

The rate shall cover the cost of construction of new or reinstating of existing dry stack precast block retaining walls, including design, supply and installation of concrete block retaining wall complete with plant, labour, material, on-loading, transporting, off-loading and cleaning. The wall shall be designed by a specialist, for internal and global stability to a maximum height of 4 m measured from final ground level. Supplier to provide compliance certificate on completion.

Client:		Contractor:	
Witness:		Witness:	

PSD EARTHWORKS

PSD 2 INTERPRETATIONS

PSD 2.1 SUPPORTING SPECIFICATIONS

REPLACE SUBCLAUSE 2.1.2 WITH THE FOLLOWING:

“PSD 2.1.2: Any of the other SANS 1200 Specifications may form part of the Contract Documents.”

PSD 2.3 DEFINITIONS

REPLACE THE WORD AND THE DEFINITION FOR “Borrow” WITH THE FOLLOWING:

“Borrow material: Material, other than material obtained from excavations required for the Works, obtained from sources such as borrow pits or the authorised widening of excavations. “Borrow” shall have a corresponding meaning.”

REPLACE THE DEFINITION FOR “Specified density” WITH THE FOLLOWING:

“Specified density: The specified dry density expressed as a percentage of modified AASHTO dry density.”

REPLACE THE DEFINITION FOR “Stockpile” WITH THE FOLLOWING:

“Stockpile (verb): The process of selecting and, when necessary, loading, transporting and off-loading material in a designated area for later use for a specific purpose.”

ADD THE FOLLOWING DEFINITIONS:

“Commercial source: A source of material provided by the Contractor, not the Client, and including any borrow pit, provided by the Contractor.

Fill: An embankment or terrace constructed of material obtained from excavations or borrow pits. In roads it includes the earthworks up to the underside of the selected subgrade level.

Fill (material): Material used for the construction of an embankment or terrace.

Roadbed: The natural in situ material on which the fill, or in the absence of fill, the pavement layers, are constructed.”

PSD 3 MATERIALS

PSD 3.1 CLASSIFICATION FOR EXCAVATION PURPOSES

PSD 3.1.1 Method of classifying

ADD THE FOLLOWING:

“The classification of material other than ‘soft excavation’ shall be agreed upon before excavation may commence.

The Contractor shall immediately inform the Project Manager if and when the nature of the material being excavated changes to such an extent that a new classification is warranted for further excavation. Failure on the part of the Contractor to advise the Project Manager in good time shall entitle the Project Manager to reclassify, at his discretion, such excavated material.”

ADD THE FOLLOWING NEW SUB CLAUSES:

PSD 3.1.3 Classification for hand excavation

Classification of material for various types of hand excavation will be based on the results of a dynamic cone penetrometer. The category of material shall be determined by testing the material at regular intervals and at various depths along the centre line of the trench. A minimum of 5 tests shall be done at each location and the average number of blows of the tests shall be used to determine the category of material.

Client:		Contractor:	
Witness:		Witness:	

The interval between test locations shall be determined by the variation of material type but shall not exceed 50m. The depth of testing shall be determined by the variation of material type and can increase or decrease in hardness with increasing depth of excavation. Table PSD 3.1.3 indicates the categories:

TABLE PSD 3.1.3: Classification for Hand Excavation

Category of Material	Consistency		DCP Blows to Penetrate 100mm	
	Granular	Cohesive	Granular	Cohesive
<u>Soft</u> Soft excavation shall be excavation in material that can be efficiently removed from the trench using a pick and shovel but not requiring prior breaking using mechanical equipment such as pavement breakers	Up to medium dense	Firm to stiff	0-6	1-5
<u>Intermediate</u> Intermediate excavation shall be excavation in material that require loosening with a hand spike (gwala) before being removed from the trench	Dense	Stiff to very stiff	7-15	6-8
<u>Hard</u> Hard excavation shall be excavation in material that requires prior breaking using mechanical equipment, such as pavement breakers with clay spades, before being removed from the trench.	Very dense		16-50	9-15
<u>Rock</u> Rock excavation shall be excavation in material other than described above which by nature of the material requires prior breaking using mechanical equipment, such as pavement breakers with moil points, before being removed from the trench	-	-	>50	>15

PSD 3.2.3 Material suitable for backfill or fill against structures

REPLACE THE CONTENTS OF THIS SUBCLAUSE WITH THE FOLLOWING:

"Material used for backfill behind structures shall generally be the material excavated, subject to the following conditions:

- The material shall not contain an excessive number of stones retained on a 50 mm sieve.
- The material shall not contain large clay lumps that do not break up under the action of the compaction equipment.
- The liquid limit of the material shall not exceed 40, neither shall the Pi exceed 18."

ADD THE FOLLOWING PARAGRAPHS TO SUBCLAUSE:

"c) Cement-stabilised backfilling:

Client:		Contractor:	
Witness:		Witness:	

Backfilling shall, where directed by the Project Manager, be stabilized with 5% cement. The aggregate shall consist of approved soil or gravel containing stones not bigger than 38 mm and with a plasticity index not exceeding 10.

The soil or gravel shall be mixed with 5% cement and shall be compacted in layers of 100 mm thick to 90% of modified AASHTO density.

d.) Soilcrete backfilling:

The aggregate for soilcrete shall be mixed with 5% cement and shall consist of approved soil or gravel containing stones not bigger than 38 mm and with a plasticity index not exceeding 10.

The soil or gravel shall be mixed in a concrete mixer with the cement and enough water to acquire a consistency that allows the mixture to be placed with vibrators to fill all voids between the pipe and the sides of the trench. Shuttering shall be used where necessary."

PSD 3.3 SELECTION

ADD THE FOLLOWING SUBCLAUSE:

PSD 3.3.3 Selection in borrow pits and excavations

Approval of a borrow area for a certain purpose does not necessarily mean that all the material in that area is suitable for the specified purpose. What it does mean is that the borrow area contains some suitable material. The onus shall rest on the Contractor to ensure that only material that is indeed suitable is removed and used for the specified purpose.

When the Contractor has to select excavated material for a specific purpose, the above provisions relating to borrow areas shall apply *mutatis mutandis* to excavations.

The Contractor shall not waste or contaminate material that has been selected for a specific purpose."

PSD 4 PLANT

PSD 4.4 DETECTORS

REPLACE THE CONTENTS OF SUBCLAUSE 4.4 WITH THE FOLLOWING:

"The Contractor shall, for the purposes of detecting and locating underground services in accordance with the provisions of subclause 5.4 of SANS 1200 A and subclause 5.1.2 of SANS 1200 D, at his own cost, provide and use detecting equipment which is suitable for the detection of underground cables and pipes."

PSD 5 CONSTRUCTION

PSD 5.1 PRECAUTIONS

PSD 5.1.1 Safety

PSD 5.1.1.1 Barricading and lighting

REPLACE "Machinery and Occupational Safety Act, 1983 (Act 6 of 1983)" WITH "Occupational Health and Safety Act, 1993 (Act 85 of 1993)."

REPLACE SUB-PARAGRAPH (a) AND (b) WITH THE FOLLOWING AND ADD SUB-PARAGRAPH c):

- h) adequately protected by a barrier or fence comprising fluorescent orange plastic netting of height at least 1 000 mm and as close to the excavation as practicable; and
- i) provided with notice boards marked "CLOSED – GESLUIT" at each end of closed or partially closed roads; and
- j) provided with flashing orange lights, placed at 15 m intervals along the barricading at night.

ADD THE FOLLOWING TO THIS SUBCLAUSE:

Should the Contractor fail to provide adequate lighting, signing and barricading, access to properties, or leave the site in a dangerous condition, the Project Manager shall be entitled to suspend all work under the Contractor until in the Project Manager's opinion the Contractor's obligation in these respects have been

Client:		Contractor:	
Witness:		Witness:	

fulfilled and/or arrange for any emergency work to be carried out by some other agency and to deduct the cost of this work from any monies due to the Contractor.

PSD 5.1.1.2 Safeguarding of excavations

REPLACE "Machinery and Occupational Safety Act" IN SUB-PARAGRAPH (a) WITH "Occupational Health and Safety Act, 1993 (Act 85 of 1993)."

ADD THE FOLLOWING TO SUB PARAGRAPH (d):

Loose ground, materials, tools and appliances shall be kept clear of the edge of the excavations and a pathway at least 0,30 m shall be left clear along the edge of the excavation.

PSD 5.1.1.3 Explosives

REPLACE THE CONTENTS OF THIS SUBCLAUSE AS FOLLOWS:

Where blasting is resorted to, it shall be carried out strictly according to Explosives Act and Regulations 1956 (Act No. 26 of 1956, as amended). However, in no case will blasting be allowed if a reasonable possibility exists of injury to any foundation, wall, pipe, cable or any structure, complete or partly complete. Where the Project Manager considers blasting to be dangerous, the same shall not be permitted and his decision shall be final and binding.

Wherever blasting is permitted and resorted to in the vicinity or within the limits of existing townships, roads, etc., it shall only be executed under the cover of sufficient earth backfill, heavy wire mesh screens or rubber matting of adequate weight and area to prevent the blasted material from being ejected from the trench. If any damage should occur, the Contractor shall carry out remedial work arising from such damage and will be held to have allowed therefore in his price.

The Contractor shall undertake such blasting so that the Peak Particle Velocity (PPV) as measured at the closest point to the existing outfall sewer and or building structure shall not exceed 25 mm/s. Each blast shall be monitored and the findings recorded by an appropriately qualified explosives expert using a suitably calibrated apparatus. The Contractor shall also timeously inform the relevant inspectorate and obtain the required blasting permit from the South African Police Services, Division of Explosives before proceeding with any blasting on site. If in the opinion of the Project Manager, the Contractor makes careless use of explosives, he may forbid the Contractor the use of explosives.

It is a condition that should blasting result in the disturbing of material outside the trench, the Project Manager will require the Contractor to remove the disturbed material and backfill it to a compaction standard of the natural in-situ material. All this work for correcting areas of disturbed material will be done at the Contractor's cost.

The schedule rate for hard rock excavation shall cover all costs incurred in connection with supply, transportation, storage and handling of explosives, the related blasting costs and any remedial work should this be required.

ADD THE FOLLOWING TO THIS CLAUSE:

PSD 5.1.1.4 Hard rock excavation without using explosives

Should there be a risk that blasting will result in the disturbance of structures outside the trench or any other potential damage to existing properties or services; the Project Manager will require the Contractor to remove the rock material by means of pneumatic or hydraulic breakers, e.g. jack-hammers or wood-peckers.

The schedule rate for hard rock excavation without using explosives shall cover all costs incurred in connection with supply of specialist equipment, the transportation to and from the site as well as the removal and disposal of the hard material should this be required.

PSD 5.1.2 Existing services

PSD 5.1.2.2 Detection, location and exposure

REPLACE THE CONTENTS OF SUBCLAUSE 5.1.2.2 WITH THE FOLLOWING:

"The exposure by the Contractor of underground services, as required in terms of subclause 5.4 of SANS 1200 A (as amended) shall be carried out by careful hand excavation at such positions and to such dimensions as are agreed to by the Project Manager.

Client:		Contractor:	
Witness:		Witness:	



Unless otherwise instructed or agreed by the Project Manager, no service shall be left exposed after its exact position has been determined and all excavations carried out for the purposes of exposing underground services shall be promptly backfilled and compacted to the following densities:

- (a) In roadways: 93% Mod AASHTO density; and
- (b) In all other areas: 90% Mod AASHTO density.

Where hand excavations to expose underground services have to be carried out in roadways, the Contractor shall reinstate the road layerworks in accordance with the provisions of subclause 5.9 of SANS 1200 DB.

Payment in respect of exposing the services by means of hand excavation as described above, will be made in accordance with subclause PSA 8.8.4.

Payment in respect of reinstating layerworks in roadways will be made in accordance with subclause 8.3.6.1 of SANS 1200 DB."

PSD 5.1.2.3 Protection of cables

REPLACE SUBCLAUSE 5.1.2.3 WITH THE FOLLOWING:

PSD 5.1.2.3 Protection during construction

Further to the requirements of subclause 5.4.2 of SANS 1200 A (as amended), major excavating equipment and other plant shall not be operated dangerously close to known services. Where necessary, excavation in close proximity to known services shall be carefully carried out with suitable hand tools, excluding picks wherever their use could damage the services. No additional payment will apply to such more difficult work.

Should any service not being a known service be discovered or encountered during the course of the Contract, the Contractor shall, in addition to complying with the requirements of subclause 5.4.2 of SANS 1200 A (as amended), immediately notify the Project Manager thereof and implement such measures as will prevent damage of such service or, if it was damaged in the course of discovery, will prevent and minimize the occurrence of any further damage occurring."

PSD 5.1.2.4 Negligence

DELETE SUB-CLAUSE 5.1.2.4

PSD 5.1.3 Stormwater and Groundwater

ADD THE FOLLOWING TO THE SUB-CLAUSE:

"The Contractor shall, where applicable and at the earliest practicable opportunity, install the permanent drainage specified or shown on the drawings and shall at his own cost provide the temporary drainage required to protect the Works."

PSD 5.1.4 Nuisance

PSD 5.1.4.3 Excavated material not to endanger or interfere

AMEND THE CLAUSE AS FOLLOWS:

"A safe, clear path shall be kept open at all times for pedestrians. Equipment, materials and waste shall be stored, stockpiled or removed in such a manner that pedestrians are not endangered and that the nuisance level is kept to a minimum. If construction activities occupy the whole footway and verge area so that pedestrians are forced to walk in the traffic lane, adequate protection from traffic shall be provided.

Where instructed by the Project Manager or where the Works impose a danger to traffic or pedestrians, the Contractor shall at his own cost remove off Site excavated material to temporary stockpiles (approved by the Project Manager) and the return to Site, excavated material for use as backfill or bedding."

ADD THE FOLLOWING NEW SUBCLAUSE:

PSD 5.1.4.4 Open Trenches

Unless otherwise permitted and where relevant, not more than the 100 m of trench in one place shall be opened ahead of the completed and backfilled pipeline."

Client:		Contractor:	
Witness:		Witness:	

PSD 5.1.5 Reinstatement and Maintenance of Roads

ADD THE FOLLOWING TO THE SUB-CLAUSE:

“Where crossings have been made, the roads shall be reinstated in accordance with the details specified in subclause 5.9 of SANS 1200 DB.”

PSD 5.1.6 Road Traffic Control

DELETE THE SECOND SENTENCE OF SUBCLAUSE 5.1.6

PSD 5.2 METHODS AND PROCEDURES

PSD 5.2.2 Excavation

PSD 5.2.2.1 Excavation for general earthworks and for structures

ADD THE FOLLOWING TO PARAGRAPH (b):

“When the nature of the material precludes the above procedure, additional excavations shall be carried out to provide working space for the erection of formwork. The rate tendered for item 8.3.5 will be deemed to include the cost of a working width of 600 mm, but the Contractor may excavate a greater working width at no additional cost to the Client.”

REPLACE THE CONTENT OF PARAGRAPH (e) WITH THE FOLLOWING:

“Where excavations have been carried below the authorised levels, the Contractor shall backfill such excavations to the correct level with approved gravel compacted to 90% of modified AASHTO density or to the density of the surrounding material.

Where excavations have been carried out in hard material, the Project Manager may direct the over-excavation to be backfilled with weak concrete if there is a danger of settlement or differential settlement of the foundations.

Where the sides of excavations against which concrete is to be cast have been over-excavated or have collapsed partially, the Contractor shall retrim the excavations if necessary and, unless other remedial measures are agreed to by the Project Manager, shall cast the concrete for the structure, including the additional concrete that may be required as a result of the over-excavation or partial collapse. The cost of the additional concrete or remedial measures shall be for the Contractor’s account.”

PSD 5.2.2.3 Disposal

REPLACE THE SECOND SENTENCE WITH THE FOLLOWING:

“The Contractor shall provide all necessary spoil sites for the spoiling of all surplus and unsuitable materials and shall make the necessary arrangements with the owner of the site where the material is disposed of, and pay all charges and levies as may be applicable for the use of such spoil sites. Arrangements for the consent of the owner of a property to deposit spoil and or temporary spoil thereon shall be confirmed in writing. Such arrangements shall be approved before being implemented. All spoil sites shall be neatly finished off and compacted to 90% of MOD.AASHTO density

Every spoil site provided by the Contractor shall be approved by the local authority in whose area it is located, and the spoiling shall comply with the applicable statutory and municipal regulations as well as the requirements of the owner of the spoil site.”

ADD THE FOLLOWING SUBCLAUSE IN SUBCLAUSE 5.2.2:

PSD 5.2.2.4 Selection and stockpiling

Approval or designation of the material in a particular borrow pit or excavation for a particular purpose does not imply that all the material in the borrow pit or excavation is suitable for the particular purpose to which the said approval or designation relates, nor that all material in the borrow pit or source should be used for the particular purpose. The Contractor shall select suitable material from that borrow pit or source, discard unsuitable material and reserve material for other purposes as necessary.

The Contractor shall organize and carry out his operations in such a manner as will prevent the contamination of suitable embankment and backfill material with unsuitable materials. Any excavated material which becomes, in the Project Manager’s opinion, unsuitable for use in embankments or backfill as a result of contamination,

Client:		Contractor:	
Witness:		Witness:	



shall be disposed of in a manner acceptable to the Project Manager and shall be replaced by the Contractor with materials acceptable to the Project Manager, all at the Contractor's cost."

PSD 5.2.5 Transport for earthworks

REPLACE THE CONTENT OF SUBCLAUSE 5.2.5 WITH THE FOLLOWING:

"The transport of all excavated materials, irrespective of the distance and source, shall be deemed to be free-haul, the cost of which is included in the Contractor's tendered rates and prices for the excavation of the materials. No separate compensation shall apply for the transportation of excavated materials."

PSD 7 TESTING

PSD 7.2 TAKING AND TESTING OF SAMPLES

REPLACE THE CONTENT OF THIS SUBCLAUSE WITH THE FOLLOWING:

"The Contractor shall arrange with the approved independent laboratory to carry out sufficient tests on a regular basis as agreed between him and the Project Manager to determine whether the degree of compaction, and, where applicable, the quality of materials used, comply with the specifications and shall submit the results of these tests to the Project Manager in a form approved by him.

The Project Manager may likewise instruct for such tests to be carried out. Testing by the Project Manager will not relieve the Contractor of his obligations to provide materials and workmanship in accordance with the specifications

The compaction requirements for fills shall be deemed complied with when at least 75% of the dry-density tests on any lot show values equal to or above the specified density and when no single value is more than five percentage points below the specified value."

PSD 8 MEASUREMENT AND PAYMENT

PSD 8.3 SCHEDULED ITEMS

PSD 8.3.1 Site preparation

REPLACE SUBCLAUSES 8.3.1.1 AND 8.3.1.2 WITH THE FOLLOWING:

"Where site preparation such as clearing, grubbing, the removal of large trees or the removal and stockpiling of topsoil is required, the provisions and scheduled items of SANS 1200 C shall apply."

PSD 8.3.3 Restricted Excavation

ADD THE FOLLOWING AT THE END OF THE EXISTING SUB-ITEM 2:

"No payments will be made under sub items (1) and (2) in respect of any materials measured and paid for under sub item 5 below."

AND ADD THE FOLLOWING NEW SUBITEMS IN 8.3.3(b):

"5) Hand excavation where ordered by the Project Manager

a) Soft material Unit: m³

b) Intermediate material Unit: m³

c) Hard material Unit: m³

The unit of measurement shall be the cubic metre of material, measured in place according to the authorized dimensions, which was excavated by the hand on the specific prior written instructions of the Project Manager; provided always that the Project Manager's said instruction shall have stated that measurement and payment for such hand excavation will be in accordance with this item.

The tendered rate shall include full compensation for the additional cost, effort and time resulting from excavating in the respective materials using hand methods only.

Client:		Contractor:	
Witness:		Witness:	



The Project Manager shall not be obliged to authorize payment under this item in respect of any hand excavation carried out (whether ordered in writing or otherwise), which hand excavation was in any case necessary to achieve compliance by the Contractor with his obligations under the Contract to

- (i) utilize construction appropriate to the nature of the specific parts of the works; and/or
- (ii) protect existing structures and/or services; and/or
- (iii) comply with all prevailing legislation and regulations.

6) Backfill stabilized with 5% cement where directed by the Project Manager Unit: m³

The unit of measurement shall be the cubic metre of backfill material, measured in place after compaction according to the authorised dimensions, which was stabilised on the Project Manager's instructions in accordance with subclause PSD 3.2.3(c).

The tendered rate shall include full compensation for supplying the cement and for selecting, mixing, backfilling and compacting the stabilised material to 90% of modified AASHTO density.

7) Soilcrete backfill where directed by the Project Manager Unit: m³

The unit of measurement shall be the cubic metre of soilcrete placed on the Project Manager's instructions in accordance with subclause PSDB 3.2.3(d), measured in place according to the authorised dimensions.

The tendered rate shall include full compensation for supplying the cement and for selecting, mixing and placing the soilcrete as well as for the cost of shuttering if required."

PSD 8.3.6 Overhaul

DELETE SUBCLAUSE 8.3.6

Client:		Contractor:	
Witness:		Witness:	

PSDB EARTHWORKS (PIPE TRENCHES)

PSDB 3 MATERIALS

PSDB 3.5 BACKFILL MATERIALS

ADD THE FOLLOWING PARAGRAPHS TO SUBCLAUSE:

“c) Cement-stabilised backfilling:

Backfilling shall, where directed by the Project Manager, be stabilized with 5% cement. The aggregate shall consist of approved soil or gravel containing stones not bigger than 38 mm and with a plasticity index not exceeding 10.

The soil or gravel shall be mixed with 5% cement and shall be compacted in layers of 100 mm thick to 90% of modified AASHTO density.

d.) Soilcrete backfilling:

The aggregate for soilcrete shall be mixed with 5% cement and shall consist of approved soil or gravel containing stones not bigger than 38 mm and with a plasticity index not exceeding 10.

The soil or gravel shall be mixed in a concrete mixer with the cement and enough water to acquire a consistency that allows the mixture to be placed with vibrators to fill all voids between the pipe and the sides of the trench. Shuttering shall be used where necessary.”

PSDB 3.7 SELECTION

REPLACE THE WORDS “If he so wishes” IN THE FIRST LINE OF THE SECOND PARAGRAPH WITH THE WORDS “at his own cost.”

ADD THE FOLLOWING NEW SUBCLAUSE TO CLAUSE 3:

“PSDB 3.8 MATERIALS FOR SUBSURFACE DRAINS

PSDB 3.8.1 20 mm Crushed stone

Crushed stone used for subsurface drains shall comply with the requirements given in SANS 1083: Table 3: Stone for Concrete, and shall be either be fine (14 mm nominal size) or coarse (20 mm nominal size). Crushed stone shall be clean with not more than 5,0 % of the material passing through the 0,075 mm sieve.

PSDB 3.8.1 Geotextiles

Geotextiles shall be a non-woven, needle punched, continuous filament fabric consisting of at least 85% by mass of polypropylene, polyester or other approved material and manufactured for civil-engineering applications by a recognized manufacturer. The geotextile shall have minimum thickness of 2.6 mm and minimum tensile strength of 19.5 kN/m in the weaker direction.”

PSDB 5 CONSTRUCTION

PSDB 5.1 PRECAUTIONS

PSDB 5.1.2 Stormwater, Seepage and Dewatering of Excavation

PSDB 5.1.2.3 Sloping ground

ADD THE FOLLOWING SENTENCE AT THE END OF THE PARAGRAPH:

“All trench excavations on sloping embankments shall be backfilled in accordance with 5.6.2 over the full extent of the actual trench excavation and to the original embankment ground level.”

PSDB 5.1.3 Accommodation of traffic and access to properties

REPLACE THE SEMICOLON AND THE WORD “and” AT THE END OF THE SUBCLAUSE 5.1.3 (a) WITH A FULL STOP AND REPLACE ITEM (b) WITH THE FOLLOWING:

“(b) Where necessary to achieve compliance by the Contractor with his obligations to provide and maintain pedestrian and vehicular access to properties affected by the works, the contractor shall construct and maintain to the satisfaction of the Project Manager, such temporary access roads around,

Client:		Contractor:	
Witness:		Witness:	

and/or steel or timber bridges over excavations in roads, pavements, entrances or accesses to properties.

Temporary pedestrian access bridges shall be at least 1,2 m wide and temporary access bridges for vehicles shall be at least 3,6 m wide. All temporary access bridges shall be fitted with handrails as well as protective mesh fencing on both sides.

On completion of the work, the Contractor shall dismantle and remove all such temporary constructions and reinstate these areas to their former condition.

Except only where the Project Manager has included in the Schedule of Quantities, particular payment items specifically therefore, the Contractor will not be paid directly for the construction and maintenance of temporary access roads and/or the provision and maintenance of bridges as aforementioned, and the costs thereof shall be deemed included in the Contractor's tendered rates for excavation."

ADD THE FOLLOWING NEW SUBCLAUSE TO SUBCLAUSE 5.1:

PSDB 5.1.5 Removal of existing pipelines

Where existing pipes have to be removed, they shall be carefully opened up by machine excavation to 300 mm above the pipes after which the whole pipe shall be fully exposed by means of hand excavation. The excavation width shall comply with subclause 8.2.3.

The pipes shall be removed from the trench in a manner approved by the Project Manager, and brought to the surface for inspection by the Project Manager.

Pipes that are declared suitable for reuse and pipes declared unfit for reuse shall be dealt with in an applicable manner described in the specifications, or on the Drawings or on the Project Manager's instructions, as relevant."

PSDB 5.2 MINIMUM BASE WIDTHS

ADD THE FOLLOWING SUB PARAGRAPH TO:

- c) Should the excavated trench width exceed the specified side allowance on each side of the pipe by a value greater than 300 mm, remedial measures shall be as directed and shall be provided at the Contractor's cost unless it can be shown that such excess width is due to factors beyond the Contractor's control.

PSDB 5.4 EXCAVATION

ADD THE FOLLOWING SUB CLAUSES:

PSDB 5.4.1 Principles

- a) The cost of trimming excavations by hand or machine shall not be paid for separately but shall be included in the rates tendered for excavation.
- b) All excavated material shall be kept within defined limits and shall, wherever possible, be deposited alongside the trench. The material shall be deposited so as to leave a clear strip of at least one metre between the edge of the trench and the excavated material and shall not cause undue inconvenience to traffic and property owners. The material shall be placed and kept well clear of all manhole covers, culvert in- and outlets, fire hydrants, benchmarks, stand pegs, fences, etc.
- c) To prevent vertical trench walls from collapsing, excavated material shall, wherever possible, not be stacked on the side of any underlying strata sloping down towards the trench and in this regard attention is specifically drawn to the shales sloping south to north in the Pretoria area.
- d) Excavations more than 1,5 m deep shall be adequately shored or braced to support the overhanging material and other loads which may occur. If the Contractor is of the opinion that shoring or bracing for an excavation of depth of more than 1,5 m is not necessary, he shall notify the Project Manager accordingly in writing, including a report from a Professional Engineer or a Professional Technologist competent in excavations. The report shall include the relevant laboratory tests.

Client:		Contractor:	
Witness:		Witness:	

- e) The Contractor shall provide all the open and close timbering, strutting and shoring required for the safety of the excavations and structures adjacent to the trenches and shall be solely and wholly responsible for ensuring the adequacy of these measures for this purpose.
- f) Without in any way affecting or detracting from the Contractor's responsibility, the Project Manager shall have the right to instruct the Contractor to provide additional or improved timbering, shoring or strutting where he considers this to be necessary. The Contractor shall have no claim for additional payment on this account.
- g) The shoring method adopted shall be compatible with the soil type and the excavating, backfilling and pipe-laying methods adopted and shall not place any undue restrictions on the laying of the pipes.
- h) Timbering and shoring shall be left in position until the Project Manager has authorised their removal.
- i) Shoring and bracing may not be necessary where the Contractor elects to slope the sides of the excavation to at least the maximum angle of repose measured relative to the horizontal plane, as determined by laboratory tests. Sloping of the sides could be combined with steps. The Contractor will submit the proposed excavation profile to the Project Manager for approval.
- j) The cost for shoring, bracing and sloping of the sides will be included in the rates tendered for excavation. The cost for the services of a Professional Engineer or a Professional Technologist, including the relevant laboratory costs, shall be included in the tendered rates.
- k) The Safety Officer, or another competent person appointed by the Contractor in writing, shall inspect every excavation, including bracing and shoring:
 - (i) daily, prior to each shift;
 - (ii) after every blasting operation;
 - (iii) after an unexpected fall of ground;
 - (iv) after substantial damage to supports; and
 - (v) after rain,

in order to pronounce the safety of the excavation to ensure the safety of persons, and those results are to be recorded in a register kept on site and made available to an inspector, the Client, Project Manager, Contractor or employee upon request;
- l) Each 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, shall be
 - (i) adequately protected by a barrier or fence of at least one metre in height and as close to the excavation as is practicable; and
 - (ii) provided with warning illuminates or any other clearly visible boundary indicators at night or when visibility is poor."

PSDB 5.4.3 Excavation of Asphalt Surfaces

The existing asphalt road surfacing shall be saw-cut prior to excavation commencing for the full width of the trench as specified on the construction drawings so as to ensure a neat finish to the reinstated surfacing.

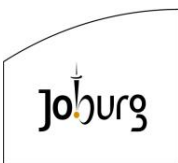
PSDB 5.6 BACKFILLING

PSDB 5.6.3 Disposal of Soft Excavation Material

DELETE THE EXISTING CLAUSE AND REPLACE WITH:

"The Contractor shall provide all necessary spoil sites for the spoiling of all surplus and unsuitable materials and shall make the necessary arrangements with the owner of the site where the material is disposed of, and pay all charges and levies as may be applicable for the use of such spoil sites. Arrangements for the consent of the owner of a property to deposit spoil and or temporary spoil thereon shall be confirmed in writing. Such arrangements shall be approved before being implemented. All spoil sites shall be neatly finished off and compacted to 90% of MOD AASHTO density

Client:		Contractor:	
Witness:		Witness:	



Every spoil site provided by the Contractor shall be approved by the local authority in whose area it is located, and the spoiling shall comply with the applicable statutory and municipal regulations as well as the requirements of the owner of the spoil site.”

PSDB 5.6.6 Completion of Backfilling

ADD THE FOLLOWING TO THIS SUB CLAUSE:

“Backfilling should not lag more than 50 m behind the laying operation.”

PSDB 5.9 REINSTATEMENT OF SURFACES

PSDB 5.9.2 Private Property and Commonage

ADD THE FOLLOWING TO THIS SUB CLAUSE:

“The ground and paved surface of servitudes, parks, driveways, roadways and sidewalks shall be reinstated to at least the standard and conditions as existed previously.

Grass sods shall be cut out from the grassed areas to be excavated and shall be set aside, preserved and kept damp until used for reinstatement. All other material to be used for reinstatement shall be suitably stored for such purpose.

The rate for reinstatement of block paved surfacing shall include all costs for the supplying and laying of the surfacing. The rate shall also cover for taking brick paving out carefully, stockpiling and replacement with new if bricks are broken or damaged. The rate must furthermore provide for all plant, labour and material costs associated with the work.

The rate for reinstatement of asphalt or concrete paved surfacing shall include all costs for the saw cutting, supplying and laying of the surfacing. The rate shall also cover for removal and spoiling of the material. The rate must furthermore provide for all plant, labour and material costs associated with the work.

The width of any trench through an area paved with bricks or precast concrete units shall be the minimum practicable width that, in the opinion of the Project Manager, can be removed without cutting bricks or precast units.”

PSDB 5.9.4 Bitumen roads: Sub-base and Base

DELETE THIS SUB CLAUSE AND REPLACE WITH THE FOLLOWING:

Johannesburg Roads Agency shall be given first preference to provide and execute all the reinstatement of asphalt at places where excavation is within the roadway. Refer to PS 6.9.

ADD THE FOLLOWING NEW SUB CLAUSES:

“PSDB 5.9.7 Walkways and Driveways

The reinstatement of the paving blocks, concrete and other materials for walkways and driveways shall be the responsibility of the Contractor.

PSDB 5.9.8 Existing Kerbs and Channels

Where excavations have to cross existing kerbs and channels, then:

- a) In the case of a precast kerb and channel the kerb, segmented paving blocks and channel shall be carefully removed and stored so as to avoid any damage to or theft of the kerb and channel, and replaced after the excavation has been backfilled. Any damage to or theft of the kerb and channel shall be made good by the Contractor at his expense.
- b) In the case of cast insitu or extruded insitu kerb and channel the kerb and channel shall be cut with a diamond tipped saw and carefully removed so as to avoid any damage to the remaining kerbs and channels. After the excavation has been backfilled the portion of kerb and channel removed shall be replaced with a cast insitu kerb and channel of the same profile as the existing kerb and channel.”

ADD THE FOLLOWING NEW SUBCLAUSES IN CLAUSE 5:

Client:		Contractor:	
Witness:		Witness:	

“PSDB 5.11 LOCATION OF EXISTING SERVICES

Positions and details of known existing services as received from the various Departments are indicated on the Construction Drawings. Exact positions cannot be guaranteed by the Client who will not be held responsible for any damages to any services. The Contractor shall excavate by hand to locate any such services and ensure that care is taken not to damage these services.

PSDB 5.12 DEALING WITH AND PROTECTING EXISTING SERVICES

All existing services, underground as well as above ground level, shall be protected by the Contractor in an appropriate manner, for the duration of the construction or as deemed necessary by the Project Manager, such that no damage to or interruption of the services shall occur.

PSDB 5.13 GAS MAINS, ELECTRICITY AND TELECOMMUNICATION POLES

Gas mains, electricity and telecommunication poles along the pipe route are to be stabilized and protected prior to excavation and for the duration of construction.

PSDB 5.14 TREES IN CONSTRUCTION PATH

Whenever possible any trees that lie within the construction path, shall not be removed and care shall be exercised to avoid damaging them. If the Contractor considers the removal of any tree unavoidable he/she shall obtain in writing the approval of the Project Manager and the Johannesburg Water Environmental Section prior to removal of any trees. Rates to cover removal and replacement where practical are provided in the schedule of quantities. A penalty of R 10,000.00 will be applied for any unauthorized or unnecessary damage to any tree which in the opinion of the Project Manager could have been avoided.”

PSDB 7 TESTING

ADD THE FOLLOWING NEW SUBCLAUSE IN CLAUSE 7:

“PSDB 7.2 INSPECTION AT INTERMEDIATE STAGES OF CONSTRUCTION

The Contractor shall call the Project Manager, giving him reasonable notice, to inspect the works at the following intermediate stages of construction:

- a) After completion of the trench excavation and preparation of the trench bottom and before any pipe is laid.
- b) After the selected backfill material has been placed around the pipe and before the remainder of the trench is backfilled.
- c) Before placing of premix on roads or any final surfacing on constructed footways. Work shall not progress through the specified stages without the approval of the Project Manager or Supervisor.

Failure to comply with the provision of this clause shall result in the suspension of the backfilling work until the testing has been approved by the Project Manager.”

PSDB 8 MEASUREMENT AND PAYMENT

PSDB 8.1 BASIC PRINCIPLES

ADD THE FOLLOWING PARAGRAPH:

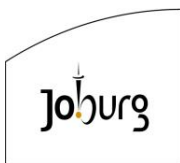
“The basic principle of measurement and payment for earthworks for a pipe trench is that the rates tendered for excavation shall also cover the cost of trimming, handling and shoring or bracing as specified in clause PSDB 5.4”.

PSDB 8.3 SCHEDULED ITEMS

PSDB 8.3.2 Excavation

- a) Excavate in all materials, for trenches, backfill compact and dispose of surplus material

Client:		Contractor:	
Witness:		Witness:	



ADD THE FOLLOWING SUB-ITEM:

The rate shall also cover the cost of excavating for trenches using labour intensive construction methods. The rate shall exclude the cost of removal of grass sods but shall include for the disposal of surplus/unsuitable material. The rate shall, in addition, cover the costs for compliance with the requirements of PSDB 5.4.1.

b) Extra over item (a) above for:

ADD THE FOLLOWING AT THE END OF THE EXISTING SUB-ITEM 2:

"No payments will be made under sub items (1) and (2) in respect of any materials measured and paid for under sub item 3 below."

AND ADD THE FOLLOWING NEW SUBITEMS IN 8.3.2(b):

"3) Hand excavation where ordered by the Project Manager

a) Soft material Unit: m³

b) Intermediate material Unit: m³

c) Hard material Unit: m³

The unit of measurement shall be the cubic metre of material, measured in place according to the authorized dimensions, which was excavated by the hand on the specific prior written instructions of the Project Manager; provided always that the Project Manager's said instruction shall have stated that measurement and payment for such hand excavation will be in accordance with this item.

The tendered rate shall include full compensation for the additional cost, effort and time resulting from excavating in the respective materials using hand methods only.

The Project Manager shall not be obliged to authorize payment under this item in respect of any hand excavation carried out (whether ordered in writing or otherwise), which hand excavation was in any case necessary to achieve compliance by the Contractor with his obligations under the Contract to

- (i) utilize construction appropriate to the nature of the specific parts of the works; and/or
- (ii) protect existing structures and/or services; and/or
- (iv) comply with all prevailing legislation and regulations.

4) Backfill stabilized with 5% cement where directed by the Project Manager Unit: m³

The unit of measurement shall be the cubic metre of backfill material, measured in place after compaction according to the authorised dimensions, which was stabilised on the Project Manager's instructions in accordance with subclause PSDB 3.5(c).

The tendered rate shall include full compensation for supplying the cement and for selecting, mixing, backfilling and compacting the stabilised material to 90% of modified AASHTO density.

5) Soilcrete backfill where directed by the Project Manager Unit: m³

The unit of measurement shall be the cubic metre of soilcrete placed on the Project Manager's instructions in accordance with subclause PSDB 3.5(d), measured in place according to the authorised dimensions.

The tendered rate shall include full compensation for supplying the cement and for selecting, mixing and placing the soilcrete as well as for the cost of shuttering if required."

ADD THE FOLLOWING SUBITEMS IN 8.3.2 AFTER SUBITEM 8.3.2(C):

"d) Excavate in all materials for stormwater inlet and outlet structures and for manholes, catchpits, valve chambers and the like, irrespective of depth, and backfill around structures Unit: m³

The unit of measurement shall be the cubic metre of material excavated, measured in place according to the authorised dimensions, and excluding the volume of material excavated and paid for under subitem (a).

Client:		Contractor:	
Witness:		Witness:	

The tendered rate shall include for the costs of excavating in all materials, backfilling, compacting, trimming and tidying the final surface around the structure, disposing of surplus and unsuitable materials within the free-haul distance and, where applicable, selecting and keeping separate, excavated material suitable for use as backfill.

e) Extra over subitems (d) for excavating in:

1) Intermediate material Unit: m³

2) Hard material Unit: m³

Measurement and payment shall be in accordance with the provisions of 8.3.2(b) of SANS 1200 D (as amended).

f) Hand excavation where ordered by the Project Manager

1) Soft material Unit: m³

2) Intermediate material Unit: m³

3) Hard material Unit: m³

The unit of measurement shall be the cubic metre of material, measured in place according to the authorized dimensions, which was excavated by the hand on the specific prior written instructions of the Project Manager; provided always that the Project Manager's said instruction shall have stated that measurement and payment for such hand excavation will be in accordance with this item.

The tendered rate shall include full compensation for the additional cost, effort and time resulting from excavating in the respective materials using hand methods only.

The Project Manager shall not be obliged to authorize payment under this item in respect of any hand excavation carried out (whether ordered in writing or otherwise), which hand excavation was in any case necessary to achieve compliance by the Contractor with his obligations under the Contract to

- (i) utilize construction appropriate to the nature of the specific parts of the works; and/or
- (ii) protect existing structures and/or services; and/or
- (v) comply with all prevailing legislation and regulations.

g) Backfill stabilized with 5% cement where directed by the Project Manager Unit: m³

The unit of measurement shall be the cubic metre of backfill material, measured in place after compaction according to the authorised dimensions, which was stabilised on the Project Manager's instructions in accordance with subclause PSDB 3.5(c).

The tendered rate shall include full compensation for supplying the cement and for selecting, mixing, backfilling and compacting the stabilised material to 90% of modified AASHTO density.

h) Soilcrete backfill where directed by the Project Manager Unit: m³

The unit of measurement shall be the cubic metre of soilcrete placed on the Project Manager's instructions in accordance with subclause PSDB 3.5(d), measured in place according to the authorised dimensions.

The tendered rate shall include full compensation for supplying the cement and for selecting, mixing and placing the soilcrete as well as for the cost of shuttering if required."

PSDB 8.3.3 Excavation Ancillaries

PSDB 8.3.3.3 **Compaction in road reserves**

REPLACE THE HEADING OF THIS SUBITEM WITH THE FOLLOWING:

"PSDB 8.3.3.3 Compaction in roadways"

REPLACE THE SENTENCE, "The volume will be measured as specified in 8.2.2, 8.2.3 and 8.3.3.1", WITH THE FOLLOWING:

Client:		Contractor:	
Witness:		Witness:	

"To determine the volume in the case of gravel roads, the depth will be measured from the underside of the gravel wearing course to the top of the fill blanket, and in the case of bitumen roads, from the underside of the subbase to the top of the fill blanket.

The rest of the trench shall be backfilled as specified in clauses 5.9.3, 5.9.4 and 5.9.5, as applicable, and payment will be made under item 8.3.6.1."

PSDB 8.3.3.4 Overhaul

REPLACE THE CONTENTS OF THIS ITEM WITH THE FOLLOWING:

"Measurement and payment shall be in accordance with subclause PSD 5.2.5."

PSDB 8.3.4 Particular items

PSDB 8.3.4 a) Shore trench opposite structure or service Unit: m

ADD THE FOLLOWING AFTER THE LAST SENTENCE:

"Shoring of trenches as opposed to sloping the sides of the excavation to at least the maximum angle of repose will be required where trenches are in close proximity to existing operational services, structures or within roadways. Payment for this item will only be made if written instructions were issued by the Project Manager over and above the Standard Specifications for safety of excavations as specified in SANS 1200 DB, subclause 5.1 and the principles in PSD 5.4.1. Any other shoring implemented by the Contractor will be deemed to have been included in his trench excavation rate"

AND ADD THE FOLLOWING NEW SUBITEMS IN SUBCLAUSE 8.3.4:

"PSDB 8.3.4 c) Dealing with groundwater

(1) Crushed stone (14 mm or 20 mm) Unit: m³

"The unit of measurement for 19 mm crushed stone shall be the cubic metre of crushed stone in place, calculated according to the authorized dimensions. The tendered rates shall include full compensation for the supply of the material and construction of the crushed stone layers as specified. No overhaul shall be paid on crushed stone for subsurface drains and drainage blanket and crushed stone to control groundwater will only be paid for where the use thereof has been approved by the Project Manager."

(2) Nonwoven, needle punched, continuous filament, polyester Geotextile Unit: m²

"The unit of measurement shall be the square metre of geotextiles installed, calculated from the authorized dimensions, including the specified overlap on the top surface of filter drains but not at the joints.

The tendered rate shall include full compensation for the supply and installation of the geotextiles, as specified, including wastage and overlap. The use of geotextiles to control groundwater will only be paid for where the use thereof has been approved by the Project Manager"

PSDB 8.3.5 Existing services that Intersect or Adjoin a Pipe Trench

DELETE THIS SUB-CLAUSE AND REPLACE WITH THE FOLLOWING:

The rate tendered for this item shall include for the crossing or **working in close proximity** of any type of service, at any angle and any trench width and depth. Attention is drawn to the provisions of SANS 1200 D Clause 5.1.2, which must be taken into account in the determination of the rate for this item.

ADD THE NEW SUBCLAUSE PSDB 8.3.5 c) TO CLAUSE 8.3.5 AS FOLLOWS:

PSDB 8.3.5 c) Services that require special care

1) Description of service Unit: No

2) Etc for other items Unit: No

The unit of measurement shall be the number of each service described. Electricity, telecommunication poles and water mains along the pipe route are to be stabilised and protected prior to excavation and for the duration of construction. The rate shall cover the temporary stabilization and protection of electricity and telecommunication poles.

Client:		Contractor:	
Witness:		Witness:	

PSDB 8.3.6 Finishing

PSDB 8.3.6.1 Reinstate road surfaces complete with all courses

DELETE "road". This clause shall be extended to cover surfaces other than road surfaces.

General: Johannesburg road agency (JRA) shall be given first preference to reinstate road surfaces. Where the work is not executed by JRA, road surfaces with all courses needs to comply with the specifications of JRA.

The width of any trench through an area grassed or paved with bricks or pre-cast concrete units shall be the minimum practicable width, which in the opinion of the Project Manager is sufficient. In the case of blocks this minimum area will be the minimum area over which units (whether bricks or pre-cast units) can be removed without requiring cutting.

The Contractor's rate for supply and lay of asphalt must provide for all plant, labour and material costs associated with the work, including inter alia:

The cost of the asphalt and foamed concrete, the collection, transport to site and placing in accordance with the JRA specification. All wastage and overbreak re-instatement costs, including the purchase of the asphalt and foamed concrete.

PSDB 8.3.6.1 b) Asphalt of thickness 40 mm in parking area Unit: m²

REPLACE "*parking area*" WITH "*areas other than roadways*".

The rate shall include reinstatement of base, sub-base, and subgrade layers as shown on drawing JW14358-16941-T-017-S11-00-TMS, saw cutting the asphalt neatly as required to remove broken edges and reinstatement of 40 mm asphalt as specified.

PSDB 8.3.6.1 c) Asphalt of thickness 40 mm in roadway Unit: m²

The rate shall include reinstatement of base, sub-base, and subgrade layers as shown on drawing JW14358-16941-T-017-S11-00-TMS, saw cutting the asphalt neatly as required to remove broken edges and reinstatement of 40 mm asphalt as specified.

ADD THE FOLLOWING NEW SUBCLAUSES TO SUBCLAUSE PSDB 8.3.6.1:

PSDB 8.3.6.1 d) Re-instatement of unreinforced concrete Unit: m²

The rate shall include loading, transporting and re-instatement complete to previous levels, including the necessary shuttering and placing, vibrating and floating 20 MPa unreinforced concrete with sufficient construction joints. The reinstated concrete shall not exceed 125 mm but shall not be less than 50 mm.

PSDB 8.3.6.1 e) Re-instatement of reinforced concrete Unit: m²

The rate shall include loading, transporting and re-instatement complete to previous levels, including the necessary shuttering and placing, vibrating and floating 20 MPa concrete with sufficient construction joints and one layer of ref 395 steel mesh. The reinstated concrete shall not exceed 125 mm but shall not be less than 50 mm.

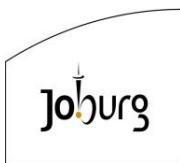
PSDB 8.3.6.1 f) Re-instatement of bricks, concrete pre-cast units and interlocking concrete segmental paving Unit: m²

The rate shall include loading, transporting and re-instatement complete with 150 mm Sub-base (C4) stabilised and compacted to 93% MOD AASHTO density, laying bricks, pre-cast units or concrete segmental paving on 20 mm river sand bedding, jointing sand (plaster sand) and mortar infill between edge restraint and blocks .

PSDB 8.3.6.1 g) Re-instatement of grouted brick paving, complete Unit: m²

The rate shall include loading, transporting and re-instatement complete with 150 mm Sub-base (C4) stabilised and compacted to 93% MOD AASHTO density, laying bricks, pre-cast units or concrete segmental paving on 20 mm river sand bedding, grout jointing within bricks, pre-cast units or concrete segmental paving units and mortar infill between edge restraint and blocks .

Client:		Contractor:	
Witness:		Witness:	



PSDB 8.3.6.1 h) Re-instatement of gardens, lawns and grassing Unit: m²

The unit of measurement shall be square metre of area reinstated. The rate shall cover loading, transporting, and re-instatement complete with receival area preparation, compaction, levelling, 150 mm topsoil laying sods or reinstating garden areas, and watering with water supplied by the Contractor.

ADD NEW SUBCLAUSES TO CLAUSE 8.3.6 AS FOLLOWS:

PSDB 8.3.6.2 Reinstatement of surfacing for walkways

PSDB 8.3.6.2 a) Re-instatement of walkways with unreinforced concrete Unit: m²

The rate shall include loading, transporting and re-instatement complete to previous levels, including the necessary shuttering and placing, vibrating and floating 20 MPa unreinforced concrete with sufficient construction joints. The reinstated concrete shall not exceed 125 mm but shall not be less than 50 mm.

PSDB 8.3.6.2 b) Re-instatement of walkways with interlocking concrete segmental paving Unit: m²

The rate shall include loading, transporting and re-instatement complete with 150 mm Sub-base (C4) stabilised and compacted to 93% MOD AASHTO density, laying interlocking concrete segmental paving on 20 mm river sand bedding, jointing sand (plaster sand) and mortar infill between edge restraint and blocks. The width of any trench through an area paved with bricks or precast concrete units shall be the minimum practicable width which, in the opinion of the Project Manager, can be removed without cutting bricks or precast units.

PSDB 8.3.6.3 Reinstatement of kerbs and channels

PSDB 8.3.6.3 a) Re-instatement of all types of precast kerbing, complete Unit: m

The rate shall cover loading, transporting and re-instatement complete with laying all types of precast kerbing on 50 mm bedding (cement and river sand), jointing mortar and 15 MPa concrete haunching at every joint and levelling and backfilling behind the kerb with insitu material compacted to 90% MOD AASHTO density.

PSDB 8.3.6.3 b) Re-instatement of precast concrete gutter, complete Unit: m

The rate shall cover loading, transporting and re-instatement complete with laying of precast concrete gutters (channels) on 50 mm bedding (cement and river sand). Joint between precast sections to be sealed with polyurethane sealant. Expansion joints consisting of 10 mm soft board and sealed with polyurethane sealant to be constructed after every fifth precast unit.

PSDB 8.3.6.3 c) Re-instatement of all types of insitu cast concrete kerbing, complete Unit: m

The rate shall cover all materials, loading, transporting and reinstating existing insitu cast kerbs to the same profile with 25 MPa concrete, including sufficient construction joints.

PSDB 8.3.6.3 d) Re-instatement of all types of insitu cast concrete gutter, complete Unit: m

The rate shall cover all materials, loading, transporting and reinstating existing insitu cast concrete gutters (channels) with 25 MPa concrete, including sufficient construction joints.

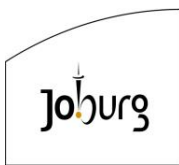
REPLACE THE HEADING AND CONTENTS OF ITEM 8.3.7 WITH THE FOLLOWING:

PSDB 8.3.7 Accommodation of Traffic Unit: Sum

The tendered sum shall, (except where particular items are scheduled to cover particular costs) include full compensation for compliance with the requirements of 5.1.3 of SANS 1200 DB (as amended), including the construction and maintenance of bypasses and the use of existing roads as bypasses during the construction period.

It shall also include full compensation: for the provision, maintenance and removal of all traffic control measures, including temporary traffic signs, road markings, lighting, barricading, flagmen and, where necessary, communications equipment to regulate traffic; for the construction of temporary drainage works;

Client:		Contractor:	
Witness:		Witness:	



for the maintenance of drainage works; and for arrangements for moving and subsequently reinstating services for the purposes of accommodating traffic, attending to traffic problems and complying with the requirements of the Road Traffic Ordinance and the relevant local authorities.

The tendered lump sum shall not be adjusted in the event of any compensation events being granted by the Project Manager.

Payment shall be made in equal monthly instalments over the entire period allowed for completion, provided that where the completion date is adjusted, the amount which shall be payable under this item in any subsequent monthly payment certificate shall be the outstanding unpaid amount of the lump sum, divided by the number of months remaining until the due completion date of the Contract, as revised in accordance with the Conditions of Contract."

Client:		Contractor:	
Witness:		Witness:	

PSDK **GABIONS AND PITCHING**

PSDK 3 **MATERIALS**

PSDK 3.2 **PITCHING**

PSDK 3.2.1 **Stone**

REPLACE THE CONTENTS OF TABLE 2 WITH THE FOLLOWING:

“TABLE 2 SIZE AND MASS OF INDIVIDUAL STONES FOR PITCHING

1	2	3	4
Size/mass of pitching	Thickness of pitching Mm, min	Least dimension Mm, min	Mass kg, min
Extra heavy	600	300	180
Heavy	400	190	50
Medium	300	150	27
Light	200	110	11

PSDK 5 **CONSTRUCTION**

PSDK 5.3 **PITCHING**

PSDK 5.3.3 **Grouted pitching**

REPLACE THE WORDS “(Table 4)” IN THE SECOND LINE OF THE FIRST PARAGRAPH WITH “(Table 2)”

Client:		Contractor:	
Witness:		Witness:	

PSL MEDIUM PRESSURE PIPELINES

PSL 2 INTERPRETATIONS

PSL 2.4 ABBREVIATIONS

ADD THE FOLLOWING:

HDPE : High density polyethylene

mPVC : Modified polyvinyl chloride

PSL 3 MATERIALS

PSL 3.1 GENERAL

ADD THE FOLLOWING TO CLAUSE:

The contract specifications for materials and construction activities will conform to SANS 1200, SANS 1914-5 and Johannesburg Water requirements. The project specifications will include specific items to ensure proper implementation, control reporting on labour based construction and methods as included in the specifications.

Materials for this contract should preferably be obtained from manufacturers who operate an effective quality management system such as that described in SANS 0157 or ISO 9000.

PSL 3.4 STEEL PIPES, FITTINGS, AND SPECIALS

PSL 3.4.3 Pipes of nominal bore over 150 mm

REPLACE THE CONTENTS OF SUBCLAUSE 3.4.3 WITH THE FOLLOWING:

“Steel pipes and fittings shall be manufactured in accordance with SANS 719 dimensions and shall be Grade API 5L X42 and have a yield strength of 289 MPa. The wall thickness of the pipes shall be as specified on the relevant drawings, but have the following minimum wall thickness:

- 200 mm nominal diameter : 6 mm
- 250 mm nominal diameter : 6 mm
- 300 mm nominal diameter : 6 mm
- 400 mm nominal diameter : 6 mm
- 500 mm nominal diameter : 6 mm
- 600 mm nominal diameter : 6 mm
- 800 mm nominal diameter : 8 mm
- 1200 mm nominal diameter : 10 mm

Pipes shall be manufactured by an approved semi-automatic submerged-arc welding process or shall be electric resistance welded. Where semi-automatic submerged-arc welding is employed, at least one pass shall be made on the inside and at least one pass on the outside. The number of longitudinal weld seams shall not exceed one seam.

BS 2971 shall generally apply to welding during pipe manufacturing.

For fusion welded pipes and specials, the internal weld bead shall not protrude more than 1 mm into the bore of the pipe or special.

For electric resistance welded pipes, the height of upset metal and flash on the inner surface shall not exceed 1,0 mm

ADD THE NEW SUBCLAUSE PSL 3.4.3.1 TO CLAUSE 3.4.3 AS FOLLOWS:

Client:		Contractor:	
Witness:		Witness:	

PSL 3.4.3.1 Quality Control Procedures for pipe manufacturing

All steel pipes shall be fabricated in accordance with a quality control plan and procedure (QCP&P) prepared by the pipe supplier and approved by the Project Manager or an Approved Inspection Authority (AIA). This QCP&P shall include inter alia details of pipe manufacture and application of linings and coatings. Manufacture shall not commence until such time as the QCP&P has been approved by the Project Manager. The QCP shall be supplied in English and address, inter alia, the tests/inspections as detailed below:

- a.) Verification/ certification of coils
- b.) Non Destructive Evaluation testing (NDE)
- c.) Verification of tolerances
- d.) Surface preparation
- e.) Welding Performance criteria
- f.) Coating / Lining performance criteria
- g.) Hydrostatic testing
- h.) Coating/lining thickness tolerances
- i.) Verification, test, surveillance and hold points
- j.) Acceptance criteria and reference standards.

Verification of raw material certificates, witnessing of inspections and tests and/or verification of inspection records may be carried out by the Project Manager or an Approved Inspection Authority (AIA) appointed by the Project Manager, at the discretion of the Project Manager. The pipe manufacturer shall generate records as required by the Quality Control Procedure.

ADD THE NEW SUBCLAUSE PSL 3.4.3.2 TO CLAUSE 3.4.3 AS FOLLOWS:

PSL 3.4.3.2 Steel Pipes inside Concrete Pipe Tunnel at M1 crossing

In addition to the requirements for all steel pipes, steel pipes that are to be installed inside the concrete pipe tunnel at the M1 crossing shall be supplied as flanged pipes in lengths of 6.00 m. Flanges shall be drilled according to SANS 1123 Table 1600/3.

PSL 3.4.4 Fittings and specials

Steel pipe fittings and specials of nominal bore larger than 150 mm shall be manufactured in accordance with the requirements of SANS 1476, BS 534 and API 1104 from pipes complying with the requirements of PSL 3.4.3 above.

Where pipes of nominal bore of 150 mm and smaller are used, the pipes shall comply with the requirements of SANS 62 and shall be of medium class unless an alternative specification is provided on the drawings.

Where details of the specials are provided on the Drawings, the specials shall comply in all respects with the Drawings.

All specials and fittings shall be manufactured exclusively at the works of an approved manufacturer, and at one works only. On site fabrication or repair of specials other than mitre bends of 11.25° or less will not be permitted.

The number of segments that a gusseted bend shall comprise shall be as given below, unless otherwise indicated on the Drawings or stated in the Bill of Quantities:

Bends 11.25° to 22.5°	2 segments
Bends 22.5° to 45.0°	3 segments
Bends 45.0° to 90.0°	5 segments

Mitres for bends of 11.25° and less shall be made in the field as part of the pipe laying operation. All deflection in the axis of butt-welded steel pipelines of 11.25° or less shall be made by scarfing equally the ends of the two pipes to be joined so that the maximum scarf in any one pipe will be 5.63°.

Where the total deflection is 3° or less, the scarfing may be made in one pipe end only. Ends to be scarfed shall be carefully and accurately marked and then either machine cut, or machine planed. Hand planning shall not be permitted

Client:		Contractor:	
Witness:		Witness:	

After scarfing, the pipe ends shall be re-chamfered as described in clause 5.1.5 of SANS 719. The minimum gap between pipe end root faces before welding shall be 1.5 mm and the maximum gap shall be 3.0 mm. After scarfing all pipe ends shall be thoroughly cleaned before the field weld is carried out.

Welding of specials shall conform to the requirements of API Standard 1104 – Welding of Pipelines and Related Facilities. All butt welds and branch fillet welds on specials shall where practical have an internal weld. The weld bead of this internal weld shall not extend above the prolongation of the original inside surface of the pipe by more than 1 mm. Internal reinforcement in the form of backing rings at weld seams shall not be permitted.

All manual or semi-automatic welds and repair welds shall only be undertaken by welders qualified in terms of tests laid down in the latest issue of the API Standard 1104 – Welding of Pipelines and Related Facilities.

Where branch connections have external reinforcement in the form of collar or wrapper plates the attachment of reinforcement to pipe branches shall be by full penetration welding. Branch connections shall be as remote as possible from the seam or spiral weld on the barrel.

ADD THE NEW SUBCLAUSE PSL 3.4.4.1 TO CLAUSE 3.4.4 AS FOLLOWS:

PSL 3.4.4.1 Quality Control Procedures for pipe manufacturing

All steel fittings and specials shall be fabricated in accordance with a quality control plan and procedure (QCP&P) prepared by the manufacturer and approved by the Project Manager or an Approved Inspection Authority (AIA) appointed by the Project Manager. This QCP&P shall cover details similar to the QCP&P for steel pipes as listed in subclause PSL 3.4.3.1.

Shop drawings for the manufacturing of specials and fittings shall be prepared by the manufacturer and submitted to the Project Manager for approval.

Verification of raw material certificates, witnessing of inspections and tests and/or verification of inspection records may be carried out by the Project Manager or an Approved Inspection Authority (AIA), at the discretion of the Project Manager. The pipe manufacturer shall generate records as required by the Quality Control Procedure.

PSL 3.7 OTHER TYPES OF PIPES

PSL 3.7.2 Polyethylene Pipes

REPLACE THE SUBCLAUSE WITH THE FOLLOWING

“HDPE pipes shall conform with SANS 4427 Part 2. HDPE fittings shall conform with SANS 4427 Part 3. Unless otherwise specified, pipes shall be PN16 PE100 and plain ended for butt welding”.

ADD THE FOLLOWING NEW SUBCLAUSE:

“PSL 3.7.3 High-impact mPVC Pipes

High-impact mPVC pipes shall conform to SANS 1283 for diameters up to and including 315 mm with a fully end load restraint coupling system approved by Johannesburg Water.

Jointing shall be by means of approved grade 42 spheroidal graphite “press-on” shouldered ends coupled with fusion bonded powdered epoxy coated grade 42 spheroidal graphite Victaulic clamps. Unless otherwise specified, pipes shall be Class 16.

Where the cutting of any pipe is necessary, shouldered ends shall be fixed to the pipe by means of an approved machine capable of clamping the pipe without causing any damage to the pipe, and pressing on the shouldered end by means of a hydraulic operated jack, applying a uniform axial force to locate the shouldered end truly in position. The use of impact force to either the pipe or shouldered end will not be permitted. No on-site fixing of shouldered ends shall be permitted.”

PSL 3.8 JOINTING MATERIALS

ADD THE FOLLOWING NEW SUBCLAUSE:

PSL 3.8.2 Flexible couplings

OMIT THE EXISTING CLAUSE AND INSERT THE FOLLOWING:

“All flexible couplings shall be “Viking Johnson” couplings without centre register or similar approved.

Client:		Contractor:	
Witness:		Witness:	

Rubber rings shall be of the wedge-type and shall be manufactured from natural or synthetic rubber only. Reclaimed rubber shall not be used in the manufacture of the rubber rings."

PSL 3.8.3 Flanges and accessories

ADD THE FOLLOWING TO THE EXISTING CLAUSE:

"The dimensions and drilling of standard flanges shall comply with the requirements of SANS 1123 and SANS 1476 for a minimum working pressure of 1600kPa or 2500 kPa as stated on the drawings. Flanges to be drilled according to Table 1600/3 or Table 2500/3 unless otherwise stated on the drawings. Flanges shall be machined flat, i.e. without a raised joint face. Bolt holes shall be positioned off-centre and symmetrically off-set from the vertical centre lines of the flange and flanges shall be installed truly square to the axis of the pipe. The Contractor shall check the compatibility of drilling of all flanges to be connected together.

Puddle flanges shall have the same dimensions as standard flanges but shall be undrilled.

Faces of flanges which will be in contact with jointing gaskets shall receive a protective coating of such thickness and consistence as will not impair the air/gas/water tightness of the joint.

All gaskets shall be of non-asbestos type with thickness of 3 mm and purpose made to the dimensions of the matching flange for a pipe pressure of 1600kPa or 2500kPa as required and punched to the corresponding flange "PCD" and bolt spacing.

Bolts and nuts for steel flanges shall comply with the requirements of DIN 934 and shall be High Tensile Grade 8.8 and Grade 8 respectively. Bolts shall be supplied with two washers i.e. one per flange face installed under the nut as well as the bolt head to protect the paintwork. A minimum of two and maximum of four screw threads of any bolt or stud shall protrude above the nut.

PSL 3.8.8 Victaulic joints

ADD THE FOLLOWING NEW SUBCLAUSE:

Joints for mPVC pipes shall conform to SANS 815-1 (Shoulder-ended and groove-ended piping systems Part 1: Shoulder-ended steel pipes, fittings and couplings).

PSL 3.8.9 HDPE Pipe joints

ADD THE FOLLOWING NEW SUBCLAUSE:

Joints for HDPE pipe shall be by means of welding, welded flanges or approved external compression type fittings (Plasson or similar approved)."

Only SAPPMA or ISO approved welders shall be used for welding HDPE pipes.

PSL 3.9 CORROSION PROTECTION

PSL 3.9.2 Steel Pipes

PSL 3.9.2.2 Steel pipes of nominal bore over 150 mm

ADD THE FOLLOWING TO THE EXISTING CLAUSE:

Pipes and fittings shall be externally coated with Rigid Polyurethane, applied in a single coating operation to a thickness of 1.7 mm. The internal lining system shall comprise plural component hot applied solvent free epoxy to a thickness of 600 µm.

Corrosion protection of steel pipes and fittings shall comply with **JWEL1701.101 – Specification For Rigid Polyurethane Coating And Solvent Free Liquid Epoxy lining On API 5L Steel Pipe** included in Volume 2 in all aspects.

PSL 3.9.2.3 Repairs to epoxy coatings

ADD THE FOLLOWING TO THE EXISTING CLAUSE:

PSL 3.9.2.3.1 General

- (a) Where the damage is extensive the remedial procedures shall be agreed in writing with the Project Manager.

Client:		Contractor:	
Witness:		Witness:	

- (b) All repairs shall comply with the requirements of the repair-product manufacturer's data sheet. The Project Manager may at his discretion request that repaired coating areas undergo adhesion tests.
- (c) The Contractor shall repair any damage occurring during transport, on site during handling, assembly, storage, and erection.
- (d) The repaired area shall be tested in accordance with Sub-Clauses 8.4 and 8.12 of SANS 1217 for compliance with the relevant requirements for thickness and electrical insulation defects respectively.
- (e) Any item showing electrical insulation defects exceeding an average of five per square metre (a cluster of pinholes within a radius of 25 mm being regarded as a single defective area), or flaking or other signs of loss of adhesion, shall not be repaired. The item shall be blast cleaned and re-coated in accordance with the relevant requirements of the Clause PSL 3.9.2.3.3.

PSL 3.9.2.3.2 Repair Methods for Minor Defects

The repair of areas showing electrical insulation defects or low film thickness shall, if approved by the Project Manager, be carried out as follows:

- (a) Degrease in accordance with Clause PSL 3.9.2.3.4.
- (b) Thoroughly abrade the damaged area, including an adjacent surrounding area of at least 25 mm wide, with a medium grade 220 abrasive paper;
- (c) Vacuum-clean the surface to remove dust and debris in accordance with SANS 5769.
- (d) Wipe the abraded paint surface with methyl ethyl ketone and allow to dry, and
- (e) Apply as many coats of the following repair material as necessary to achieve the specified thickness and finish.
 - (i) Solvent free epoxy; or
 - (ii) Fusion-bonded epoxy powder repair kit.

NOTE: Apply a final topcoat over the repaired area to achieve a pleasing, uniform finish of the item.

PSL 3.9.2.3.3 Repair Methods for Major Defects

The total un-coated areas for renovation by the applicator shall not exceed 0.5% of the total surface area of a component. Each un-coated area for renovation shall not exceed 2 500 mm². If damaged areas are larger, the items containing such areas shall be re-coated.

The repair of areas showing damage down to the steel surface shall, if approved by the Project Manager, be carried out as follows:

- a) Degrease in accordance with Clause PSL 3.9.2.3.4
- b) Blast-clean all damaged areas to Sa 3 (ISO 8501-1).
- c) Feather the surrounding paint for a distance of 25 mm beyond the damaged areas with a medium grade 220 abrasive paper.
- d) Vacuum-clean the surface to remove dust and debris in accordance with SANS 5769.
- e) Wipe only the abraded paint surface with methyl ethyl ketone and allow drying.
- f) Apply as many coats of the following repair material as necessary to achieve the specified thickness and finish.
 - iii) Solvent free epoxy or
 - iv) Fusion-bonded epoxy powder repair kit.

NOTE: Apply a final topcoat over the repaired area to achieve a pleasing, uniform finish of the item.

Client:		Contractor:	
Witness:		Witness:	

PSL 3.9.2.3.4 Degreasing

- a) All surfaces to be coated shall be tested for oil and grease contamination by the water break free test.
- b) Oil and grease contamination shall be removed by:
 - v) Steam-cleaning;
 - vi) An emulsifiable or aqueous detergent applied in accordance with SANS 1344
 - vii) An alkaline cleaning solution.
- c) Allow to react, and then rinse off with clean, potable water to remove all residues prior to surface preparation, all in accordance with Clauses 3.3 and 3.4 of SANS 10064.
- d) The surfaces shall be tested after degreasing and show no oil, grease and chemical contamination after degreasing.
- e) Care shall be taken to avoid entrapment of cleaning agents in recesses or other retention areas.

ADD THE FOLLOWING NEW SUBCLAUSE:

PSL 3.9.2.4 Field joint repairs and protection

External field joints, whether but-welded or flanged, shall be repaired and protected with a poly-isobutene self-healing visco-elastic coating complete with high density polyethylene outer wrap compliant with ISO 21809.

Internal field joints shall be repaired and protected with a product fully compatible with the main lining system (Solvent Free Liquid Epoxy). A valid potable water certificate must accompany the data sheet of the material to be used.

Specification sheets for all proposed products and a method statement adhering to the manufacturer's recommendations shall be submitted to the Project Manager for approval prior to any field joint repairs being undertaken.

Surface preparation and application of all field joint repair systems shall be carried out strictly in accordance with the manufacturers data sheets and recommendations. All repairs and wrapping shall be high spark holiday tested in accordance with NACE RP0274 at the test voltage recommended by the product manufacturer.

PSL 3.9.5 Joints, nuts, bolts and washers

DELETE AND REPLACE WITH THE FOLLOWING:

"Bolts, nuts and washers shall be electrogalvanised and comply with the requirements of SANS 135 or SANS 136."

PSL 3.10 VALVES

ADD THE FOLLOWING TO THE EXISTING SPECIFIED CLAUSES:

PSL 3.10.1 General

The following general specifications shall apply to all valves:

- a) Any inspection or test at the manufacturer's works will not exempt the supplier from any obligation under Johannesburg Water's specification.
- b) Each valve must be inspected and tested in accordance with the relevant SANS specification and procedures by Johannesburg Water's Materials Officer at the manufacturer's works before coating. The manufacturer must provide all test facilities.
- c) The Johannesburg Water Materials Inspector must be advised at least 48 hours before the valves or components are ready for either inspection or testing.
- d) Before assembly JW's inspector must suitably mark all approved castings and components.
- e) The following information must be legibly and indelibly cast or embossed on the valve body:
 - Manufacturer's name
 - Valve size

Client:		Contractor:	
Witness:		Witness:	

- Class of valve e.g. Class 16 or PN 16
 - The SANS mark of approval (Where a relevant SANS standard is available)
- f) A metal identification plate must be permanently fixed to each valve and must bear the following information:
- Manufacturer's name
 - Contact number
 - Nominal size in millimetres
 - Nominal pressure
 - Serial number
 - Date of manufacture
 - Type of trim
 - Mass of valve in kg
- g) One flange shall be clearly marked with machined notches, 3mm wide and 3mm deep, with the length of the notches to suite the width of the flange. These notches shall be coated red and the following shall apply:
- Two notches – 1600kPa operating pressure
 - Three notches – 2500kPa operating pressure
- h) Flanges shall be flat-face machined (i.e no raised face).
- i) Valve caps shall be coated black. The wording "CLOSE" with the direction indicator arrow shall be legibly cast on the gland follower and all direction indicator arrows with the "CLOSE" wording on the valve cap top must be highlighted in red.
- j) The wording "CLOSE" with direction indicator arrows should be legibly cast on the gland follower and must be highlighted in red.
- k) All parts must be smooth and free from fins and burrs.
- l) All surface must, after they have been cleaned in a manner appropriate to the type of coating used, be coated internally and externally with an approved fusion bonded epoxy coating with a minimum coat film thickness of 250 microns and a maximum coat film thickness of 650 microns.
- m) Valves must be flanged to SANS 1123 Table 1600 or Table 2500, with bolt holes drilled off centre. Flange stud bolts must be supplied and fitted if required by the valve design. Multi-drilled flanges will not be accepted.
- n) Body ends must be sealed during delivery and storage to prevent entry of foreign matter.
- o) The front faces of flanges shall be flat faced, fully machined, parallel to one another, with appropriate bolt holes being spot faced on the back for valve sizes 200 mm and upwards.
- p) Bolts and nuts must comply with the requirements of SANS 135 or SANS 136.
- q) Body gaskets in contact with water must be non-hydroscopic.
- r) General arrangement drawings of all valve types indicating the main components such as body, bonnet, gate, spindle nut, sealing faces, channel guides, gate shoes and jacking screws with the method of securing channel guides, gate shoes and sealing rings together with main dimensions with an itemised parts list and material specification shall be submitted for approval.
- s) A quality control plan and procedure (QCP&P) prepared by the manufacturer shall be submitted to the Project Manager for approval and no valve manufacturing shall commence until the QCP has been approved in writing by the Project Manager and Johannesburg Water's Materials Inspector. The QCP shall be supplied in English and address, inter alia, all the tests, inspections and hold points as well as the acceptance criteria and standards for tests.

PSL 3.10.2 Wedge-type Gate Valves

Wedge type gate valves for vertical operation shall be Spheroidal Graphite grade 42, non-rising spindle, double flanged (flat face fully machined) manually operated with multi-stage open spur geared drives for sizes 300mm and upwards. The gear ratio of the gear drives shall be 4:1 for valves 300 mm up to and including 400 mm and 6:1 for valves 450 mm up to and including 900 mm.

Wedge gate valves shall comply with the following specification:

Client:		Contractor:	
Witness:		Witness:	

- a) Valves must comply with SANS 664 Part 1 and Part 2 and bear their mark.
- b) Valves must be Class 16 or Class 25, as shown on the drawings, non-rising spindle, wedge type gate valves. Substantial ribs to minimize distortion under pressure shall be provided internally and externally.
- c) Metallic components must be in accordance with Table 4 – General materials for valves of SANS 664 – Part 1. Non-metallic materials shall be suitable for use within the temperature range of 0° - 50° C.
- d) Valve spindles or drive shafts must be fitted with a spheroidal graphite iron to SANS 936 grade 42 valve caps, dimensioned to SANS 664 – 1, which shall have the wording “CLOSE” together with directional arrows legibly cast on the valve cap. The wording “CLOSE” as well as the direction arrows shall be highlighted in red against the black coated cap top for anti-clockwise closing valves. The valve cap top shall be secured to the spindle by means of an approved shearing pin of which will allow maximum operational torque of the valve in the open and close position. The shearing pin shall be easy replaceable in the field and hard driven taper pins and split pins shall not be allowed. Two spare shearing pins shall be attached to each valve.
- e) Valves must be closed by turning the valve caps on the spindles or drive shafts in a direction that is anti-clockwise when seen from above the valve caps.
- f) Valves must be provided with gland seals that permit the maintenance of the glands while the valves are under pressure. The spindle seal for valves where no open spur gearbox are required shall consist of at least two O-rings and dirt intrusion into the seals and bearings must be prevented. For valves of sizes DN 300 to DN 900 where an open spur gearbox is required a suitable gland packing of PTFE of similar approved packing may be utilized.
- g) Each valve including and above 200 mm diameter must have two eyebolts of requisite strength for lifting purposes.
- h) Valves, 300 mm up to and including 400 mm diameter, shall be multi stage open spur gear driven with a 4:1 minimum gear ratio and for sizes 450mm up to and including 900mm shall be multi stage open spur gear driven with a 6:1 gear ratio, having operating spindles on the input spindles and at a stage where the valve can be stroked without exceeding the maximum input torque if no differential pressure is applied to the valve. The gears shall be robust and machine cut and their mounting shall be of a substantial design. A permanently secured direction indicator dial shall be fitted to the gearbox to show the position of the gate. Stainless steel grease nipples shall be provided on the gearboxes for lubrication purposes. Enclosed gearboxes shall not be permitted. The supplier must furnish the following details on geared valves:
 - i. Total number of turns of the valve cap to fully open the valve from a closed position.
 - ii. Maximum torque required to operate the valve.
 - iii. Gear ratios.
- i) The operating mechanism shall be capable of withstanding an overload-input torque of 400 Nm for one minute at fully open and fully closed positions without damage to the valve or valve operating mechanism.
- j) The spindle and thrust collar must be a homogeneous unit and located within the bonnet. For valve sizes larger than 450 mm Ø a thrust bearing must be provided.
- k) The spindle nut shall be a one-piece, replaceable component which, for valves not exceeding 100 mm, may be rigidly fixed in the gate.
- l) All valves, including and above 400 mm, must be fitted with jacking screws.
- m) When tested to an internal hydraulic test pressure of 1600 kPa for the Class 16 valve of 2500 kPa for a Class 25 valve, the rate of seat leakage shall not exceed the value given in column 2 in the table below appropriate to the size of valve given in column 1.

1	2	3
Size of valve	Maximum leakage rate (ml/min.)	Test duration for body and seat test (min.)
80	2.5	1
100	3	1
150	4.5	1
200	6	2
250	7.5	2
300	9	3
350	10.5	3
400	12	3
450	13.5	3

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Witness:		Witness:	

500	15	5
600	18	5
700	21	5
800	24	5
900	27	5

- n) When the valve body is tested there shall be no leakage of water when subjected to an internal hydraulic test pressure of 3200 kPa for Class 16 valves and 3800 kPa for Class 25 valves for a period of not less than 5 minutes.

PSL 3.10.3 Resilient Seal Gate Valves

Resilient seal gate valves shall be Spheroidal Graphite grade 42, non-rising spindle, double flanged (flat face fully machined) manually operated.

Resilient seal gate valves shall comply with the following specification:

- a) Valves must conform fully to SANS 664 Part 1 and Part 3 and bear their mark.
- b) Valves must be Class 16 or Class 25, as shown on the drawings, non-rising spindle, resilient seal gate valves.
- c) Valves must be constructed of the following metallic materials:
 - (i) Body, bonnet, stuffing box, gates and gland - Spheroidal Graphite iron to BS2789 grade 420/12, SANS 936 grade 42.
 - (ii) Spindle – Stainless Steel to BS 970 grade 420 S29.
 - (iii) Spindle nut – Bronze to BS 1400 LG2.
- d) Non metallic materials shall be suitable for use within the temperature range 0° - 50° C.
- e) The valve spindle and thrust collar must be a homogeneous unit and located within the bonnet.
- f) Valve spindles must be fitted with SG 42 valve caps dimensioned to SANS 664, secured to the spindle by means of a shearing pin that will allow maximum operational torque of the valve in the open and closed position.
- g) Valves must be closed by turning the spindle in a direction that is anti-clockwise when seen from above the spindle.
- h) Valves must be provided with gland seals that consist of at least two O-rings and dirt intrusion into seals and bearings must be suitably prevented.
- i) Sealing and gate-guide areas must be designed to eliminate deposits.
- j) The operating mechanism must be capable of withstanding an overload input torque of 400 Nm for one minute at fully open and fully closed position without damage to the valve or valve operating mechanism.
- k) All assembled Resilient Seal Gate valves shall be so constructed that there is no leakage of water when subjected to an internal hydraulic test pressure of 3200 kPa for Class 16 valves and 3800 kPa for Class 25 valves for a period of not less than 5 minutes.
- l) For seat sealing hydraulic testing the internal hydraulic test pressure shall be 1600 kPa for a Class 16 valve and 2500 kPa for a Class 25 valve.

PSL 3.10.4 Control Valves (Referred to as Hytrol Main Valves in the Johannesburg Water Valve Specifications)

Control valves shall comply with the following:

- a) The valve shall consist of cast material to BS 1452 Grade 260 body and cover and a diaphragm assembly. No separate chambers shall be allowed between the main valve cover and the body. The design of the valve shall be that of a globe, self-acting, hydraulically operated, diaphragm actuated type with the diaphragm assembly being the only moving component separating the operating pressure from the line pressure. Semi-globe designs shall not be permitted.
- b) All surfaces must, after they have been cleaned in a manner appropriate to the type of coating used, be coated internally and externally, with an approved fusion bonded powder epoxy coating with a minimum coat film thickness of 250 micron.
- c) The valve shall contain a resilient, synthetic rubber disc with a rectangular cross section supported on all four sides by a disc retainer and disc guides. No o-ring type seals shall be permitted as a sealing surface.
- d) The disc guide shall be of the contoured type to permit smooth transition of flow and shall hold the disc firmly, preventing the possibility of being dislodged. No slotting of V-type disc guides shall be considered.

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Witness:		Witness:	

- e) The disc retainer shall be of a sturdy one-piece design. It shall have straight edge sided and a radius at the top edge to prevent excessive diaphragm wear. No hourglass shaped disc retainers shall be permitted.
- f) The diaphragm assembly shall contain a non-magnetic stainless steel stem of sufficient diameter to withstand high differential pressure. The diaphragm assembly stainless steel stem shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat with the bearing being cast in a stainless steel material dissimilar to that of the stem material. Centre guides, V-notched systems acting as secondary bearings and piston actuated designs shall not be permitted. The stem shall be drilled and tapped in the cover end to receive any accessories deemed necessary. No gland seals shall be permitted.
- g) The flexible and non-wicking diaphragm shall consist of a nylon fabric bonded with synthetic rubber that is compatible with urban potable water supply. The centre hole for the main stem shall be sealed by means of vulcanisation. The diaphragm shall be fully supported in the valve body and cover by machined surfaces and shall not be used as the seating surface, either in the fully opened or fully closed positions.
- h) The diaphragm shall withstand a Mullins Burst Test of a minimum of 41 bar per layer of nylon fabric and shall also be 100 000 times cycle tested. Proof of such to be submitted when requested.
- i) The valve shall be constructed that the maintenance, repairs and modifications to the valve can be achieved without that removal of the valve from the reticulation system. The diaphragm assembly shall be a singular component removable by lifting it vertically from the valve seat without the need of removing any locating screws. The main valve seat and the stem bearings in the valve cover shall be replaceable.
- j) The valve body and cover shall be machined with circulating locating edges to ensure proper alignment of the valve stem. The pinned cover method shall not be permitted.
- k) The valve shall be capable of withstanding a velocity of flow in the pipeline as high as 5 m/s and shall be capable of a differential pressure ratio as high as 3:1 for fully ported valves or 4:1 for reduced ported valves. Under these conditions the valves shall not suffer from damage as a result of cavitation.
- l) All assembled control valves shall be so constructed that there is no leakage of water when subjected to an internal hydraulic test pressure of 3200 kPa for Class 16 valves and 3800 kPa for Class 25 valves for a period of not less than 5 minutes.

PSL 3.10.5 Butterfly Valves

Butterfly valves must be manually operated, flanged, double offset, PN16 or PN25 as shown on the drawings, carbon steel design and conform to the requirements of BS5155. Butterfly valves shall comply with the following:

- a) Valves must be flanged to SANS 1123 Table 1600 for PN16 or Table 2500 for PN25 with the bolt holes drilled off centre. Flange stud bolts must be supplied and fitted if required by the valve design and shall not exceed eight per valve.
- b) Drive shafts shall be provided with SG 42 caps dimensioned to SANS 664 and be securely fitted to the spindle.
- c) Valves must be closed by turning the drive shaft in an anti-clockwise direction when seen from above. An indicator to show the position of the disc must be provided.
- d) Valves shall be constructed of the materials specified in the table below:

<u>Component</u>	<u>Material type</u>	<u>Material Specification</u>
Body	SG Iron	BS2789 GR 420/ SANS 936 SG 42
Body seat ring	Stainless Steel	BS 970 Part 4, Grade 304 S15
Valve disc	SG Iron	BS2789 GR 420/ SANS 936 SG 42
Disc/body seal	Elastomer/rubber	EPDM 75 Shore A / Nitrile
Seal retaining ring	Stainless Steel	BS 970 Part 4, Grade 304 S15
Valve shaft	Stainless Steel	BS 970 Part 4, Grade 304 S15
Shaft bearing/bushes	Phosphor Bronze	BS 1400 PB1C (Cu, Sn10, P)
Shaft seals	Radial lip type / cup seal	Nitrile / Viton
External fasteners	Steel (Galvanised)	SANS 136 Grade 8.8

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Witness:		Witness:	

Internal fasteners	Stainless Steel	BS 970 Part 4, Grade 304 S15

- e) Valves must have a replaceable stainless steel seat to the body or disc and a replaceable and adjustable resilient seal fitted to the edge of the disc or body and be a tight shut-off type.
- f) The valve bodies shall have adjustable mechanical stops to prevent over travel of the valve disc in the open and closed position.
- g) The preferred flow direction must be indicated.
- h) Valve shafts must be stainless steel as indicated. Two “Glacier DU” sleeve bearing with seals must be fitted to each shaft. A thrust bearing shall be provided to secure the valve disc in the centre of the valve.
- i) The valves must be capable of operation by one man turning the cap top with a differential pressure of 1600kPa across the disc. A thrust bearing to hold the valve disc securely in the centre of the valve seat must be provided.
- j) The operating mechanism must be capable of withstanding an overload-input torque of 400 Nm for one minute at fully open and fully closed positions without damage to the valve or valve operating mechanism.
- k) Sleeve bearings shall be provided to the worm drive shaft with the casing being of spheroidal graphite iron to SANS 936 grade 42 and weatherproof to IP65.
- l) All assembled Butterfly Valves shall be so constructed that there is no leakage of water when subjected to an internal hydraulic test pressure of 3200 kPa for Class 16 valves and 3800 kPa for Class 25 valves for a period of not less than 5 minutes.
- m) For seat sealing hydraulic testing the internal hydraulic test pressure shall be 1600 kPa for a Class 16 valve and 2500 kPa for a Class 25 valve.

PSL 3.10.6 Air Release Valves

Air release valves shall have a double orifice with an anti-shock orifice. Air valves shall comply with the following:

- a) Valves must be double acting air valves of compact single chamber design with both small and large air release orifices inside the chamber. The valve must also act as a vacuum breaker, with intake capacities of 60% of discharge rates given.
- b) The valve shall be capable to provide all of the following functions:
 - (i) Pipeline filling:
Uninterrupted high volume air discharge through the large orifice.
 - (ii) Pipeline draining or column separation:
Uninterrupted high volume air intake through the large orifice.
 - (iii) Pipeline full and operating:
Discharge of disenfranchised pressurized air through the small orifice.
 - (iv) Rapid filling/column separation:
The valve must incorporate an integral surge alleviation mechanism which will automatically dampen surge pressures due to rapid air discharge or the subsequent re-joining of separated water columns.
- c) An independent test centre must substantiate the discharge and intake rates.
- d) The valve body must be stainless steel T316 or SG 42 and the end connections must be the same nominal size as the valve designation.
- e) The air valves must have the following minimum discharge capacities:
 - (i) 25 mm – 4,5 m³ / minute at 40 kPa differential pressure.
 - (ii) 50 mm – 13m³ / minute at 40 kPa differential pressure.
 - (iii) 80 mm – 27m³ / minute at 40kPa differential pressure.
 - (iv) 100 mm – 34m³ /minute at 40 kPa differential pressure.
 - (v) 150 mm – 84m³ /minute at 40kPa differential pressure.

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Witness:		Witness:	

- f) End connections may be screwed to SANS 1109 or flanged to SANS 1123 Table 1600 or SANS Table 2500.
- g) A stainless steel screen on the air outlet port must provide protection against dirt.

PSL 3.11 FLOW METERS

Flow meters which have not previously been commonly used in South Africa shall not be acceptable unless specifically called for in the specifications or agreed upon with the Project Manager in writing.

Flow meters must be JW approved and must be delivered with a certificate of calibration traceable to SA National Standards. The contractor shall submit details of the flow meters to the Project Manager for approval prior to ordering any flow meters.

Flow meters shall be in-line full bore electromagnetic field flow meters and shall be supplied complete with a sensor, a remotely mounted transmitter, a display unit, cabling, supports and grounding rings (if applicable).

All electromagnetic flow meter installations shall include a concrete bunker complying with the following specification:

The overall height of the bunker prior to installation shall be no less than 1.4 m. The minimum wall thickness in any part of the bunker shall be 250 mm. The door shall be a lockable galvanized steel door at least 5 mm thick that provides extreme protection against vandalism of bunkers. It shall have no exposed hinges and a vandal resistant locking mechanism. The bunker shall have a 3CR12 chassis and gland plate to facilitate mounting of equipment. Adequately sized access holes shall be provided to accommodate all the monitoring point cables. The minimum internal bunker dimensions shall be 680 H x 500 W x 375 D.

The bunker shall be installed complete with a 150 mm thick apron slab and sleeves complete with lightning protection.

The flow meter shall meet the following minimum criteria:

- a) Flow meter shall be double flanged and must comply with SANS 1123 Table 1600/3 or Table 2500/3 as indicated on the drawings.
- b) Flow meter must have a dual pulse (forward and reverse), 4-20 mA output and must have a Modbus output standard DCP3 MODBUS.
- c) Flow meter must be able to be installed horizontally and vertically.
- d) Flow meter must be PN16 or PN25, as indicated on the drawings.
- e) Flow meter must be able to work up to 70°C.
- f) The meter needs to have an error of less than 2% as shown in the below graph.
- g) The enclosure sensor must be factory potted on the terminal connections and cable length must be adequate to reach the transmitter installed in a bunker.
- h) The flow meter must be able to measure forward and reverse flow.
- i) Flow meters will be installed in remote locations where no power supply and supporting telemetry infrastructure is available and shall be battery operated and equipped with GSM technology and fully compatible with Johannesburg Water's SCADA system.
- j) Flow meters must include a pressure sensor integrated into the meter converter to allow for simultaneous monitoring of flow and pressure.

PSL 3.12 PRESSURE TRANSMITTERS

Pressure transmitters shall be installed on the up and downstream side of all Pressure Reducing Valve installations. Pressure transmitters shall comply with the following:

- a) Pressure transmitters must have 4-20 mA output.
- b) Pressure transmitters shall be installed with data loggers.
- c) Pressure transmitters will be installed in remote locations where no power supply and supporting telemetry infrastructure is available and pressure transmitters and data loggers shall be battery operated and equipped with GSM technology and fully compatible with Johannesburg Water's SCADA system.

PSL 5 CONSTRUCTION

Client:		Contractor:	
Witness:		Witness:	

PSL 5.1 LAYING

PSL 5.1.4 Depth and Cover

PSL 5.1.4.2 Cover

ADD THE FOLLOWING TO THIS SUBCLAUSE:

"The minimum cover to finished surface over water mains shall be at least 1000 mm in trafficked areas and at least 800 mm elsewhere. At valves the depth of the pipeline shall be increased if necessary to ensure a minimum cover of 100 mm over the valve cap. The cover shall be maintained as close as possible to the minimum without local sags or humps and shall not be increased above the minimum by more than 200 mm without the approval of the Project Manager."

PSL 5.2 JOINTING METHODS

PSL 5.2.3 Welding (Steel Pipelines of Diameter 600 mm or greater)

DELETE THE EXISTING CLAUSE AND REPLACE WITH THE FOLLOWING:

"a) General

All pipes welded in the trench shall be properly laid and aligned before welding commences. Joint holes shall be excavated at all field welds. The Contractor shall not lift the pipe to provide adequate access for the welders to enable them to weld the joint.

The alignment of abutting ends shall be such that the offset will not exceed 1.7 mm. Line up clamps shall be used for joint "fit-ups". The use of "bridges and wedges" or any method that may induce unnecessary stresses is forbidden.

Both ends of coated and lined pipes shall be wrapped for a distance of at least 800 mm on either side of the weld by means of an asbestos mat or other approved material to ensure that weld spatter or other damage is not caused to the coating and lining during the welding process. The pipe trench shall be kept free of all dirt and water in the vicinity of the weld until after all corrosion protection measures have been completed and approved.

Destructive testing as specified in Clause PSL 7.2.3 shall be carried out. The Contractor shall submit to the Project Manager for approval a full procedure specification as detailed in API 1104, clause 5.3 prior to any field welding being allowed.

b) Welding procedure and qualification of welders

Welding shall be done only by qualified welders who satisfy the requirements of API 1104, Clause 3.0. Before any welding of pipeline materials commences, the qualification of welders shall have been approved, all detailed welding procedure specifications with weld diagrams required for their completion shall have been submitted for approval in a neat form and the welding procedure qualification tests shall have been successfully concluded all in accordance with the relevant standard specifications. The contractor shall be required to submit the following documents for each type of weld performed and each relevant change in base material, all in accordance with API 1104:

- WPS – Welding Procedure Specification
- PQR – Procedure Qualification Records
- WQR – Welders Qualification Records

Each welder shall mark the pipe adjacent to the weld with the figure assigned to him. Sufficient records shall be kept by the Contractor to ensure that all field welds can be subsequently identified with the welder concerned.

As far as practicable all out of trench welding shall preferably be done by an automatic submerged process and the Contractor shall provide all necessary plant to carry out this process. MSEAP welding may be used where in-trench welding is done.

Pre and post-heat treatment for welding shall be in accordance with API 1104 if required by same and the Contractor shall provide an approved shield to protect the pipe joint from wind and weather during heat

Client:		Contractor:	
Witness:		Witness:	

treatment and welding.

c) Line up

Pipes shall be lined up in such a manner as to prevent damage thereto. If the pipe to be used has a longitudinal seam, these seams shall be staggered by not less than twenty degrees and welded sections, or single lengths, shall be assembled in such a manner that this seam shall remain in the top quadrant of the pipe during coating operations and after lowering into the trench.

d) Cleaning of pipe ends

Before welding, all foreign matter shall be removed from the bevelled ends. If any of the ends of the pipe joints are damaged to the extent that satisfactory welding contact cannot be obtained, the damaged pipe ends shall be cut and bevelled with an approved bevelling machine.

These field bevels of pipe ends shall be made to the satisfaction of the Project Manager. Should laminations, split ends, or other defects in the pipe be discovered, the joints of pipes containing such defects shall be cropped, repaired, or removed from the line as designated by the Project Manager.

e) Inclement Weather

No welding shall be carried out during rain or high wind unless the welder and joint are adequately protected and sheltered, to ensure that the welding is not impaired.

f) Protection of coatings and linings

Before welding commences, a suitable apron at least 800 mm wide shall be wrapped around both sides of the area to be welded to ensure that weld spatter or fallout from arc weld does not damage the coating and lining.

To protect the pipe lining, before welding commences, rubber mats or other suitable material shall lay in the pipe invert of epoxy lined steel pipes to protect the lining against damage by construction traffic or fall-out from arc welding at the joint. The mats shall be placed the full distance from the point of access up to the point of weld or weld inspection. The mats shall be of sufficient width and shall cover a sufficiently wide area of pipe to protect the lining against damage due to access by staff, equipment, inspectors or fallout from arc weld.

Workmen shall wear soft rubber soled shoes before entering lined pipes. Care shall be taken not to stroke arcs on the epoxy lined areas adjacent to the weld joint. Immediately before welding of joints, the protective tape between the ends of cement-mortar or epoxy linings and coatings and pipe ends shall be removed.

g) Butt-welding

Pipes and specials to be joined by field welding shall be supplied with ends bevelled for welding. All welding of joints shall comply with API 1104 and only approved type welding rods shall be used.

If backing rings are permitted, they shall be placed in position and wedged up or adjusted so that the pipe ends are completely circular and properly mated. The space between abutting pipe ends, when aligned for welding, shall be such as to ensure complete penetration without burn-through. For pipes having the same dimensions, the spacing shall be approximately 1.5 mm.

The alignment of the abutting pipe ends shall be such as to minimize the offset between pipe surfaces. For pipes of the same nominal wall thickness, the offset shall not exceed 1.5 mm.

Internal line-up clamps shall be used wherever practicable and may be removed after the root bead is 50% completed, provided that the completed part of the root bead is in segments of approximately equal lengths, spaced about the circumference of the pipe. If conditions make it difficult to prevent movement of the pipe, or if the weld will be unduly stressed, the root bead shall be completed before releasing clamp tension.

External line-up clamps shall be used where it is impracticable to use internal line-up clamps. Partial root beads made when using external clamps shall be uniformly spaced about the circumference of the pipe, and shall have an accumulative length of not less than 50% of the pipe circumference before the clamps are removed.

Client:		Contractor:	
Witness:		Witness:	

Tack welding shall be carried out to maintain the root gap and position of the pipe ends during the welding proper. The number of tack-welds shall be kept to a minimum but shall not be less than four around the circumference of the pipe.

After proper preparation and tack welding, the root bead shall be carried out followed by successive filler passes, and capper pass in accordance with the approved welding procedure.

The filler and finish beads shall be deposited by an acceptable method and each filler bead shall be approximately 3 mm in thickness. Completed welds shall have a reinforcing of not less than 0.8 mm and not more than 1.5 mm above the pipe surface around the entire perimeter of the weld, and the width of the finish or cover shall be not more than 3 mm greater than the original groove.

The number of beads required shall be governed by the wall thickness of the pipe, so that the completed weld will have the reinforcement previously specified; provided, however, that each weld shall consist of at least three beads. No two beads shall be started at the same point. No mitre welds will be permitted, and all welds are to be at ninety degrees ($\pm 5^\circ$) to the axis of the pipe. All slag and scale shall be removed from each bead for visual inspection immediately after each bead is run.

In all field butt-welds where it is possible to work inside the pipe, the inside weld shall be undertaken first. The inner weld metal or reinforcement shall not extend more than 1mm above the inside metal surface of a pipe or special, and any excess shall be removed by grinding.

The Contractor will not be allowed to complete butt-welds partly (i.e., alignment, tack-welding and root-welding) and then returning only to complete the filler welding much later.

The chemical composition of weld metal and parent metal shall be similar.

Defects caused by stray welding arc flashes shall be removed by grinding, provided that the pipe wall thickness is not reduced to less than the specified minimum thickness, otherwise the portion shall be cut out and repaired.

h) Fillet welding

Welding shall be as for butt-welding as applicable. All pipes of 600 mm ND and over shall be welded on both the outside and the inside.

i) Welding Rods

Only welding rods which have been kept dry and uncontaminated shall be used. Welding rods shall be of grade and quality such that the chemical composition of weld metal and parent metal is similar.

j) Welding alongside the Trench

Pipes may be welded together alongside the edge of the trench. For factory lined and coated pipes, the maximum length so welded together shall be such that:

The pipe can be subsequently stored, lifted or handled without damage to linings or coatings.

The out of roundness at a plane perpendicular to the pipe axis at any point along the pipe length during storage, lifting or handling does not exceed 4% of the minimum inside diameter. Out of roundness being measured as the difference between the minimum and maximum inside diameter of the plane at the point.

Safe and easy access to internal tie-in welds are assured for staff and inspectorate with equipment.

The linings and coatings of pre-lined and coated pipes jointed together outside the trench shall be made good at these joints outside the trench.

k) Repair of welds

Rectification of defective welds shall be in accordance with API 1104 and to the satisfaction of the Project Manager. All costs related to the repair of defective welds shall be borne by the Contractor. Defective welds shall be repaired immediately they are found to be so. The Project Manager has the right to stop the

Client:		Contractor:	
Witness:		Witness:	

Contractor proceeding with further pipe laying in the event of the Contractor delaying the rectification of defective welds. Furthermore, no consideration will be given to any claims arising from delays in construction resulting from such action.

All welded joints which have been repaired shall be 100% radiographed or otherwise tested to the Project Manager satisfaction at the Contractor's own expense."

PSL 5.6 VALVE AND HYDRANT CHAMBERS

PSL 5.6.1 General

REPLACE THE WORDS "drawing L-1" IN THE SECOND LINE WITH "the Drawings".

PSL 5.6.2 Construction of chambers

REPLACE THE WORDS "drawing L-1, L-2 and L-3" IN THE FOURTH LINE WITH "the Drawings".

PSL 5.8 BRICKWORK IN CHAMBERS AND MANHOLES

ADD THE FOLLOWING TO THIS SUBCLAUSE:

"The joints of exposed faces shall be flush-trowelled, hard and smooth and shall be rubbed for the full width of the joint as the work proceeds to give a hard polished finish."

PSL 5.10 DISINFECTION OF WATER PIPELINES

DELETE EXISTING CLAUSE AND REPLACE WITH:

"On satisfactory completion of hydrostatic testing, all pipelines shall be flushed with potable water supplied by the Contractor. The Contractor shall ensure that the water used for flushing is disposed of in an approved manner without causing damage, nuisance, or injury. If required, the Contractor shall arrange for all pipelines to be sterilised by chlorination by an approved specialist firm after flushing has been complete. The preferred method of sterilisation is as follows:

The volume of the section of the pipeline to be chlorinated is calculated. A concentration of 8 – 10 ppm of chlorine to this volume of water is injected into the pipeline at the point of charging to form a highly concentrated chlorine block about 20 m in length. Charging of the pipeline is then commenced with chlorine being continuously inject at a concentration of 3 – 4 ppm. This moves the highly concentrated block throughout to end of that section of the pipeline. This results in high concentration and short contact times in the high contamination zones and lower chlorine concentration with longer contact times in the other zones.

During this process each scour is left closed. When the section of pipeline is fully charged, each scour in "blown" under pressure until there is no evidence of turbidity. The highly concentrated block is scoured out of the pipeline at the end of the section of pipeline. During this scouring process, chlorine is injected into the pipeline at the charging point at a concentration of 3 – 4 ppm. Generally after a 24 hour contact time water sample analysis indicates chlorine concentrations of 1-2 ppm.

In all cases of chlorination, HTH granular chlorine is to be dissolved with water prior to injection.

The chlorinated water shall thereafter be drained from the pipelines and disposed of in an approved manner if necessary, after dechlorination, without causing damage, nuisance or injury. The mains shall then be refilled with potable water."

ADD THE FOLLOWING NEW SUBCLAUSES:

"PSL 5.11 WORK ON AND CONNECTIONS TO EXISTING MAINS

"Where connections are to be made to existing mains, the Contractor shall excavate back along the existing main only as far as is necessary to complete the connection satisfactorily and shall ensure that the existing mains are disturbed as little as possible. Backfilling shall be carefully placed and properly compacted beneath existing and new work to ensure that the mains, specials, etc. are properly bedded.

Client:		Contractor:	
Witness:		Witness:	

Work on existing mains and components of the water supply system shall be carefully planned in consultation with the Project Manager and the Client. The work shall be carried out expeditiously to ensure that the disruption of services and inconvenience to the local residents is kept to a minimum. All tie-ins shall be completed within a maximum of 10 hours.

The Contractor under strict supervision by the Project Manager or The Client will do all these connections.

Hand excavation must be used to expose the existing mains and erf connections where required. While every effort has been made to ensure that the information relating to these connections is correct the Project Manager or The Client takes no responsibility for the accuracy, or for the completeness of the information."

The Contractor shall supply all necessary fittings / materials for under pressure connections suitable for all pipe sizes. The Contractor shall confirm all measurement on site prior to ordering any pipe fittings.

PSL 5.12 PIPELINE RENEWAL WORK

All material recovered as a result of the repairs or replacement of the components shall be returned to the Contractors store where they shall be cleaned, sorted and listed. A list of the recovered material shall be handed to the Project Manager on a monthly basis. All recovered material shall be delivered to the relevant Depot on a regular basis or at the end of the Contract.

PSL 5.13 STERILISING OF WATER MAINS

All new water mains shall be sterilised at 10 mg/l free chlorine for 12 hours and will then be thoroughly flushed. This clause is to be read in conjunction with Clause 5.10.

PSL 5.14 PIPELINE ROUTE MARKERS

Route markers for the various water pipelines shall be erected in the positions shown on the drawings and shall be manufactured according to the details shown on the Drawings."

PSL 7 TESTING

PSL 7.2 INITIAL TESTS ON WELDED STEEL PIPES

PSL 7.2.1 Dye-Penetrant Test

ADD THE FOLLOWING TO THIS SUBCLAUSE:

"100% of the total length of all field fillet welds shall be dye-penetrant tested, using equipment and materials supplied and staffed by the Contractor's Inspectorate. Scheduling of the testing activities will have to be coordinated to have the least interference with the progress of the Works.

100% of the total length of all fillet welds undertaken in the manufacturing process of pipe specials and bends shall be dye-penetrant tested, using equipment and materials supplied and staffed by the Contractor's Inspectorate."

PSL 7.2.2 Radiographic Examination

ADD THE FOLLOWING TO THIS SUBCLAUSE:

"100% of the total length of all manual field butt welds and field welds undertaken by an approved automatic process on pipe sections and pipe specials will be examined radiographically with particular reference to weld intersections, using equipment supplied and staffed by the Contractor's Inspectorate. Scheduling of the testing activities will have to be coordinated to have the least interference with the progress of the Works.

100% of the total length of all manual butt welds and welds undertaken by an approved automatic process in the manufacturing process of pipe specials and bends will be examined radiographically with particular reference to weld intersections, using equipment supplied and staffed by the Contractor's Inspectorate.

The Contractor shall be responsible for radiographic testing and adjudication of test records to maintain his quality control system and a high standard of installation and welding. The Contractor shall provide all equipment and consumables required for his own testing.

Client:		Contractor:	
Witness:		Witness:	

Although an Approved Inspection Authority (AIA) may be appointed by the Project Manager to independently monitor the quality of welding and corrosion protection in the factories and on site, this shall not absolve the manufacturers and Contractor from the obligation to implement their own quality assurance programmes for this work. However, the Client recognises that the radiographic weld testing on site is a time-consuming process and that it may not be practical to duplicate this activity without potentially delaying production. In this regard the Contractor shall allow for the testing of 100% of the field joints by an accredited weld testing authority other than the AIA. The Contractor will share these test results with the Project Manager but the Project Manager will have the right to instruct independent ad hoc radiographic testing as and when required.

All welds formed by the installation of the temporary end-caps for the hydrostatic testing shall be tested radiographically.

The Contractor's Inspectorate shall process and adjudicate radiographs on site. The standard of acceptability shall be in accordance with API 1104.

All welds which are found to be unsatisfactory shall be repaired and re-radiographed at the Contractor's expense.

When welding the line together at places where the test welds have been cut out, one weld will be used if it is practicable to pull the line back into position, otherwise, two welds will be made by setting in a short length of pipe with a minimum length of 750 mm.

A record of the results of each test weld shall be made by the Contractor's Inspectorate and jointly signed by the Project Manager or Supervisor and Contractor's Representative. Extra welds shall be construed to mean those welds cut out at the Project Manager's request which, after specified tests, are found to meet the Project Manager's Specification, except those free initial test welds referred to herein.

Claims arising from delays in construction caused by justifiable additional radiography which may be ordered by the Project Manager or re-radiography of repairs will not be considered."

ADD THE FOLLOWING NEW CLAUSE:

"PSL 7.2.3 Destructive tests

Tests as specified in API 1104 clause 6.5 shall be carried out and approved prior to any field welding being undertaken."

PSL 7.3 STANDARD HYDRAULIC PIPE TEST

PSL 7.3.1 Test pressure and time of test

The test pressure shall be 1.25 the maximum working pressure for pipeline components. The maximum working pressure for the pipes shall be taken as the rating of the valves and flanges, PN16 or PN25 as relevant.

ADD THE FOLLOWING NEW CLAUSE:

"PSL 7.3.4 Supply of water for testing

The contractor shall supply all water used for hydraulic testing of pipelines and bare all costs in connection therewith."

ADD THE FOLLOWING NEW CLAUSE:

"PSL 7.5 TESTING OF HDPE PIPES

Sample of the welded joints shall be taken and the following test shall be carried out by an approved laboratory selected by the Client:

1. Tensile strength on seam weld
2. Elongation at break
3. OIT (Oxidation Induction Time)
4. MFR (Melt Flow Rate)
5. Carbon black content
6. Carbon black dispersion"

Client:		Contractor:	
Witness:		Witness:	



PSL 8 MEASUREMENT AND PAYMENT

PSL 8.2 SCHEDULED ITEMS

REPLACE THE CONTENTS OF SUBCLAUSE 8.2.1 WITH THE FOLLOWING:

“PSL 8.2.1 Supply, Lay and Bed Pipes Complete with Couplings Unit: m

Pipelines will be measured by length over all lengths as laid. No deduction will be made for specials and valves. Separate items will be scheduled for each for each diameter and each type and class of pipe laid. The rates shall cover the cost of the provision of the pipes complete with couplings, and the cost of the handling, inspecting, transporting, bedding, laying, jointing and cutting of the pipe, but exclude the cost of disinfecting and hydraulic testing of the pipe.”

PSL 8.2.11 Anchor blocks/Thrust blocks and pedestals

Insert "concrete" before "and" in the last line of the last paragraph.

Add the following:

"Where mild steel fittings are used with High Impact mPVC pipes, the tendered rate shall include wrapping the fittings with a poly-isobutene self-healing visco-elastic coating complete with high density polyethylene outer wrap compliant with ISO 21809 where the fittings are in contact with concrete.

ADD THE FOLLOWING NEW SUBCLAUSES:

“PSL 8.2.16 Supply, Lay and Bed Steel Pipes Complete with Welded Joints Unit: m

Pipelines will be measured by length over all lengths as laid. No deduction will be made for specials and valves. Separate items will be scheduled for each for each diameter and each type and class of pipe laid. The rates shall cover the cost of the provision of the pipes and the cost of handling, transporting, bedding, laying, cutting (where required), welding, non-destructive testing of welds and field joint repairs to pipe coating and lining, but exclude the cost of disinfecting and hydraulic testing of the pipe.”

“PSL 8.2.17 Supply and install Steel Pipes inside Concrete Pipe Jacking Sleeve Complete with Welded Joints Unit: m

Pipelines will be measured by length over all lengths as laid within DN 1800 mm pre-cast concrete jacking pipes. Separate items will be scheduled for each diameter and each type and class of pipe laid according to this method. The rates shall cover the cost of the provision of the pipes and the cost of handling, transporting, installing, cutting (where required), welding, non-destructive testing of welds and field joint repairs to pipe coating and lining, but exclude the cost of disinfecting and hydraulic testing of the pipe. The cost shall further include all skids, brackets or bracing and support to install the steel pipes inside the concrete jacking pipes.”

“PSL 8.2.18 Supply and install Steel Pipes inside Concrete Pipe Tunnel at M1 crossing Complete with Flanged Joints Unit: m

Pipelines will be measured by length over all lengths as laid within the Concrete Pipe Tunnel at the M1 crossing as shown on drawing JW14358-16941-T-014-S11-00-TMS. Separate items will be scheduled for each diameter and each type and class of pipe laid according to this method. The rates shall cover the cost of the provision of the pipes and the cost of handling, transporting, installing, cutting and welding (where required), jointing sets and field joint repairs to pipe coating and lining, but exclude the cost of disinfecting and hydraulic testing of the pipe. The cost shall further include all skids, brackets or bracing, support and equipment to install the steel pipes inside the Concrete Pipe Tunnel.”

“PSL 8.2.19 Extra over 8.2.1 or 8.2.16 for the Supplying, Laying, Welding or Jointing and Bedding of Steel specials Unit: No.

Specials will be measured by the number of each type, class and size. The rates, which shall be extra-over rates for PSL 8.2.1 or PSL 8.2.16, shall cover the cost for providing the special or providing all materials and manufacturing of each special, complete with pipe supports where it is indicated on the drawings that pipe supports form part of specials and jointing sets for flanged fittings and bolts for pipe supports, and the cost of handling, fixing, bedding, welding and non-destructive testing of the special, cutting of the pipes and field joint repairs to pipe coating and lining where applicable.”

Client:		Contractor:	
Witness:		Witness:	

“PSL 8.2.20 Supply, Lay and Bed HDPE Pipes Complete with Welded Joints Unit: m

Pipelines will be measured by length over all lengths as laid. No deduction will be made for specials and valves. Separate items will be scheduled for each for each diameter and each type and class of pipe laid. The rates shall cover the cost of the provision of the pipes and the cost of handling, transporting, bedding, laying, cutting (where required) and electrofusion welding, but exclude the cost of disinfecting and hydraulic testing of the pipe.”

“PSL 8.2.21 Extra over 8.2.20 for the Supplying, Laying, Butt Fusion Welding and Bedding of HDPE specials Unit: No.

Specials will be measured by the number of each type, class and size. The rates, which shall be extra-over rates for 8.2.1, shall cover the cost for the provision of each special, and the cost of handling, fixing, bedding, butt fusion welding and cutting of the pipes.”

“PSL 8.2.22 Flushing and sterilising of pipelines Unit: m

Pipelines will be measured by length over all lengths of pipeline sterilised. Separate items will be scheduled for each for each diameter and each type and class of pipe sterilised. The tendered rates shall include full compensation for the provision of all labour, chemicals and equipment and for sterilising the pipeline, including all water used for flushing and disinfecting.”

“PSL 8.2.23 Hydraulic field-testing of pipelines Unit: m

Pipelines will be measured by length over all lengths of pipeline tested and which has passed the test. Separate items will be scheduled for each for each diameter and each type and class of pipe tested. The tendered rate shall include full compensation for the provision of all labour, materials, pressure testing domes, blank flanges, bullnoses and fittings required, for the provision, installation, calibration and operation of the equipment, pumps and gauges used for testing and for visually inspecting the pipe for leaks.”

“PSL 8.2.24 Pipeline and Valve Markers

a) Precast Concrete Marker (drawing JW14358-16941-T-017-S07-00-TMS) Unit: No.

b) Kerb Marking (drawing JW14358-16941-T-017-S07-00-TMS) Unit: No.

The tendered rate shall include full compensation for all excavation and backfill, labour, equipment and materials to manufacture and install the pipeline markers or paint kerbs as shown on the Drawings.

“PSL 8.2.25 Supply and Installation of HDPE pipes through Horizontal Directional Drilling (HDD) Unit: m

The rate shall include the complete (labour, qualified operators, material, plant and equipment) cost for the successful drilling of the pipe, installation and supply of pipes of various diameters, jointing of pipe, launching and reception pits. The rate shall also include the provision and operation of all equipment and accessories, provision and application of all materials, safety equipment (including that required for the Project Manager or Supervisor’s sole use), traffic accommodation and testing and reporting.”

“PSL 8.2.26 Laboratory testing of HDPE joints Unit: Prov Sum

The Project Manager shall set aside an amount as Provisional Sum for laboratory testing of HDPE welding joints. The amount shall cover the cutting, transportation and laboratory test of the sample joints.”

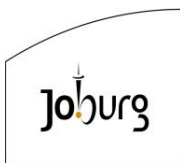
“PSL 8.2.27 Connect to Existing Mains

a) Tie-in of new DN 400 chamber on existing DN 400 pipeline (drawing JW14358-16941-T-013-S35-00-TMS) Unit: Sum

b) Tie-in DN 200 High-Impact mPVC pipe to upgraded existing DN 150 PRV chamber (drawing JW14358-16941-T-013-S49-00-TMS) Unit: Sum

The tendered sums shall include full compensation to the Contractor for constructing and completing the tie-in activities at each tie-in point. It shall include all labour, materials (other than the pipe specials measured elsewhere), standby equipment, maintaining excavation integrity, dewatering of the excavations, shift changes, lighting, liaison with Johannesburg Water to arrange a shutdown and miscellaneous items. The Contractor shall provide the Project Manager with a complete breakdown of this tendered sum when requested to do so.”

Client:		Contractor:	
Witness:		Witness:	



“PSL 8.2.28 Connect to Existing Mains using Hot Tapping

- a) Connect DN 600 (PN25) stub to existing DN 1500 pipeline Unit: Sum
- b) Connect DN 800 (PN25) stub to existing DN 1200 pipeline Unit: Sum
- c) Connect DN 500 (PN25) stub to existing DN 525 pipeline Unit: Sum

The rate shall cover the cost of the materials, equipment, labour, transport of equipment and materials, welding, drilling or cutting and testing and commissioning of the stub connection. The materials deemed to be included are:

- Compensation pad where stub is welded onto the existing main pipe
- Pipe stub that will protrude from compensation pad
- Flange to be welded to pipe stub

The rate shall include design of the compensation pad and pipe stub according to dimensions provided on the drawings, which shall be submitted to the project manager for approval. Excavation, construction of the chamber and supply and installation of the gate valve and other specials inside the chamber shall be measured elsewhere.

“PSL 8.2.29 Steel pipe supports Unit: No.

Additional payment for steel pipe supports will only be made where separate items have been scheduled for pipe supports. The rate for supports shall cover all material, plant and labour required for the supply, manufacturing and installation of the support, including all anchor bolts, jointing material and corrosion protection.”

“PSL 8.2.30 Extra over 8.2.1 or 8.2.16 for the Supplying, Installing and Commissioning of Flow Meters Unit: No.

Flow meters will be Electromagnetic Flow meters and measured by the number of each class and size. The rates, which shall be extra-over rates for PSL 8.2.1 or PSL 8.2.16, shall cover the cost for the provision of each electromagnetic flow meter, complete with a sensor, remotely mounted transmitter, a display unit, length of cabling as indicated, supports and grounding rings and cable racks inside the valve chamber, and the cost of transport, handling, installing, setting up, calibrating and commissioning of the flow meter.”

“PSL 8.2.31 Insitu repair of epoxy coated and lined pipe specials

The tendered sums shall include full compensation to the Contractor for doing insitu repairs to pipe coating and lining. It shall include labour, materials, equipment, including all surface preparation for field joint repairs as outlined in the manufacturer’s specifications.”

- a) Flanges Unit: No

Separate items will be scheduled for each diameter of flange.

- b) Pipes Unit: m²

Payment shall be made per m² of coating or lining repaired to the nearest 0.1 m².

“PSL 8.2.32 Replacement of Existing Valves and Specials under Shutdown Conditions

- a) Butterfly Valve Chamber 1 (drawings JW14358-16941-T-013-S45-00-TMS and JW14358-16941-T-013-S46-00-TMS) Unit: Sum
- b) Butterfly Valve Chamber 2 (drawing JW14358-16941-T-013-S47-00-TMS) Unit: Sum

The tendered sums shall include full compensation to the Contractor for constructing and completing the valve and special replacement activities at each chamber. It shall include all labour, materials (other than the valves and pipe specials measured elsewhere), standby equipment, maintaining excavation integrity, dewatering of the excavations, shift changes, lighting, liaison with Johannesburg Water to arrange a shutdown and

Client:		Contractor:	
Witness:		Witness:	



miscellaneous items. The Contractor shall provide the Project Manager with a complete breakdown of this tendered sum when requested to do so.”

“PSL 8.2.33 Supplying, Installing and Commissioning Pressure transmitters with GSM Battery operated data loggers Unit: No.

The rate shall cover the cost for the provision of each pressure transmitter, complete with a GSM Battery operated data logger, and the cost of transport, handling, installing, setting up and commissioning of the pressure transmitter and data logger.”

“PSL 8.2.34 Operation and Maintenance Manuals for Valves and Flow Meters Unit: Sum

The rate shall cover the cost of providing operating and maintenance manuals for valves and flow meters. Different items will be scheduled for each valve type, diameter and class supplied.”

Client:		Contractor:	
Witness:		Witness:	

PSLB BEDDING (PIPES)

PSLB 3 MATERIALS

PSLB 3.1 SELECTED GRANULAR MATERIAL

REPLACE THE CONTENTS OF THIS SUBCLAUSE WITH THE FOLLOWING:

Selected granular material shall be fine sand or fine non-cohesive soil, carefully selected, with maximum particle size of 5 mm and which shall not cake nor form lumps when drying. Samples of bedding sand (selected granular material) sourced from a quarry (supplier) with a valid river sand mining permit shall be submitted by the Contractor to the Project Manager for approval well in advance of construction. Only after the Contractor has received written approval from the Project Manager, may he proceed with placing sand as selected granular material.

No sharp-edged stones shall be allowed to come into contact with the pipes or fittings. Joint holes (pockets) shall be provided in the trench bottom and bedding, at each pipe joint to facilitate welding, and no extra payment will be made for forming or filling the joint holes (pockets) with bedding sand (selected granular material).

All bedding sand used for the cradle beneath and surrounding the pipes shall comply with the following requirements:

GRADING ANALYSIS RANGE	
SIEVE SIZE (mm)	PERCENTAGE PASSING
5,00	100
2,00	40 to 95
1,00	20 to 75
0,60	15 to 50
0,425	12 to 40
0,30	10 to 30
0,15	5 to 20
0,075	0 to 15

The material shall be free of organic matter and shall have a compatibility factor of not more than 0.4. The material should be classified as silty to fine sand having a stiffness of not less than 5,0 MPa. Furthermore, the origin of the materials should, preferably, be river transported since it is preferable that the larger grains (exceeding 3,0 mm in size) be rounded and not sharp and angular.

The Contractor will be required to carry out his own quality control testing of the material to ensure that it meets the requirements and complies with this specification at all times. At least one grading analysis shall be carried out for every 300 lineal metres of bedding placed. The results of these tests shall be forwarded to the Project Manager within 24 hours of completion of the test. Should the material not comply with the specification, the Contractor shall remove and replace it with approved material at his own cost.

Depending on the actual material supplied by the Contractor, the moisture content may be critical to enable satisfactory placing and compaction and the Contractor will be deemed to have allowed in his tendered rate for any and all adjustments required to the moisture content of the material at all times.

PSLB 3.2 SELECTED FILL MATERIAL

ADD THE FOLLOWING TO THE EXISTING SPECIFIED CLAUSES:

Maximum particle size shall be 25 mm with at least 60% passing 6,75 mm sieve. The material shall be granular and non-flaky and shall contain no organic matter. It shall not cake or form lumps on drying out. The pH of the material may not be less than 6.0.

PSLB 3.3 BEDDING

ADD THE FOLLOWING:

"mPVC, HDPE and steel pipes are deemed to be flexible pipes for the purposes of this subclause.

Client:		Contractor:	
Witness:		Witness:	

Bedding for all pipes shall be as per SANS 1200 LB, including the Variations and Additions and as per JW standard detail for bedding of water pipes."

PSLB 3.4 SELECTION

PSLB 3.4.1 Suitable material available from trench excavation

REPLACE THE WORDS "(but is not required)" IN THE FIFTH LINE WITH THE WORDS "(at his own cost)".

PSLB 7 TESTING

PSLB 7.1 DENSITY

REPLACE THE SECOND SENTENCE IN THE FIRST PARAGRAPH WITH "The test will be carried out by an independent laboratory using a Nuclear Moisture Density Gauge."

ADD THE FOLLOWING SUB-CLAUSE

PSLB 7.1.1 Submission of bedding compaction test results

The Contractor will be required to submit to the Project Manager four (4) compaction test results of bedding for every 100 metres. Bedding compaction to be 90% MOD AASTHO density. The compaction tests to be performed using a Nuclear Moisture Density Gauge.

PSLB 8 MEASUREMENT AND PAYMENT

PSLB 8.1 PRINCIPLES

ADD THE FOLLOWING TO THIS SUB-CLAUSE

PSLB 8.1.3 Volume of bedding materials

The volume of bedding material shall be measured net i.e. the volume of the pipe is to be deducted.

a) The dimensions of the trench shown on Drawing JW14358-16941-T-017-S05-00-TMS, or else the minimum trench width as defined by Clause 5.2 of SANS 1200 DB, and the actual dimensions of the pipe shall apply.

b) The volume of the void formed by the pipe shall be subtracted from these computations.

No payment will be made for any bedding material required to backfill over-excavation beyond the widths or depths determined according to (a) above.

PSLB 8.1.5 Disposal of displaced material

DELETE THIS SUB-CLAUSE AND REFER TO CLAUSE PSDB 5.6.3:

Material displaced by importation of material in terms of 8.1.2 shall be disposed of to embankments where required and compacted to a minimum of 90% Mod AASHTO density, or to designated approved spoil sites, where it shall be levelled and shaped to conform with the natural contours of the land. No overhaul will be paid for the disposal of such material.

PSLB 8.1.6 Free-haul

REPLACE THE CONTENTS OF SUBCLAUSE 8.1.6 WITH THE FOLLOWING:

"The transport of all material imported from commercial sources and excavated materials, irrespective of the distance and source, shall be deemed to be free-haul, the cost of which is included in the Contractor's tendered rates and prices for the excavation of the materials. No separate compensation shall apply for the transportation of materials."

PSLB 8.2 SCHEDULED ITEMS

PSLB 8.2.1 Provision of bedding from trench excavations

DELETE THIS SUB-CLAUSE AND REPLACE WITH THE FOLLOWING:

Client:		Contractor:	
Witness:		Witness:	

PSLB 8.2.1.1 Provision of bedding from trench excavations without the need for screening or other treatments

a) Selected granular material.....Unit: m³

b) Selected fill material.....Unit: m³

The rates shall cover the cost of acquiring, from any point along the trench excavation as may be selected by the Project Manager, bedding that complies with the relevant requirements of the specification, of delivering it to points alongside the trench spaced to suit the Contractor's methods of working, of making good any backfill deficiency from points where backfill has been acquired, and of disposing of displaced material.

PSLB 8.2.1.2 Provision of bedding from trench excavations including screening or other treatments

a) Selected granular material.....Unit: m³

b) Selected fill material.....Unit: m³

The rates shall cover the cost of screening by means of mesh sieves or otherwise treating excavated material, at any point along the trench excavation as may be selected by the Project Manager, in order to produce bedding that complies with the relevant specification, delivering it to points along the trench, spaced to suit the Contractor's methods of working, of making good any backfill deficiency there may be from points where screened backfill material has been acquired, and of disposing of displaced material.

PSLB 8.2.5 Overhaul of Material for Bedding Cradle and Selected Fill Blanket (see 8.2.1) (Provisional)

REPLACE THE CONTENTS OF THIS ITEM WITH THE FOLLOWING:

"The transport of all material imported from commercial sources and excavated materials, irrespective of the distance and source, shall be deemed to be free-haul, the cost of which is included in the Contractor's tendered rates and prices for the provision of bedding. No separate compensation shall apply for the transportation of excavated materials."

ADD THE FOLLOWING SUB-SUBCLAUSES:

"PSLB 8.2.6 Extra over items 8.2.1 and 8.2.2 for bedding stabilized with 5% cement Unit: m³

The tendered rate shall include full compensation for selecting, mixing, backfilling and compacting the stabilized material to 90% of modified AASHTO density."

"PSLB 8.2.7 Compaction Testing using a Nuclear Moisture Density Gauge Unit: No.

The rate shall cover the cost for an independent laboratory to test the compaction of bedding material using a Nuclear Moisture Density Gauge. Payment will only be made where the Contractor is instructed by the Project Manager to perform additional compaction tests over and above those specified in clause PSLB 7.1.1."

Client:		Contractor:	
Witness:		Witness:	

PSLC CABLE DUCTS

PSLC 3 MATERIALS

PSLC 3.1 DUCTS

ADD THE FOLLOWING SUB-CLAUSE:

“PSLC 3.1.1 Split uPVC pipes

Split pipes shall only be used to provide ducts for existing services that cannot be severed and threaded through the ducts. The pipes shall be cut accurately in the middle, and opposite halves shall be matched as sawn. Split pipes shall be placed around the service, firmly bound by steel straps, and encased in concrete.”

PSLC 3.4 CABLE DUCT MARKERS

ADD THE FOLLOWING:

“A cable duct marker shall consist of a 300 mm x 300 mm x 100 mm deep, class 20 MPa/19 mm concrete block, connected by means of a non-ferrous metal strip to a temporary plug to seal the end of the duct. The plug shall prevent moisture or soil from entering the duct. The metal strip shall be firmly connected to both the plug and the concrete block. The concrete block shall be positioned not further than 0,5 m horizontally from the end of the cable duct. The face of the concrete block shall be clearly marked to indicate cable type.”

PSLC 5 CONSTRUCTION

PSLC 5.3 DUCT LAYING

ADD THE FOLLOWING SUB-CLAUSE:

“PSLC 5.3.5 Screening

Pipe ducts used for data and telemetry cables shall be screened against damage by lightning by bare copper earth wire. All joints in screen wires shall be soldered. The screen shall consist of two strands of a 10 mm² bare copper wire. The bare copper earth wire shall be placed on the outside of the sleeve and run parallel to the sleeve.”

PSLC 8 MEASUREMENT AND PAYMENT

PSLC 8.2 SCHEDULED ITEMS

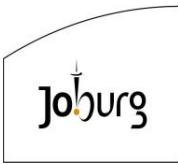
PSLC 8.2.5 Supply, lay, bed and prove duct, including draw wire and screening wire

REPLACE THE PAYMENT PARAGRAPH WITH THE FOLLOWING:

“Separate items are scheduled for each diameter of duct.

The rates shall cover the cost of providing all the materials and the cost of laying the ducts, installing the draw wire, jointing, bedding, bare copper earth screening wire and providing all as specified.”

Client:		Contractor:	
Witness:		Witness:	



PSLE STORMWATER DRAINAGE

PSLE 3 MATERIALS

PSLE 3.1 CULVERT UNITS AND PIPES

(d) Skewed ends

ADD THE FOLLOWING:

"Skewed ends for pipe culverts may be cut on Site."

PSLE 3.4 MANHOLES, CATCHPITS, AND ACCESSORIES

PSLE 3.4.1 Bricks

ADD THE FOLLOWING:

"Bricks shall be engineering bricks complying with the requirements of SANS 227."

Client:		Contractor:	
Witness:		Witness:	

PORTION C: PARTICULAR SPECIFICATIONS

PSCC1 CONCRETE WORKS (STRUCTURAL)

PSCC1- 1. SCOPE

This Section deals with the structural use of plain, reinforced, pre-stressed and precast concrete to be used in the Works and gives amendments and additions to the South African National Standard SANS 2001, Part CC1: Concrete Works (Structural) which shall form part of the Contract. Clause headings are followed by numeric characters which refer to the sub-clause of the Standard. Sub-clauses are numbered sequentially. The clause reference, to which a sub-clause refers, either amends or adds to the sub-clause in the Standard. Where the sub-clause is an addition and there is no appropriate clause in the Standard to which it can be linked, no clause reference is given in the heading.

Should any requirement of this Section conflict with any requirement of the Standard, the requirement of this Section shall prevail.

PSCC1- 2. NORMATIVE REFERENCES

The applicable national and international standards, Normative References of SANS 2001 CC1, shall apply to this Contract, with due cognisance of the provisions of Clause 1.14.1.

PSCC1- 3. DEFINITIONS, ABBREVIATIONS AND REFERENCES

DEFINITIONS

PSCC1- 3.1.1 Additives

Additives enhance the properties of concrete for a specific purpose. This could be setting time, viscosity, porosity, mechanical resistance, etc. There are generally nine types of additives: accelerators, retarders, plasticizers, flow promoters, air-entraining agents, anti-freezers, water-repellents and curing agents.

PSCC1- 3.1.2 Cementitious extenders

Portland cement extenders are cementitious materials used with ordinary portland cement and must never be used on their own. In the South African context these extenders are ground granulated blast furnace slag, fly ash and silica fume.

PSCC1- 3.1.3 Construction Joint

“Construction Joint” shall be a joint required on account of constraints or convenience in the method of construction and that is not a movement, contraction or expansion joint.

PSCC1- 3.1.4 Designated Joints

“Designated Joints” means joints that are shown on the Drawings consisting of movement, contraction or expansion joints.

Construction joints that are required by the Contractor as a result of his construction constraints or for any other reason, whether approved by the Project Manager or not, shall not be considered to be designated joints.

ABBREVIATIONS

BS: British Standard
CEM: Calcium-Enriched Mixture

Client:		Contractor:	
Witness:		Witness:	

CQC:	Construction Quality Control
CSF:	Condensed Silica Fume
FA:	Fly Ash also known as Pulversised Fuel Ash (PFA)
GGBS:	Ground Granulated Blast-Furnace Slag
GGCS:	Ground Granulated Core Slag
HD:	Holding Down
MPa:	Megapascal
MQC:	Manufacturing Quality Control
OPC:	Ordinary Portland Cement
RHPC:	Rapid-Hardening Portland Cement
RPM:	Revolutions Per Minute
SANS:	South African National Standard
SANAS:	South African National Accreditation System
UFC:	Ultra Fine Cement
UCS:	Unconfined Compressive Strength

REFERENCES

When reference is made to a Code of Practice, Specification or Standard, the reference shall be taken to mean the latest edition or replacement at time of tender of the Code, Specification or Standard; including addenda, supplements, modifications and revisions thereto. Where a previous version is intentionally used, it will be indicated as such. Where reference is made to a Code, Specification or Standard that has subsequently been withdrawn and not replaced, the intended content will remain relevant unless confirmed otherwise in writing by the Project Manager.

PSCC1- 4. REQUIREMENTS

GENERAL

PSCC1- 4.1.1 Concrete Work Samples

At least 28 days before commencement of concrete work the Contractor shall supply, at his own cost, full details and representative samples to the Project Manager of the materials he intends using, together with certificates from approved SANAS accredited laboratories indicating that the materials comply with the requirements of this Section as well as the mix design (on form D2) for each type of concrete specified on the project. In the case of ready-mix equipment, equipment capacity and equipment calibration should be verified and the equipment will be inspected by the Project Manager. All materials used for the concrete shall be from a consistent source.

No concrete shall be placed in the Works until the Project Manager has approved the materials and the mix designs the Contractor intends using. For each mix design, the cube results as well as shrinkage test results must be included.

After approval, these samples shall be taken as the standard for the agreed materials. If at any time during the course of the Contract there is a deviation from the approved standard or the source of material or if the Project Manager considers that there has been a deviation, the Contractor shall submit further tested samples of the new materials to the Project Manager for approval.

PSCC1- 4.1.2 Brand Name Products

In addition to the requirements of this Section the conditions and the methods specified by manufacturers of specified or approved brand name products shall be strictly adhered to.

The Contractor shall confirm and submit to the Project Manager at least 28 days prior to the commencement of any specific section of the Works, samples, specification and performance data, as applicable of all the products he intends to use.

Client:		Contractor:	
Witness:		Witness:	

PSCC1- 4.1.3 Cementitious Binders (Clause 4.2.1)

a) **Cement Extenders**

Cement extenders shall only be used where specified and approved by the Project Manager. An approved cement extender shall only be blended with CEM I or CEM II Portland Cement.

b) **Conformity Criteria**

The test results conducted to evaluate the conformity of cement in terms of SANS 50197-1 shall be made available to the Project Manager before the materials are incorporated into the Works.

c) **Fly Ash Concrete**

The cementitious material for fly ash concrete shall consist of a blend of CEM I or CEM II Portland Cement. The ratio of fly ash to cement may be varied by the Project Manager before or during the Contract. Fly ash to comply with SANS 1491-2, Portland cement extenders- Part 2: Fly ash.

The fly ash and the Portland cement shall be added separately at the batching equipment where they shall be intimately mixed in the concrete mixer.

For structural concrete, the maximum total fly ash content by weight shall be 30%.

PSCC1- 4.1.4 Water (Clause 4.2.2)

Untreated water from the rivers or streams may not be used for mixing. It may possibly be used for curing but should be tested for confirmation and approval by the Project Manager.

PSCC1- 4.1.5 Aggregates (Clause 4.2.3)

a) **General**

All aggregate shall be of a consistent quality and from a consistent source. Fine aggregate (sand) and coarse aggregate (stone) shall be obtained from an approved commercial source.

b) **Interpretation**

The nominal stone size specified in the concrete class or grade is given by the figure after the oblique. For example, 30 MPa/19 mm shall mean stone conforming to the grading specified in SANS 1083 for the nearest equivalent size, i.e. 19 mm which means stone that complies with SANS 1083 for 37.5 mm size.

c) **Fine Aggregate**

The fineness modulus sand delivered to the mixer shall lie between 1.7 and 3.0 and the standard deviation of fineness moduli of samples of sand that is delivered to the mixer shall be not more than 0.1 per aggregate batch.

d) **Use of Plums (Sub-clause 4.3.2.4 and 4.7.10.11)**

The use of plums will not be permitted for structural elements.

e) **Tests Required (Sub-clause 4.2.3.5)**

The following tests are required on concrete used in the Contract:

- i) Drying shrinkage on fine and coarse aggregates;
- ii) Drying shrinkage of concrete (maximum shrinkage 0.040%);
- iii) Flakiness index of the stone; and
- iv) Alkali-aggregate reaction (per SANS 6245:2006).

PSCC1- 4.1.6 Admixtures, Air-entrainment Agents and Curing Agents (Clause 4.2.4)

Admixtures shall comply with SANS 50934 Parts 1 to 6 for admixtures (2011-2012). Admixtures are permitted, provided that the results of trial tests which demonstrate their suitability and the following are made available to the Project Manager for Approval:

- v) The trade name of the admixture, its source and the manufacturer's recommended method of use;
- vi) The chemical names of the main active ingredients in the admixture;
- vii) Typical dosages and possible detrimental effects of under or over dosages;

Client:		Contractor:	
Witness:		Witness:	

- viii) Whether compounds that are likely to cause corrosion of the reinforcement or deterioration of the concrete (such as those containing chloride, in any form, as an active ingredient) are present and, if so, the chloride content of the admixtures, expressed as a mass fraction of chloride ions or expressed as an equivalent mass fraction of anhydrous calcium chloride; and
- ix) The average expected air content of the freshly mixed concrete containing an admixture that causes air to be entrained when the admixture is used at the manufacturer's recommended dosage.

PSCC1- 4.1.7 Reinforcement (Clause 4.2.5)

a) Welded Steel Fabric (Sub-clause 4.2.5.2)

The wire of welded steel fabric shall be hard-drawn steel wire of round cross-section, having a surface that is plain.

PSCC1- 4.1.8 Grade of Concrete (Clause 4.2.6)

a) Classification

The grade of concrete shall be as specified on the Drawings and Bill of Quantities by a compound number:

A/B C (e.g. 30 /19 F20)

Where:

A = the 28-day characteristic strength (MPa)

B = the nominal maximum aggregate size e.g. 19 mm

C = the cement extender as a % of total cementitious material e.g.:

F20 = 20% of Fly Ash (FA)

C5 = 5% of Condensed Silica Fume (CSF)

G30 = 30% of Ground Granulated Blast-furnace Slag (GGBS)

PSCC1- 4.1.9 Tendons (Clause 4.2.8)

a) Characteristic Strength of the Steel (Sub-clause 4.2.8.2)

The characteristic strength of the steel shall not be less than 1860 MPa.

PSCC1- 4.1.10 Joint Fillers, Sealants, Waterstops, Bearings and Accessories (Clause 4.2.11)

The following prescribed products or brand name products, or equivalent materials subject to the written approval of the Project Manager, shall be used:

a) Joint Fillers (Sub-clause 4.2.11.1)

Joint filler material shall be closed cell expanded polyethylene of minimum density 110 kg/m³ (Jointex or equivalent approved).

Fillers shall be pre-cut to suit the application with a tear-out strip forming the specified recess for the sealant. If required the filler shall be glued into position with approved glue.

b) Bond Breakers (Sub-clause 4.2.11.2)

The bond breaker at the bottom of a joint, if specified or where the sealant is not backed by a joint filler, shall be self-adhesive PVC tape (or equivalent approved material) with the same width as the joint recess which it is to be supplied to.

The bond breaker between the blinding layer or soil and the underside of ground floor slabs or surface beds shall be 250 micron polyethylene sheeting that complies with SANS 952, i.e. USB Green co ex 250 ® or equivalent approved.

c) Sealants (Sub-clause 4.2.11.1)

SikaFlex® Pro-3WF 1-part, moisture cured, high mechanical resistant polyurethane sealant, or equivalent approved, shall be used for all watertight and water retaining structures including pump stations, valve chambers, and inlet and outlet structures.

Client:		Contractor:	
Witness:		Witness:	

SikaFlex® PRO-2HP 1-part moisture cured, soft elastic polyurethane sealant, or equivalent approved, shall be used for building structures above ground floor level.

d) **Water stops (Sub-clause 4.2.11.1)**

Water stops shall be Durajoint extruded plasticized PVC compound supplied by and applied in accordance with the recommendation of ABE Construction Chemicals or equivalent approved.

The Water stops shall comply with the requirements of CKS 389:1973 and have an elongation at break of 300%.

e) **Bearings (Sub-clause 4.2.11.1)**

Bearings, where indicated on the Drawings, shall consist of Kilcher Resilient, Limitgloss or Teflon Sliding bearings or Laminated Elastometric bearings, supplied by Freyssinet Posten, or equivalent approved.

PSCC1- 4.1.11 Colour Mitigation

The Contractor shall supply and apply concrete colouring at the locations as specified on the Drawings or indicated by the Project Manager.

The colouring material shall be landscape varnish which shall be aqueous containing salts and iron and manganese and other trace elements including copper and zinc. The material shall be manufactured as a concentrate that can be diluted with water to achieve the desired colour intensity. The material shall contain no caustic or alkaline chemicals.

The colouring material shall be Pergamon / Concrete grey or equivalent approved.

FORMWORK

PSCC1- 4.1.12 General (Clause 4.3.1)

a) **Earth Cuts (Sub-clause 4.3.1.5)**

Earth cuts may be used as forms for vertical surfaces only if dictated by the Design and indicated on the Drawings or approved by the Project Manager on Site.

Concrete used in pipe trenches for encasement may be cast against the side of the excavation.

Concrete for thrust / anchor blocks shall be cast directly against the side of the excavation as shown on the Drawings.

b) **Approval by Authority (Sub-clause 4.3.1.6)**

Liaison with the authority controlling the service is required before commencing with the design of formwork over an existing service i.e. pipe lines, roads, streets, railways, etc. The design shall be approved by the authority.

c) **Surface Finish of Formed Surfaces (Sub-clause 4.3.1.8)**

i) The formed surfaces of sections of the work shall be as specified in Sub-clause 4.3.1.8.

ii) The degree of accuracy for formed surfaces shall be Degree II (SANS 2001:CC1 Table 11).

iii) Special off-form surface finishes / exposed aggregate finishes shall be as shown on the Drawings and, where they are required, listed in the Bill of Quantities.

d) **Chamfers and Fillets**

All exposed external angles in concrete work shall have 25 mm x 25 mm chamfers unless otherwise specified on the Drawings or ordered by the Project Manager, but the top edge of a slab that is to receive an applied finish shall not be chamfered.

Internal corners in concrete work need not have fillets unless such fillets have been specified on the Drawings or ordered by the Project Manager.

PSCC1- 4.1.13 Design and Construction of Formwork and Falsework (Clause 4.3.2)

a) **Design of Formwork (Sub-clause 4.3.2.1.4)**

Client:		Contractor:	
Witness:		Witness:	

Where approval is required in terms of Sub-clause 4.3.1.6, by a controlling authority, the design and drawings for formwork and falsework shall be submitted to the Project Manager for review before being submitted to the authority for approval.

PSCC1- 4.1.14 Formwork Accessories (Clause 4.3.3)

a) Formwork Ties (Sub-clause 4.3.3.1)

All steel ties used for wall and other formwork shall run through a sleeve in order for the ties to be completely removed after the formwork has been struck. The sleeves shall be removed by drilling or any other appropriate method leaving a clean inner surface suitable for caulking / grouting.

The Contractor shall thoroughly caulk any tie holes left in the concrete and be accountable for the water tightness thereof. The details of the method and materials he intends using for caulking the tie holes shall be submitted to the Project Manager for review and approval.

PSCC1- 4.1.15 Temporary Openings (Clause 4.3.4)

a) Casting Pipes and Specials in Concrete

Refer to Sub-clause 4.6.3.

PSCC1- 4.1.16 Removal of Formwork (Clause 4.3.8)

a) Removal of Falsework and Supporting Formwork on Reinforced Concrete Structures (Sub-clause 4.3.8.3)

Where a continuously reinforced concrete structure will be constructed in stages, the Contractor shall submit to the Project Manager for his review and approval, at least 28 days prior to the commencement of the work, full details of the manner in which the falsework and supporting frame work will be removed.

b) Removal of Falsework and Supporting Formwork for Pre-stressed Concrete Structures (Sub-clause 4.3.8.4)

Where the falsework and supporting formwork in pre-stressed structures will be removed, prior to the full pre-stressing force relating to the particular stage of construction being applied, the Contractor shall submit to the Project Manager for his review and approval, at least 28 days prior to the commencement of the work, full details of the manner in which the falsework and supporting frame work will be removed.

REINFORCEMENT

PSCC1- 4.1.17 Bending (Clause 4.4.1)

a) Hot Bending (Sub-clause 4.4.1.3)

Bars shall not be bent hot.

PSCC1- 4.1.18 Fixing (Clause 4.4.2)

a) Welding of Bars (Sub-clause 4.4.2.2 b)

Welding of bars will not be permitted.

b) Spacers (Sub-clause 4.4.2.3)

Concrete spacer blocks manufactured on Site shall not be used. All spacer blocks shall be concrete, of the same strength as the structure. No plastic cover blocks will be allowed.

PSCC1- 4.1.19 Cover (Clause 4.4.3)

a) Exposure Conditions

The exposure conditions for the various structural members / surfaces are severe unless otherwise noted.

b) Cover (Sub-clause 4.4.3.1)

Client:		Contractor:	
Witness:		Witness:	

The concrete cover over reinforcement shall be as given in Table 3, but shall not be less than 40 mm for any given class of concrete.

HOLES, CHASES AND FIXING BLOCKS

PSCC1- 4.1.20 Fixtures (Clause 4.5.1)

Fixtures to be embedded in the concrete shall be embedded into the concrete as shown on the Drawings.

PSCC1- 4.1.21 Ferrules (Clause 4.5.3)

Refer to Clause 20.4.3.3 (a).

EMBEDDED ITEMS

PSCC1- 4.1.22 Waterstops (Clause 4.6.2)

a) **General**

Factory-made junction pieces shall be properly corner-mitred and jointed at intersections, shall be formed in accordance with the manufacturer's instructions to approval and shall have a tensile strength across the joint of not less than 75% of that of the original material. Junction pieces shall be made so that all ribs in the original cross-section are maintained continuously and the joints are dense, homogeneous, free of all porosity and each leg of the junction having a minimum length of 300 mm. Intersections of waterstops with dissimilar pattern (i.e. "rearguard centre bulb" type, with "internal dumbbell" type) shall be made using specially-made junction pieces which accommodate the transition between patterns.

On site joints shall comply with the requirements for factory-made joints as specified above.

The Contractor shall test, in the presence of the Project Manager, joints made in waterstops of each type of material used.

PSCC1- 4.1.23 Pipes, Conduits and Ducts (Clause 4.6.3)

a) **Casting in of Pipes and Pipe Specials in Concrete**

The Contractor shall be responsible for the installation, positioning, alignment and concreting in of all pipes and pipe specials regardless of whether or not these have been supplied by him.

The Contractor shall submit to the Project Manager for his review and approval, at least 28 days prior to the commencement of any specific section of the Works, a schedule indicating all the pipes and pipe specials he intends to cast in directly and the items for which he intends to provide box-outs.

Where it is a requirement that a pipe or pipe special be anchored to resist longitudinal forces and it is provided with anchor flanges, details of the box-out and special reinforcement around the anchor flange(s) shall be as shown on the Drawings and Reinforcement Schedules. Reinforcement shown at box-outs shall not be cut and will generally have been detailed to run through the formwork, but not through the opening itself. Reinforcement shall be added around the anchor flanges to tie in with protruding reinforcement before the pipe or pipe special is concreted in.

Where it is not a requirement that a pipe or pipe special be anchored to resist longitudinal forces, the reinforcement shall not initially be cut and will generally have been detailed to run through the formwork and through the opening itself. Reinforcement shall only be cut and/or bent out of the way at a later stage to suit the item to be cast in. After installation of the item, the remaining reinforcement shall be bent back in position as directed by the Project Manager.

During the installation, positioning and concreting in of any item in an opening the Contractor shall:

- i) Remove all formwork remaining in the box-out;
- ii) Make any alterations required to the position and shape of the opening;
- iii) Thoroughly prepare the sides of the opening so as to obtain a satisfactory bond surface for the new concrete in accordance with Sub-clause 4.7.12.1.3;

Client:		Contractor:	
Witness:		Witness:	

- iv) Install, position and align the item to be cast;
- v) Bend back and/or fix reinforcement around the item as directed by the Project Manager or as shown on the Drawings;
- vi) Install formwork as required for the concreting in operation; and
- vii) Carry out final surface preparation in accordance with Sub-clause 4.7.12.1.3 before concreting.

QUALITY OF CONCRETE

PSCC1- 4.1.24 General (Clause 4.7.1)

The cementitious content of a binder for any class of concrete shall not exceed 450 kg/m³ of concrete.

PSCC1- 4.1.25 Consistency (Clause 4.7.2)

a) **Slump (Sub-clause 4.7.2.1)**

The minimum slump for vibrated concrete shall be 50mm and the maximum slump shall be 100 mm. For pumped mixes the maximum slump can be increased to 125 mm..

Hand-compacted concrete will not be permitted.

PSCC1- 4.1.26 Workability (Clause 4.7.3)

a) **Pumping of Concrete (Sub-clause 4.7.3.2 and 4.7.10.15)**

Pumping of concrete will be permitted.

PSCC1- 4.1.27 Chloride and Sulphate Content (Clause 4.7.4)

a) **Chloride Content (Sub-clause 4.7.4.1)**

The maximum chloride ion content for mass concrete shall be as given in Table 5; and for reinforced concrete shall be 0.2%.

Efflorescence will not be acceptable on any exposed concrete surface.

b) **Sulphate Content (Sub-clause 4.7.4.2)**

The total water soluble sulphate content of a concrete mix shall not exceed a mass fraction of 4% of the cementitious binder content of the mix.

PSCC1- 4.1.28 Prescribed-mix Concrete (Clause 4.7.6)

a) **Watertight Structures (Sub-clause 4.7.6.1)**

Any mix to be used in the wall, floor or roof of a water retaining or excluding structure shall have a water / binder ratio not exceeding 0.53, shall have a cementitious content of not less than 325 kg/m³ of concrete and the proportions of the various aggregates shall be such as to produce a density of at least 2 400 kg/m³. The cementitious material shall consist of a blend of CEM I or CEM II Portland Cement with a maximum total fly ash content by weight of 30%. The ratio of fly ash to cement may be varied by the Project Manager before or during the Contract.

PSCC1- 4.1.29 Placing (Clause 4.7.10)

a) **Under Water (Sub-clause 4.7.10.13)**

Concrete may be placed under water if dictated by the design and indicated on the Drawings, or as approved by the Project Manager on Site. A mix design for this concrete shall be submitted for approval.

PSCC1- 4.1.30 Compaction (Clause 4.7.11)

a) **Method (Sub-clause 4.7.11.3)**

Client:		Contractor:	
Witness:		Witness:	

Compaction shall only be achieved by means of mechanical vibration.

PSCC1- 4.1.31 Joints (Clause 4.7.12)

a) Construction Joints

(i) Location (Sub-clause 4.7.12.1.1)

Construction joints will be required.

The location and details of planned construction joints, not indicated on the Drawings, shall be submitted to the Project Manager for review and approval.

(ii) Proprietary Bonding Compounds (Sub-clause 4.7.12.1.2)

No proprietary bonding compounds may be used between old and new concrete.

b) Sealing of Joints (Sub-clause 4.7.12.4)

The sealing of joints shall be undertaken in accordance with the requirements of the details as shown on the Drawings. In addition to the requirements of this Section the conditions and methods specified by the manufacturers of the specified or approved brand name products shall be strictly adhered to.

PSCC1- 4.1.32 Curing and Protection (Clause 4.7.13)

a) Curing Compound (Sub-clause 4.7.13.2.e)

Curing through ponding (horizontal surfaces) is preferred where possible. For watertight structures, the ponding shall be for at least 7 days, with a minimum ponding depth of 50mm. Water for ponding to comply with

The use of membrane curing compounds will be considered on vertical surfaces or inclined surfaces of cast in situ members of a structure. Approval of their use shall be subject to the Contractor producing sufficient, satisfactory cube crushing strength test results of cubes which have been cured with the proposed curing membrane and left exposed to the elements. These test results shall be compared with those of an equal number of water cured cubes. For the use of the membrane to be considered, the crushing strength of the cubes cured with the proposed membrane shall be at least 85% of the crushing strength of the water-cured cubes (using 150 mm cubes).

Before any membrane curing compound is used, each batch of compound shall be tested on a trial surface to ensure that it forms a satisfactory membrane, and any batch which is unsatisfactory, in the opinion of the Project Manager, shall be rejected. Curing membranes shall be disallowed if it causes permanent discolouration of the concrete to take place. Surfaces where curing membranes are used shall be treated in such a manner that the final concrete texture and colour blends in with the rest of the concrete work. Furthermore, the Project Manager will, at his discretion, require the Contractor immediately to adopt an effective alternative means of curing any area of the structure to which a membrane has been applied which, in the opinion of the Project Manager, is unsatisfactory. The curing compound used shall be to the approval of the Project Manager. Wax based curing compounds will not be permitted.

The curing compound shall be applied immediately as formwork is progressively stripped or, in the case of unformed surfaces, when the concrete has taken its initial set. The compound shall preferably be applied by spraying and the rate of application shall be strictly in accordance with manufacturer's recommendations. A method of monitoring the area to which the curing compound has been applied, and the application rate, shall be approved by the Project Manager and rigidly adhered to by the Contractor.

Surfaces of joint rebates, where elastomeric sealant is to be applied, shall be protected from contamination by curing compound by the use of masking tape.

The use of membrane curing compounds on surfaces that are to be coloured will not be permitted. In this instance, effective alternative means of curing shall be used.

The use of plastic sheets or intermittent spray / sprinkle as method of curing will not be permitted.

PSCC1- 4.1.33 Adverse Weather Conditions (Clause 4.7.14)

a) Prevention and Repair of Plastic Shrinkage Cracks

Client:		Contractor:	
Witness:		Witness:	

The Contractor shall take whatever measures are necessary to prevent plastic shrinkage cracking in the concrete. Particularly on dry windy days or hot sunny days the Contractor shall make provision for fine spraying of the concrete surface within one hour of casting, or immediately covering the concrete with white plastic sheeting. Erection of wind breaks may also be required. If plastic shrinkage cracking occurs, it may be necessary to change the aggregates or the concrete mix proportions. In order to combat shrinkage cracking it may also be necessary to change the time at which, or the manner in which, power floating in terms of Clause 20.4.7.13 (f) is carried out.

If plastic shrinkage cracks occur, after floating of the concrete in accordance with Sub-clause 4.7.15.1 (a), the cracks shall be closed up by re-vibrating the concrete with a poker vibrator. Because the setting time of most concrete involves some uncertainty, re-vibration should commence well before first set (approximately one hour of placement and initial vibration) and it should continue if needed at intervals until the concrete clearly approaches initial set.

Once the cracks have been closed, and after the completion of the specified or scheduled surface finish, the concrete shall be kept thoroughly wet, or covered with plastic sheeting for at least a further three hours.

b) Ambient Temperatures and Heat of Hydration

The Contractor shall take cognizance of the high ambient temperatures as well as large cross-sectional areas (if applicable) and shall consider mitigating measures in terms of mixing and placing of concrete to accommodate high ambient temperatures as well as heat of hydration of the concrete sections. The mitigation shall be submitted in a method statement for approval.

The maximum casting temperature of the concrete for structural elements, mass concrete retaining walls and weir shall be a target of 25 degrees C with a maximum of 30 degrees C. The temperature shall be measured and recorded for every truck at point of placement.

For large concrete pours (structural or mass concrete) the Project Manager may order measurement of in-situ concrete temperatures as an additional control.

PSCC1- 4.1.34 Concrete Surfaces (Clause 4.7.15)

a) Exposed Surfaces (Sub-clause 4.7.15.1)

Exposed surfaces of concrete not cast against formwork shall be finished in accordance with Sub-clause 4.7.15.1.

b) Non-skid Surfaces (Sub-clause 4.7.15.2)

Exposed surfaces requiring a non-skid finish will be indicated on the Drawings and/or in the Bill of Quantities.

c) Screeded Finish (Sub-clause 4.7.15.1 a)

In addition to Sub-clause 4.7.15.1 (a) no mortar shall be added during the screeding operation, and noticeable surface irregularities caused by the displacement of coarse aggregate shall be made good by re-screeding after displaced aggregate has been removed or tamped.

d) Wood-floated Finish (Sub-clause 4.7.15.1 b)

Where wood-floating is specified, the surface shall first be given a finish as specified in Sub-clause 4.7.15.1 (a) and, after the concrete has hardened sufficiently, the surface shall be wood-floated, either by hand or machine, only sufficiently to produce a uniform surface free from screeding marks.

e) Steel-floated Finish (Sub-clause 4.7.15.1 c)

Where steel-floating is specified, the surface shall first be given a finish as specified in Sub-clause 4.7.15.1 (b). When the moisture film has disappeared and the concrete has hardened sufficiently to prevent laitance from being worked to the surface, the screeded surface shall be finished through a combination of wood-floating, followed by steel floating under firm pressure to produce a dense, smooth, uniform surface free from trowel marks.

f) Power Float Finish

Where power floating is specified, the surface shall be treated as specified in Sub-clause 4.7.15.1 (a). When the moisture film has disappeared and the concrete has hardened sufficiently to prevent laitance from being worked to the surface, the surface shall be power floated to produce a dense, smooth and uniform surface free of trowel marks. In corners and areas of restricted access the concrete surface shall be finished by steel floating in accordance with Sub-clause 20.4.7.15 (c).

The timing of power-floating is critical to its success. Power-floating shall not commence until the concrete can support the weight of a person with minimum indentation or when a footprint is barely perceptible and

Client:		Contractor:	
Witness:		Witness:	

until the moisture sheen has disappeared. Thus several hours may have to elapse after concreting has been completed before this operation can commence, depending on ambient temperature and relative humidity and the type of concrete mix used. Night work may therefore be required.

g) **Broom-swept Finish (Sub-clause 4.7.15.2)**

Where broom-swept finish is specified, the surface shall be wood floated as specified in Sub-clause 4.7.15.1 (b) and thereafter swept with a stiff bristle broom to produce an approved non-skid surface.

h) **Colour Mitigation – Application**

Surfaces to be coloured shall be free of curing compounds or other material that may prevent direct contact with the colouring.

The colouring shall be applied directly to clean concrete surfaces at locations as specified or directed by the Project Manager. Dark patches that may develop shall be controlled or avoided by custom blending of the basic technique, amending the dilution rate of the colour concentrate with water or a combination of these.

If required the Contractor shall apply the colouring to a test section to be reviewed by the Project Manager. Upon approval of both the test section and application procedures by the Project Manager, the Contractor may proceed using the approved application procedures.

Rock colouring material shall be applied only by licensed applicators approved by the manufacturer. Variegated patinas that develop shall be controlled by custom blending of the rock colouring material and/or varying the application techniques.

i) **Concrete Topping (screed)**

Before placing any concrete topping (screed), the base concrete shall be chipped to expose the aggregate over 100% of the area to be screeded, and then soaked with water for at least 24 hours to achieve a saturated surface-dry substrate

Before laying the screed, the concrete shall be thoroughly cleaned by scrubbing, and all standing water removed after soaking. A 1:2 cement / sand grout shall then be brushed on to the prepared surface, and topping laid before the grout sets. The topping shall be of the driest feasible consistency with a slump not exceeding 50 mm and shall be formed true to profile and shape as required and shown on the Drawings. Before fresh topping is placed against existing, adjacent topping the edge of the latter shall be prepared by chipping back to firm material, wire brushing the exposed surface and brushing it with grout as for the base concrete.

Topping (screed) shall be compacted to remove all air and shall be screeded and steel trowel finished to a degree of accuracy II.

The trowelling shall be carried out in the following stages:

- i) 1st – as soon as the topping has been compacted and screeded.
- ii) 2nd – after 2 hours to close the surface and remove laitance.
- iii) 3rd – after a further 4 hours.

These time intervals are appropriate to normal temperature conditions and shall be varied by the Contractor according to the temperature to ensure a smooth dense finish.

Toppings shall be cured as specified in Clause 4.7.13 but shall additionally be protected from direct sunlight and drying winds as it is being placed.

All screeding necessary to accommodate mechanical equipment shall be done under the equipment supplier's supervision and strictly in accordance with his instructions. Screeding shall commence as soon as the equipment supplier gives notice on completion of erection and shall be finished expeditiously.

The Contractor shall make good any damage to the mechanical equipment resulting from his personnel not following the supplier's instructions. Any spillage on the equipment shall be cleaned off immediately.

PSCC1- 4.1.35 Watertight Concrete (Clause 4.7.16)

The following structures shall be regarded as watertight structures:

a) **Valve chambers**

The tests in Sub-clauses 5.1.6.1 and 5.1.6.2 will not be required.

Client:		Contractor:	
Witness:		Witness:	

However, should any section of the concrete Works show any sign of water leakage or penetration, irrespective of the source, that section shall be deemed to be defective and the necessary remedial work shall be carried out in accordance with Sub-clause 5.1.6.3.

PSCC1- 4.1.36 Grouting (Clause 4.7.18)

a) Holding-down Bolts, Column Bases and Mechanical Equipment Bedplates

The mortar grout for holding-down bolts, column bases and mechanical equipment bedplates shall be a proprietary grout ready mixed in sealed packets as supplied by the manufacturer, and mixed and placed in accordance with the manufacturer's instructions.

The following prescribed products or brand name products, or equivalent materials subject to the written approval of the Project Manager, shall be used:

SikaGrout® Masterflow 525, high performance cementitious grout or equivalent approved.

b) Pipe box-outs and other box-out items

The mortar grout for grouting pipe box-outs shall be a proprietary grout and may be mixed on site, mixed and placed to supplier's specification. For larger volumes, 9mm or 13mm aggregate may be added to the mix, pending supplier's recommendation and approval.

The following prescribed products or brand name products, or equivalent materials subject to the written approval of the Project Manager, shall be used:

SikaGrout® 212, high performance cementitious grout or equivalent approved.

PSCC1- 4.1.37 Defects (Clause 4.7.19)

a) General

Defects shall be repaired as soon as possible after formwork has been removed and the Project Manager has inspected the concrete. A statement of the method to be used for each repair shall be submitted to the Project Manager for his approval before any work is carried out. The Project Manager may prohibit the further placing of concrete in the particular structure concerned until he is satisfied that the repair has been satisfactorily executed.

PSCC1- 4.1.38 Units that have Architectural Finishes (Clause 4.8.6)

a) Samples of Concrete (Sub-clause 4.8.6.1)

Samples of precast concrete units that have architectural finishes shall be prepared for approval prior to construction. The approved samples shall be retained throughout the contract as reference.

Samples of concrete units, not having architectural finishes shall also be prepared to establish quality before full-scale production is commenced.

PRE-STRESSED CONCRETE

PSCC1- 4.1.39 Tendons (Clause 4.9.2)

a) Solvents (Sub-clause 4.9.2.1.1)

Solvents may be used for cleaning.

b) Pre-stressing Force Diagram (Sub-clause 4.9.2.5.1)

Pre-stressing force diagrams will be shown on the Drawings.

c) Order of Loading and Magnitude (Sub-clause 4.9.2.5.8)

The order of loading and magnitude of the load for each component of the tendon shall be as indicated on the Drawings.

PSCC1- 4.1.40 Grouting of Sheaths (Clause 4.9.3)

a) Tests (Sub-clause 4.9.3.1.2)

Client:		Contractor:	
Witness:		Witness:	

Bleeding tests and grouting trials will be required.

PSCC1- 4.1.41 Permanent Protection and Bonding of External Tendons (Clause 4.9.4)

a) Tests (Sub-clause 4.9.4.2)

Preliminary tests shall be undertaken on the proposed encasement materials.

b) Protection (Sub-clause 4.9.4.3)

The protection and bonding of the tendons shall be effected within 7 days after final tensioning of the tendon(s).

HANDLING AND ERECTION OF PRECAST CONCRETE UNITS

PSCC1- 4.1.42 Handling and Transportation (Clause 4.10.1)

a) Lifting (Sub-clause 4.10.1.3)

The position of lifting and supporting points, the method of lifting, the type of equipment and the type of transport to be used shall be determined by the Contractor in liaison with the Project Manager. The agreed system layout shall be submitted to the Project Manager (for review, detailed design and reinforcement detailing) 28 days before the construction Drawings and Reinforcement Schedules are required by the Contractor.

PSCC1- 4.1.43 Assembly and Erection (Clause 4.10.2)

a) Methodology (Sub-clause 4.10.2)

At least 28 days before commencement of the work, the Contractor shall submit to the Project Manager a Method Statement including proposed methods of assembly and erection for review and approval by the Project Manager.

PSCC1- 4.1.44 Forming Structural Connections (Clause 4.10.4)

a) Design (Sub-clause 4.10.4.1)

The design requirements for the structural connections will be indicated on the Drawings.

PSCC1- 5. COMPLIANCE WITH THE REQUIREMENTS

TESTING

PSCC1- 5.1.1 General (Clause 5.1.1)

a) Ready-mix Production (Sub-clause 5.1.1.7)

The tests results from a ready-mix production facility, that form part of its quality control system, will not be accepted as valid test data.

b) Alkali-aggregate Reaction (Sub-clause 5.1.1.8)

The test for the percentage of alkali-aggregate shall be Petrography ASTM C 295 and Accelerated Mortar-bar test SANS 6245:2006.

PSCC1- 5.1.2 Acceptance of Strength Concrete (Clause 5.1.2)

a) Assessment (Sub-clause 5.1.2.3)

The test results will be assessed statistically.

PSCC1- 5.1.3 Frequency of Sampling (Clause 5.1.3)

The frequency of sampling shall be indicated in the method statement for approval by the Project Manager.

Client:		Contractor:	
Witness:		Witness:	

PSCC1- 5.1.4 Tests on Pre-stressed Structures (Clause 5.1.5)

- a) **Tests Requirements (Sub-clause 5.1.5.1.1)**
Particular requirements for pre-stressed structures will be indicated on the Drawings.
- b) **Acceptance Criteria (Sub-clause 5.1.5.4 and Table 10)**
The acceptance criteria for pre-stressed structures in extreme exposure conditions will be indicated on the Drawings.
- c) **Class (Sub-clause 5.1.5.4 a)**
The class of pre-stressed structure will be indicated on the Drawings.
- d) **Deflection (Sub-clause 5.1.5.4 c)**
The deflection measured immediately after application of the test load for deflection shall not exceed the values indicated on the Drawings.

PSCC1- 5.1.5 Tests for Water tightness (Clause 5.1.6)

- a) **Requirements (Sub-clause 5.1.6.1)**
Water shall be used as the liquid for test purposes.

The stabilizing period is 7 days for a maximum design crack width of 0.1 mm and 21 days for a maximum design crack width of 0.2 mm.

The total permissible drop in level is 10 mm or 1/500th of the average water depth, whichever is the lesser value.

TOLERANCES

PSCC1- 5.1.6 General (Clause 5.2.1)

- a) **Degree of Accuracy (Sub-clause 5.2.1.1)**
The degree of accuracy is II.
- b) **Floated Finishes (Sub-clause 5.2.1.2)**
The degree of accuracy for floated finishes is II.
- c) **Tolerances not stated (Table 11)**
The tolerances for bow, camber and twist in slipform / precast concrete shall be as indicated on the Drawings.

PSCC1- 6. MEASUREMENT AND PAYMENT

The rates tendered under this Section shall not include for the general obligations, Contractor's equipment and work deemed to be covered by the items provided in Section SANS 1200 A (General).

MEASUREMENT AND RATES

PSCC1- 6.1.1 Formwork

Formwork, other than formwork covered below, will be measured as the net area of the face of the concrete to be supported during the placing of concrete. No deduction will be made for fillets and splays of size up to 50 mm x 50 mm or for openings of diameter up to 0.7 m or of area up to 0.5 m².

Formwork in continuous lengths of narrow widths and of fillets or splays over 50 mm x 50 mm will be measured by length, the width or range of widths being stated in the schedule.

Boxing-out, the forming of holes, and other such operations will be measured by number, basic dimensions, perimeters, or drawing references, as stated in the schedule.

Separate items will be scheduled:

Client:		Contractor:	
Witness:		Witness:	

- For each class of finish required on the formed concrete.
- For the different angles of inclination of formwork given below:

DESCRIPTION OF FORMWORK	ANGLE OF INCLINATION FROM THE VERTICAL
Horizontal	Exceeding 85° and not exceeding 95°
Sloping	Exceeding 10° and not exceeding 85°
Battered	Not exceeding 10°
Vertical	0°

- For each inclination of each type of structural element, such as walls and beams, and for different prop heights for beams and slabs, and for formwork to curved (singly and double curvature), curved in plan only, arched, domical, specially moulded, and other types of work.
- For depths of openings required in the formed concrete, as follows:
 - (iii) Not exceeding 0.5 m;
 - (iv) Exceeding 0.5 m but not exceeding 1.0 m;
 - (v) Exceeding 1.0 m but not exceeding 1.5 m;
 - (vi) Exceeding 1.5 m but not exceeding 2.0 m;
 - (vii) Exceeding 2.0 m; and
 - (viii) Measured perpendicular to the surface.
- For large and small voids classified as follows:

DESCRIPTION	MAXIMUM CROSS-SECTION	
	CIRCULAR VOIDS, DIAMETER, m	OTHER VOIDS, AREA, m ²
Large	Exceeding 0.35 and not exceeding 0.7	Exceeding 0.1 and not exceeding 0.5
Small	Not exceeding 0.35	Not exceeding 0.1

Where a special smooth finish is specified and scheduled such that it requires more extensive operations to be carried out after striking than are specified in Sub-clause 5.2.1(b), payment will become due when the finish has been achieved as specified.

Where a special finish (see Sub-clause 5.2.1(c)) is specified and scheduled, payment will become due when the finish has been achieved as specified.

The unit rate shall cover the cost of all parts of formwork in contact with the concrete (including forming fillets or splays up to 20 mm x 20 mm) and the necessary bearers, struts, and other supports plus the labour and equipment necessary to erect and strike such formwork.

PSCC1- 6.1.2 Reinforcement

- a) Steel for normal reinforced concrete will be measured net by mass of all bars, including supporting steel detailed on the reinforcing schedules. The mass will be computed from the nominal bar size and the nominal mass per unit length. Rates shall include for cutting, waste, spacer devices (materials other than steel bars), and binding wire as well as costs for testing per SANS 920:2011.

Separate items will be scheduled for:

- i) Each steel section where rails and other steel sections are used; and

Client:		Contractor:	
Witness:		Witness:	

- ii) Steel to be fixed in different parts of the work where this could materially influence the pricing of the work.

Steel reinforcement for precast concrete units will not be measured unless so scheduled (see Clause PSCC1.017).

Steel off-cuts resulting from the cutting and bending of reinforcement in accordance with the bending schedule shall be deemed to be the property of the Contractor.

- b) The total mass of all round and square steel bars will be scheduled as bars of nominal size 25 mm (diameter or side, as relevant) for the purpose of obtaining a basic contract price, and the bars of all sizes actually used will be subject to the terms of the Conditions of Contract covering valuation of variations.
- c) Welded mesh will be scheduled separately for each type and mass per square metre of mesh.
- d) Welded mesh will be scheduled separately for each type and mass per square metre of mesh. The mesh will be measured by the net area shown on the Drawings, no allowance being made for cutting, waste, laps, or deduction for end cover (unless otherwise indicated on the Drawings or instructed by the Project Manager). The areas measured will be those of the concrete floor or slab reinforced by means of mesh. In the case of continuous units partly reinforced by mesh, the area will be computed from the outside dimensions of the area covered by mesh regardless of whether additional reinforcing steel is present in the same area.
- e) The unit rates for steel bars of nominal size 25 mm shall cover the cost of supply, cutting, bending, placing in position, and fixing of the reinforcing and supporting steel scheduled, and the provision of all spacer devices and binding wire, as well as the cost of tests in terms of SANS 920.
- f) The extra-over rates for bars of all nominal sizes other than 25 mm shall cover any differences in cost arising from any or all of the operations set out in (b) above in respect of bars of such other sizes.

PSCC1- 6.1.3 Concrete

- a) Concrete will be measured net to the dimensions shown on the Drawings or to the dimensions cast, whichever are the smaller. However, structural elements that are undersized will be measured for payment only if they are accepted by the Project Manager.
- b) No allowance will be made for concrete required to make up overbreak in soft excavation, but payment will be made for additional concrete or formwork, ordered in writing by the Project Manager to replace unsuitable material or overbreak in hard rock or in intermediate excavation (see (d) below).
- c) Blinding layers will be measured to the plan size of the concrete structure resting on the carpet, or the plan size of the excavation where additional excavation is provided to facilitate erection of forms. Where the concrete is scheduled by volume it will be measured on the mean thickness as cast, provided that the Project Manager is satisfied that the excavation has not at any point been taken deeper or wider than necessary (see (b) above).
- d) Where concrete is placed directly against the sides or bottoms of excavations in hard rock or in intermediate excavation, an item may be included in the Bill of Quantities for any additional concrete placed in overbreak. Such additional concrete will be measured on the basis of the superficial area of the sides or bottom, or both, as applicable, of the theoretical net excavation in rock that is overbroken and in contact with the concrete.
- e) Separate items will be scheduled, as applicable, for each type and each grade of concrete, for each type of cement and each type of aggregate, and for each unit of the Works or each element of a structure, where these could materially influence the pricing of the work and where the cost of placing concrete is affected by its position in the Works or by the conditions of placing, such as:
- iii) Slabs that are sloping, conical, or horizontal, and those of different thicknesses;
 - iv) Concrete placed under water or between tides, the levels of demarcation being stated;
 - v) Small quantities each less than 0.5 m³ of formed concrete; and
 - vi) Different surface finishes (other than striking-off and levelling) such as wood-floated or steel-floated finishes and topping or mortar screeds.
- f) The unit rates shall cover the cost of the design of the mix in the case of strength concrete, the provision of concrete (made with ordinary Portland cement unless otherwise scheduled), mixing and batching, mitigation for heat of hydration in large pours, testing, measurement and recording of temperature at the

Client:		Contractor:	
Witness:		Witness:	

point of placement, placing, compacting, the forming of stop-ends and unforeseen construction joints, striking-off or levelling as applicable, and curing and repairing where necessary.

- g) Floor slabs, where placed on sub-foundation carpets or directly on the prepared ground surface, will be measured to the net thickness dimensioned on the Drawings.
- h) Concrete in a column supporting a reinforced concrete beam or slab structure will be measured between the top surface of the foundation, beam, or slab on which the foot of the column is standing and the underside of the beam or slab supported by the column.
- i) No deduction or addition will be made for nosings, bolt holes, chamfers or splays of size up to 50 mm x 50 mm, grooves or chases not exceeding 0.015 m³ each in volume, or holding-down bolts, rails, steel sections, and reinforcement cast in the concrete.

SCHEDULED FORMWORK ITEMS

PSCC1.001 Rough Unit: m²

The surfaces to be so formed will be identified in the Bill of Quantities.

PSCC1.002 Smooth Unit: m²

The surfaces to be so formed will be identified in the Bill of Quantities.

PSCC1.003 Special smooth, repaired and rubbed Unit: m²

The surfaces to be so formed will be identified in the Bill of Quantities.

PSCC1.004 Special off-form Unit: m²

The surfaces to be so formed will be identified in the Bill of Quantities.

PSCC1.005 Narrow widths (up to mm wide) Unit: m

The constant width, if in excess of 300 mm, or the range of widths if up to 300 mm, or width and depth in the case of grooves or chases, will be stated in the Bill of Quantities.

PSCC1.006 Box-out holes/Form voids

a) Small, circular, of diameter up to 0,35 m

- (1) 0 m Up to and including 0.5 m deep Unit: No.
- (2) Over 0.5 m deep up to and including 1.0 m deep Unit: No.
- (3) Over 1.0 m deep up to and including 1.5 m deep Unit: No.
- (4) Over 1.5 m deep up to and including 2.0 m deep Unit: No.
- (5) Over 2.0 m deep Unit: No.

b) Small, other than circular, areas up to 0,1 m²

- (1) Depths as in (a) above Unit: No.

c) Large, circular, of diameter over 0,35 m and up to 0,7 m

- (1) Depths as in (a) above Unit: No.

d) Large, other than circular, areas over 0.1 m² up to 2,0 m²

- (1) Depths as in (a) above Unit: No.

SCHEDULED REINFORCEMENT ITEMS

PSCC1.007 Steel bars

a) Steel bars irrespective of grade and diameter Unit: t

Members to be identified in the Bill of Quantities.

Client:		Contractor:	
Witness:		Witness:	

b) Extra over for bars of nominal sizes larger than 25 mm.....Unit: t

Members to be identified in the Bill of Quantities.

PSCC1.008 High-tensile welded mesh Unit: m²

The type reference will be stated.

PSCC1.009 Rails or other steel sections used as reinforcement Unit: t

SCHEDULED CONCRETE ITEMS

PSCC1.010 Prescribed mix concrete Unit: m³

The proportions and the positions or elements in the Works will be stated.

PSCC1.011 Blinding layer in Concrete

Either of the following will be stated:

a) Minimum thickness and proportions or grade Unit: m²

b) Proportions or grade Unit: m³

PSCC1.012 Strength concrete, grade Unit: m³

The grade and positions or elements in the Works will be stated. Except where ordinary Portland cement is required, the type of cement will be stated.

PSCC1.013 Unformed surface finishes

Where better than rough surface finishes are required, items will be scheduled for each class or type of finish, i.e:

a) Wood-floated finish..... Unit: m²

b) Steel-floated finish Unit: m²

c) Power-floated finish Unit: m²

d) Broomed finish..... Unit: m²

e) Screed in 3:1 Sand and Cement Mix Unit: m³

PSCC1.014 Aggregate (where measured separately) Unit: m³

The rate shall cover the cost of supplying at the point of use and using the aggregate in the manner specified.

PSCC1.015 Cement (where measured separately) Unit: t

The rate shall cover the cost of supplying at the point of use and using the cement in the manner specified.

PSCC1.016 Joints Unit: m

Separate items will be scheduled for contraction and expansion joints of different types and sizes and involving different types, sizes, and qualities of water bars, soft board, sealers, etc.

The unit rate shall cover the cost of all materials and labour for the construction of each joint as specified or shown on the Drawings, including the cost of formwork, testing, and making good.

PSCC1.017 Manufacture (or supply) and erect precast elements Unit: No. or m³

Separate items will be scheduled for:

a) Different qualities of concrete

b) Different types and sizes of units

c) Small units not exceeding 0.5 m³ of formed concrete

d) Different positions of units for erection purposes

Except where separate items are scheduled for specific operations or materials, the rates shall cover the cost of supply of all materials, equipment, and labour for the concrete and reinforcement in the elements including

Client:		Contractor:	
Witness:		Witness:	

the cost of moulds for forming the element, special finishes, curing, transport, handling to Site, erecting or building in or fixing, and grouting.

PSCC1.018 Grouting

a) Under bases of pipe supports and straps Unit: m³

Grouting under structural steel column bases or members or under pumps, motors, or other machinery will be measured by the volume of grout (before the edges are trimmed at 45° from the bottom edges of bedplates) necessary to fill the voids and pockets between the underside of the metalwork and the top of the concrete. No deduction will be made for bolts, packers, and baseplate shear keys protruding into the grout space.

b) HD bolts, etc. (see Item PSCC1.019) Unit: m³

Separate items will be scheduled for HD bolts or pockets, as applicable, of different diameters, lengths, and types, and for bearings and miscellaneous metal work of different types. The quantity will be measured by the volume of grout necessary to fill the voids in the concrete. No deduction will be made for bolts and packers protruding into the grout space.

c) Pipe box outs Unit: m³

Grouting in box-outs for pipes and other cast in members will be measured by the volume of grout necessary to fill the voids and pockets between the pipe and the concrete. No deduction will be made for bolts, and puddle flanges.

The rates for a), b) and c) above shall cover the cost of scabbling, cleaning, and preparing the concrete surfaces, providing an approved grout, placing and ramming it solidly into all voids and pockets, and mitring the outside edges to a true wood-floated surface. Formwork, if any, will be included in the rates for items a) and b) above. Formwork for item c) will be measured separately in terms of PSCC1-6.2. Additional grout and formwork associated with "letter box" placing as well as the cost associated with the repair thereof will also be included

d) Between precast sections or manhole rings Unit: m³

Grouting of precast sections will be measured by the volume of grout necessary to join precast sections or manhole rings together and fill any voids between the sections or between the sections and other elements.

PSCC1.019 HD bolts and miscellaneous metal work Unit: t or No

Whether the item is to be supplied and fabricated by the Contractor or by others will be stated. Separate items will be scheduled as specified in Item PSCC1.018 (b).

The rate shall cover the cost of supplying, fabrication and delivering or taking delivery (as applicable), fixing or casting into concrete, including all required bolts, and all cleaning, preparation, and finishing.

PSCC1.020 Colour Mitigation Unit: m²

Measurement shall be on the plane projection along the exposed planes of the area being coloured.

MISCELLANEOUS ITEMS

PSCC1.021 Polythene sheeting under concrete Unit: m²

Polythene sheeting shall comply with SANS 952, Type B, 0.25 mm thick. The rate shall cover supply and installation of the sheeting and shall include 250 mm overlap between sheets where required.

PSCC1.022 Testing for water tightness Unit: Sum

The tendered amount shall include full compensation for the provision of labour, equipment and materials necessary for testing the structure for water tightness as specified, as well as for the installation and removal of any temporary plugs to blank off pipes, to the satisfaction of the Project Manager.

PSCC1.023 FRP items

The tendered amount shall include full compensation for design, supply and installation / cast in, to the satisfaction of the Project Manager including all fixing plates and clips where necessary. Geometry of ladders and handrails to comply with SANS 10400 and should be designed to resist appropriate loading per SANS 10160.

a) FRP Ladders Unit: No

Client:		Contractor:	
Witness:		Witness:	

- b) FRP Handrails Unit: m
c) FRP Grating Unit: No
d) FRP manhole lids and frames Unit: No
e) FRP platforms including frames and supports Unit: m²

PSCC1.024 Casting pipes and specials in concrete..... Unit: No

These items will be measured in number as per the schedule. The rate shall cover any additional or special shuttering and supports to cast in the items as depicted on the relevant drawings, but shall exclude the supply and jointing of the pipe or special, which will be paid elsewhere.

PSCC1.025 Installation of precast elements Unit: No. or m³

Separate items will be scheduled for:

- a) Different types and sizes of units
b) Small units not exceeding 0.5 m³ of formed concrete
c) Different positions of units for erection purposes

The rates shall cover the cost of equipment, labour, transport, handling to Site, erecting or building in or fixing, and grouting of precast elements, but shall exclude materials and form required to manufacture the precast elements.

PSCC1.026 Drilling cores through concrete Unit: No

Separate items will be scheduled for:

- a) Different sizes of cores
b) Different concrete thicknesses

The rates shall cover the cost of equipment, transport and labour to drill a core as scheduled.

PSCC1.027 Masonry Unit: m²

Different items shall be scheduled for each thickness of masonry wall. All brickwork shall comply with the requirements of Clause PS 4.2.33.

The rates shall cover the cost of materials, including brick ties and mortar, equipment, labour, transport, handling to site, and construction.

PSCC1.028 Other items

These items will be measured in metre, square metre, number or sum as per the schedule.

Where a sum is measured, the rate shall cover supply, installation and casting in of the item as depicted on the relevant drawings.

Client:		Contractor:	
Witness:		Witness:	

PSCP CATHODIC PROTECTION AND AC MITIGATION

PSCP 1 SCOPE

The proposed pipeline system that forms part of the Woodmead Water Upgrade Project is comprised of a 100 m length of DN 800 mm diameter steel pipe, a 5200 m length of DN 600 mm diameter steel pipeline and a 400 m length of DN 600 mm diameter steel pipe.

The main DN 600 mm diameter continuously welded steel pipeline that will deliver water to the new Woodmead reservoir will tee off from the existing pipeline from Linbro Park at the corner of Lilium Avenue and Zinnia Drive approximately 600 m from the Marlboro reservoir complex. At the point where the new line crosses Woodlands Drive, a DN 600mm diameter pipeline will tee off and run for 400 m to the existing PRV at the corner of Woodlands Drive and Lincoln Street in Woodmead where it will tie in to the existing DN 400 mm diameter Woodmead pipeline.

In addition to the above, as part of the project, a 100 m long DN 800 mm diameter pipe segment is to be constructed from the Linbro Park pipeline to augment the supply to the Marlboro Reservoirs.

The pipeline route runs through busy commercial and residential areas.

It has been found that the proposed pipeline route is affected by corrosive soil, DC stray current and AC interference and an impressed current cathodic protection system and AC mitigation measures are thus required.

An impressed current anode groundbed site has been identified which is located within a public park belonging to the city of Johannesburg.

The cathodic protection system required will make use of a 5 kW single phase switch mode transformer rectifier unit and an 80 m long horizontal anode groundbed.

Cathodic protection monitoring enclosures will be required at 1km intervals along the pipeline. In addition, insulating flanges will be required all tie-ins to existing lines – four in total. Resistive bonding facilities will be required at all of these locations.

Buried continuity bonds will be required at all chambers containing inline fittings.

A 600 m long continuity bond will be required to connect the DN 800 mm diameter pipe to the DN 600 mm diameter pipe at the Marlboro Reservoir site.

AC mitigation gradient control mats will be required at all valve chambers.

The pipeline crosses the M1, as well as Eskom 275 kV Power lines and Eskom 88 kV Power lines.

PSCP 2 SPECIFICATIONS

The Johannesburg Water Cathodic Protection Specification (2015) will apply. Additional specifications are as follows:

PSCP 2.1 TRANSFORMER RECTIFIER UNIT (TRU)

PSCP 2.1.1 Switch Mode Cathodic Protection Rectifier (SMCPR)

PSCP 2.1.1.1 General

The SMCPR is to comprise an input rectifier and filter, a high frequency inverter, a high frequency output transformer, output rectifier and a smoothing circuit. The smoothing circuit shall ensure ripple is less than 2% of output voltage. The output of the unit is to be controlled by means of a high speed PID control circuit such that the response time of the unit is less than 100ms.

The SMCPR is to have an output capacity of 5 kW with the ratio of current to voltage to be configurable as required to a maximum output of 100 V 50 A.

The unit shall have a power factor correction of greater than 0.99 and an energy efficiency of 70% to 95% dependent on output settings.

Protection against current surges from the AC supply shall be provided by means of a circuit breaker and fuses. The circuit breaker shall be of the thermal or magnetic type and located before the input rectifier. The circuit breaker must be capable of completely isolating the power supply except the 16 A 220 V switched socket (see later).

Client:		Contractor:	
Witness:		Witness:	

The power semiconductors are to be mounted on aluminium heat sinks cooled by convection cooling. No forced cooling is permitted.

The output voltage shall be infinitely variable within the capacity limits of the unit by means of a control circuit acting on the inverter circuit. This circuit shall also have current limiting facilities.

Output DC current, output DC voltage, incoming AC voltage, reference potential, current set point and potential set point are to be displayed on the digital display.

Banana plug terminals are to be located under the digital display to allow for manual measurement of output DC current, output DC voltage and reference potential.

In parallel with the negative cable, a monitor cable shall be connected to the pipeline and connected to the monitor terminal. This cable shall not carry "current" and is to be used only for measurement of potential.

The SMCPDR shall be of such a design and size that it may be installed inside a precast concrete "Mega Bunker" type enclosure. Details of proposed enclosures are to be supplied by tenderers at the time of tendering.

PSCP 2.1.1.2 Control Circuit

The control circuit shall perform the following functions:-

- (1) Maintain output current constant at any pre-set value within the capacity limits of the unit
- (2) Maintain pipe potential constant at any pre-set value within the capacity limits of the unit

When operating in the constant potential mode, in the event of failure of the monitoring or reference cables, or of the reference electrode itself, the SMCPDR must operate at the pre-set current limit.

- The control circuit shall have the following additional built-in features:
- Integrated interrupter – GPS synchronised
- Communication interface – Modbus RS232, GSM
- Data Logging – Output current, output voltage, reference potential, heat sink temperature, all events time stamped.
- Alarm monitoring – AC and DC surge protection failure, AC circuit breaker trip, DC output breaker trip, door open switch. All alarms are to be displayed on the digital display.
- Interface with Johannesburg Water Adroit SCADA system – the controller shall be capable of interfacing directly with the scada system

PSCP 2.1.1.3 Surge Protection

PSCP 2.1.1.3.1 Load Surge Protection

Indoor type lightning arrestors shall not be used.

Moving away from the smoothing circuit towards the output terminals, surge protection will be sequentially installed as follows:

Two off Dehn VM 280 or equivalent, are to be connected in series between positive and negative legs. Between the two VM 280 devices, a connection to the earth bar is to be made via a Dehn VM 280. In addition to the above, a Dehn VM 500 or equivalent, in parallel is to be connected between the positive and negative legs.

Followed by:

- A 0,5 mH Choke in the positive leg
- A 0,5 mH Choke in the negative leg

Followed by:

- Between positive leg and earth, two parallel Dehn VM 130 MOV in series with a Dehn Ex-FS (120 kA) spark gap with Cu-W electrodes. Between the two Dehn VM 130 and the spark gap described above, a Dehn Ex-FS (120 kA) spark gap shall be connected to the negative leg. All spark gaps to have Copper Tungsten electrodes.

PSCP 2.1.1.3.2 Electronic Circuit Surge Protection

The electronic circuit must be protected from both the AC and DC sides.

Client:		Contractor:	
Witness:		Witness:	

The DC feed into the control module shall have the following surge protection:

From the pipe monitor cable terminal a 100 ohm 100 watt 300 μ H resistive choke shall be installed in line with the Control Module, followed by an MOV to earth, type Semikron SKV20B130 or equivalent.

After the above, between the monitor and the reference circuits, a Dehn Blitzductor Type KT ALD 100V AC clamping voltage or equivalent, is to be installed.

An earth screen is to be located between the primary and secondary of the step down transformer supplying power to the electronic circuitry.

Immediately on the output of the above transformer a Dehn surge arrestor or equivalent, type Blitzductor KTALE 42V-/24V ~, is to be located between live and neutral.

PSCP 2.1.1.4 Wiring and Busbars

Wherever possible flexible, multistrand cable is to be used.

Joints or splices in any wiring will not be permitted. Not more than two conductors shall be connected to any one terminal.

All conductors shall be numbered at both ends with reference to the Schematic Wiring Diagram supplied.

All conductors excluding busbars shall be routed in trunking or harnessed.

Busbars shall be aluminium or tinned copper. The latter shall be tinned after cutting, forming and drilling. Tinning shall be in accordance with Grade Sn6C of BS 1872.

Busbar joints shall be bolted and the mating surfaces should be coated with petroleum jelly or a similar water repellent paste prior to assembly.

Bolted joints shall be provided with spring washers. Fasteners on aluminium busbars shall be tinned or cadmium plated.

PSCP 2.1.1.5 Colour Coding and Labelling

The following colour coding's should be adhered to:

Positive electrical cables	:	Red
Negative electrical cables	:	Black
Earth cables	:	Green
Electrical supply cables (1st phase)	:	Red or brown
Electrical supply cables (2nd phase)	:	White
Electrical supply cables (3rd phase)	:	Blue
Cable for reference electrode	:	Red
Electrical warning signs	:	Black on yellow background
Monitoring cable	:	Black

All components and/or components assemblies shall be labelled.

Labels shall cross reference to the circuit diagram.

Labels shall be of the engraved "sandwich" type (trafolyte) with black letters on a white background except the positive output terminal label which shall be in white letters on a red background. Alternatively aluminium silk screen labels may be used.

Labels shall be in upper case letters with a height of 6 mm for component labels and 10 mm for output terminal labels.

Output terminals shall be labelled as follows:

+ GROUND BED

- PIPE

PIPE MON

REF ELECT

EARTH

Client:		Contractor:	
Witness:		Witness:	

Labels shall be fixed by means of screws or pop rivets such that they shall not become dislodged during the life of the unit. Screws and rivets to be brass or aluminium. Cable tags to be plastic.

Cables shall be identified by means of permanently marked ferrules with black lettering on a white background. Ferrules shall be slip-on-type and matched to the size of the cable.

Ferrules shall be situated so as to read right way up on horizontal cables and from lug to insulation on vertical cables.

PSCP 2.1.1.6 Cable Ends and Terminals

Cables shall be terminated at each end by means of lugs.

Control cable lugs shall be pre-insulated or insulated by means of heat shrink sleeves.

Power cable lugs shall be insulated by means of heat shrink sleeves or slip-on rubber shrouds colour-coded as follows:

AC	:	Red, White and Blue according to phase.
DC Positive	:	Red
DC Negative (Pipe)	:	Black

All terminals shall suitably labelled and be completely accessible after completion of all wiring.

Terminals on power connections shall be provided with lock nuts and or spring washers.

Output terminals shall be fully insulated from the metal of the housing and shall comprise brass bolts, each provided with nuts, lock nuts, washers and tinned copper cable lugs suitable for the specified cable size.

The negative terminal shall be M10 and the positive terminal M16.

Separate terminals size M6 shall be provided for the pipe monitoring cable, and reference electrode cable.

A 10 mm diameter hole shall be drilled in the earth bar in order to facilitate connection via a lug to the earth cable.

PSCP 2.1.1.7 Earthing

The surge diversion units shall all be connected to the common earth incorporating the primary AC supply earth, transformer screens and the SMCPR housing.

The common earth will consist of 30 x 3 mm tinned copper or 40 x 5 mm aluminium busbar.

On installation, the common earth shall be connected to a local earth by means of two 35 mm² copper cables.

All electrical circuits shall be floating with respect to earth.

PSCP 2.1.1.8 Spares

The following spares are to be supplied with the SMCPR:

Fuses	:	three of each type and rating used
Power Semiconductors	:	two of each type and rating used
MOV	:	2 of each type of MOV
Spark Gaps	:	one of each type and rating

PSCP 2.1.1.9 Safety Devices

The SMCPR must contain certain devices which will protect the unit from damage during gross overheating conditions. This may arise during particularly hot weather conditions and/or when the SMCPR operates at a current output exceeding the rated output but below that of an outright short. It should also be pointed out that excessive current may also cause damage to the cables external to the SMCPR.

The SMCPR shall therefore contain the following safety devices:

1) Circuit Breaker:

This shall be matched as close as possible to the rating of the SMCPR output current, and shall not merely be used as an isolation switch.

2) Thermal Switch:

Client:		Contractor:	
Witness:		Witness:	

A Thermal cut out switch shall be mounted on the power heat sink assembly and shall automatically engage/disengage when the temperature reaches 85°C.

3) DC Fuses:

The DC fuses shall operate before or when the output current reaches a value of 40% greater than the SMCP R rated value. This value shall also be such that no damage to any of the components or wiring occurs.

PSCP 2.1.1.10 Auxiliary AC Supply

The SMCP R shall be provided with a standard 220V single phase 16 A 3 point plug for providing power to auxiliary devices. The auxiliary AC supply is to be protected by an earth leakage device. The three point plug shall be connected to the input side of the main circuit breaker such that power is still available even if the main circuit breaker has tripped.

PSCP 2.1.1.11 Inspection and Testing

The following tests shall be carried out at the Manufacturer's works (unless an alternative place is specified and approved by the Corrosion Engineer on the Project Manager's team). All equipment shall satisfactorily pass such tests and a test certificate made available to the Purchaser. All testing shall be carried out at the Manufacturer's expense.

In the event that any of the tests detailed below, or the complete inspection, is waived, then this shall not release the Manufacturer from his obligation to supply completely satisfactory equipment or warranted performance as specified, and to supply "type test" results from essentially similar units.

PSCP 2.1.1.11.1 Insulation Tests

The apparatus shall withstand a 16 kV insulation test from the AC input to frame, DC output to frame.

The insulation test described earlier shall be repeated immediately on conclusion of the heat run test.

PSCP 2.1.1.11.2 Efficiency Tests

Efficiency tests shall be carried out at 25%, 60% and 100% of maximum current at full rated voltage. A minimum efficiency of 70% is to be achieved.

PSCP 2.1.1.11.3 Heat Run Tests

The unit shall be run for at least 12 hours continuously at maximum current and voltage output with the door of the "Mega Bunker" enclosure closed. The difference in temperature between the inside of the enclosure and ambient shall be plotted against the time (in hours) and the test run until there is no increase in temperature difference (the curve levels off).

The maximum temperature difference increase shall be not more than 20°C.

A similar temperature time test shall be carried out on the heat sink. The maximum temperature difference between heat sink and SMCP R internal shall not be more than 50°C.

The maximum temperature that may be obtained in the cabinet under any circumstances is 55°C.

PSCP 2.1.1.11.4 Constant Current / Potential Tests

Constant current and constant potential tests shall be carried out at various voltage and current levels as decided by the Corrosion Engineer on the Project Manager's team. For the constant potential test the supplier shall have available a 200 litre drum filled with appropriate solution, together with relevant anode, cathode and reference electrode.

The control parameters are to remain within 5% of any preset value above 5% of the rectifier output voltage.

PSCP 2.1.1.11.5 Current / Overload Tests

Tests shall also be carried out to ensure that the circuit breaker or fuse operate under conditions where the current exceeds the rating of the SMCP R in a slowly rising mode.

The rectifier shall be run at increasing steps of 10A for 30minutes, starting from the maximum current rating of the unit, until one of the fuses or breakers operates. The results of the tests are to be entered on the performance test certificate.

The Corrosion Engineer on the Project Manager's team may also call for other tests to prove compliance and the specifications.

Client:		Contractor:	
Witness:		Witness:	

The tests shall be carried out in the presence of the Corrosion Engineer on the Project Manager's team. The Manufacturer will issue a Test Certificate on completion of Tests which shall be signed by the Corrosion Engineer on the Project Manager's team.

PSCP 2.1.1.12 Documentation

The Rectifier shall be supplied with the following:

- (1) Wiring / Circuit diagram with component list
- (2) Operations and Maintenance Manual

The above are to be mounted on the inside of the unit.

The Wiring Diagram with Component List are to be encapsulated in polyester fibreglass, mounted on an aluminium plate which shall be fixed by means of wing nuts to four studs welded to the door, thus rendering the drawing removable.

Six copies of the Operations and Maintenance Manuals are to be supplied to the Project Manager for forwarding to the Client.

The manual is to include a detailed fault finding and troubleshooting procedure.

PSCP 2.1.1.13 Guarantee

The equipment shall carry an unconditional two year guarantee except for damages arising from vandalism, mechanical damage, external fire, flooding or ground subsidence caused by mining or earth tremors. The unit shall operate continuously on site for a period of 2 weeks after which the 2 year guarantee will commence.

PSCP 2.1.1.14 Remote Monitoring

All TRU's are to be fitted with a remote monitoring system.

The parameters to be monitored are:

- Mains failure
- Fuse failure
- Output current
- Output voltage
- Pipe/soil potential
- Power Consumption

The system is to be capable of interfacing with Johannesburg Water's existing SCADA system (Adroit). The onus is on the contractor to ensure compatibility.

PSCP 2.1.1.14.1 Medium Utilisation

The order in which communication mediums shall be utilised shall be as follows:

- Where reliable fibre (Ethernet) is available to a remote site, it shall be used as the primary communication medium, with GSM-GDSP as secondary medium.
- Where neither fibre or UHF radio is not possible to be utilised, GSM-GDSP shall be used as the primary communications medium.
- Satellite communications may be considered if the pricing and availability is favourable.

PSCP 2.1.1.14.2 Network Planning and Report

The contractor shall conduct an extensive network planning audit whereby the various communication methodologies required, at each site, shall be evaluated and planned. The contractor shall generate an extensive network design report giving at least the following:

- Execute an extensive RF profile mapping determining the best routes to be utilised to each and every site in the network.
- Evaluate the best master and back-up communication mediums to be used.
- Determine antenna systems required.

PSCP 2.1.1.14.3 Communication Functional Requirement

A GSM data communication unit capable of communicating on the Vodacom GDSP network or similar.

Client:		Contractor:	
Witness:		Witness:	

A Wi-Fi communication unit capable of communicating on the 2.4 GHz frequency.

At least one, preferably two, Ethernet ports of which one can be interfaced with a Fibre Network.

One RS 232 port, configurable as RS 485 Port.

Advanced Cybersecurity

Forward Error Correction

Primary and Secondary path routing

Greater than 10 Years MTBF (Mean Time Between Failure)

ICASA Approved

These functionalities shall be available in one hardware platform configurable to the requirement at each site.

The communication network solution must utilise various communication methods, modulations and securities to ensure stability, functionality and redundancy.

PSCP 2.1.1.14.4 Cellular 3G Option

The Communication unit shall be capable to be equipped with a Cellular modem to be utilized as the primary or the secondary communication medium :

GSM, GPRS, EDGE, HSPA+ 850/900/1800/1900 MHz • UMTS, HSPA, HSPA+ 800/850/900/1700/1900/2100

Region/Carrier: Vodafone / Vodacom, Cell-C, Telkom, MTN

Max Throughput: 21 Mbps downlink / 5 Mbps uplink

Typical Throughput: 5.5 Mbps downlink/0.3 Mbps uplink.

The unit shall be capable to operate on the current JW platform (Vodacom GDSP). It is of extreme importance that the this shall be well proven, and the contractor shall demonstrate this within two weeks after the tender has been awarded.

PSCP ICASA approval is mandatory of all devices to be attached to the tender.

2.1.1.14.5 Access Control

The device shall:

- require a username / password for login
- have a configurable minimum password length
- have a configurable maximum password length
- follow secure password construction rules
- offer user-defined password construction rules
- auto lockout on multiple failed logins
- have no factory / engineering backdoors

PSCP 2.1.1.14.6 Environmental

The Communications unit shall comply with at least the following environment and other approvals:

- Voltage: 10-60 VDC
- Maximum Power Consumption: 4.3W (4G), 3.2W (3G), ~5.3W (400MHz)
- Typical Power Consumption: 4.0W (4G), 2.5W (3G), 3.2W (400MHz)
- Operating Temperature: -40° to 70° C - 900MHz modem
- Humidity: 95% at 60° C non-condensing
- Mounting Options: Integrated DIN Rail mount, Standard bracket
- Fully ICASA Approved.

Client:		Contractor:	
Witness:		Witness:	

PSCP 2.1.1.14.7 Remote Terminal Unit (RTU)

The RTU shall be a highly configurable, highly programmable intelligent device. JW shall meticulously evaluate the RTU to ensure that it fully and inherently support all the listed requirements as JW fully utilises all these features.

PSCP 2.1.1.14.8 Unsolicited Events

The system data gathering at the master station shall not be primarily based on a round robin polling method, but primarily on Change of State (Eventing) basis.

The remote station RTU shall inherently have the ability to report change of state (event) of user configurable Input-Outputs (IOs). The remote RTU shall thus only initiate communication when a data change event occurred, which shall then be reported to the master station or to any other remote RTU.

The event settings shall be user configurable using the Configuration Toolbox at the master station and shall be downloadable from the master or any other remote site.

The RTU shall be equipped with a real-time clock. All events shall be remotely time stamped at the remote RTU when it occurred within a 10 millisecond accuracy.

Digital inputs dead time settings shall be individually configurable. The engineer / operator shall be able to set re-action times on each input which shall trigger an event when such changes occur.

All Analogues inputs shall also be individually configurable. The sample timings, number of samples, and sampling triggers shall be configurable and downloadable to the remote station from the master station.

It shall be able to also connect with a GPS system. The GPS can then be used to set the RTU real-time clock very accurately. The GPS co-ordinates can also be extracted and then reported to the SCADA system.

PSCP 2.1.1.14.9 Data Polling

The RTU system shall also support a polling mode where any Master station or any other RTU connected to the communications network shall be able to poll the RTU for IO and other data registers.

The station RTU shall also be capable to poll any other remote RTU, connected to the communication network, for IO and other data.

The polling rates shall be fully user configurable.

A polling data transfer method shall not be the primary data exchange method, but can at any time be utilised as and when required.

PSCP 2.2 SECURE ENCLOSURES FOR TRANSFORMER RECTIFIER

The TRU is to be mounted inside a steel cabinet which is in turn to be installed inside a secure concrete enclosure on site.

PSCP 2.2.1 CABINET SPECIFICATION

PSCP 2.2.1.1 General

The cabinet shall be manufactured from 2 mm thick 3Cr12 stainless steel and shall be of sufficient size to allow for easy access for servicing and maintenance from the front only but shall not exceed the following dimensions:

- 800 mm wide x 600 mm deep x 1600 mm high.

The housing shall allow for adequate ventilation of the heatsinks and power elements.

Where cooling vents are present, insect proofing shall be bolted to the inside of the cabinet.

Cabinet doors shall be sealed by means of Closed Cell Expanded Rubber or approved equivalent.

Cabinet doors shall be provided with door stays to hold the doors open during servicing and maintenance.

All external welds shall be continuous seam welds. Stitch or tack welding is not permitted.

Cabinets shall be provided with channel section bases and lifting lugs suitably designed to prevent distortion during transport, handling and installation.

The cabinets shall be provided with a bottom plate which shall incorporate a removable gland plate. The gland plate shall be manufactured from 304L stainless steel.

Client:		Contractor:	
Witness:		Witness:	

The cabinet must be so designed that there are no inherent moisture traps.

The following information is to be hard stamped onto the manufacturer's nameplate attached to the door of the cabinet:

AC rating :

DC rating :

Max. operating temperature :

Type of equipment offered : e.g. Cathodic Protection Transformer Rectifier.

Serial No :

Owner :

Date of Manufacture :

PSCP 2.2.2 TRU CABINET COATING SPECIFICATION

Degrease, rinse, acid, pickle and phosphate.

Coating System

Primer Coat : Plascon Epilyte 325/661 or equivalent Min. 2 coats D.F.T. 60 Microns

Final Coat : Plascon Recoatable PU Code CPC Enamel or equivalent. Min. 2 coats.

D.F.T. 50 Microns

Total D.F.T. 100-125 Microns.

Colour : TBA

Application by means of electrostatic spray.

Coating system to be from one supplier only.

Alternatively, tenderers may submit their own specification for surface preparation and painting. This must be accompanied with full details, record of past performance and a two year guarantee. The successful tenderer may only use his system with the approval of the Corrosion Engineer on the Project Manager's team.

PSCP 2.2.3 SECURE CONCRETE ENCLOSURE

PSCP 2.2.3.1 General

The enclosure for the TRU is to comprise of three main components as follows :

- Outer security barrier
- Inner security enclosure
- Remotely monitored electronic intruder detection and CCTV

The details of these components are provided below:

PSCP 2.2.3.2 Outer Security Barrier

The outer security barrier is to consist of a 250 mm thick 40 MPa reinforced concrete slab and 700 mm high bund wall topped with a 2 m high Cochrane Elevate high-security barrier or equivalent.

The detail of the reinforcing is specified elsewhere.

The fence uprights and gate posts are to be of 76 mm x 76 mm by 2 mm thick high tensile steel square tubing and are to be welded to the reinforcing cage inside the concrete. The gate is to be made of the same material as the fence with a high tensile square tubing frame as per the fence uprights. The gateway is to be 900 mm wide and the gate is to open outwards.

Prior to the casting of the concrete base, cable conduits and the TRU earthing system are to be installed.

110 mm diameter conduits are to be installed from the pipeline and the power supply at a minimum depth of 1m. The conduit of the TRU earthing cables is to commence directly underneath the earth grid.

The earthing system is to consist of a 4 m x 4 m grid with cross members at 2 m spacing and vertical 1.2 m long earth rods at all nodes. The earthing cable is to be 70 mm² bare stranded copper cable and the earth

Client:		Contractor:	
Witness:		Witness:	

rods are to be 16 mm diameter copper plated steel. The entire earthing system is to be installed at a depth of 0.5 m. The horizontal conductors are to be encased in 200 mm x 200 mm 40 MPa concrete. Two 70 mm² bare copper earth cables are to be brought up through a cable duct and into the TRU enclosure.

On completion and backfilling of the conduits and earthing installations an area of 4.5 m x 4.5 m is to be levelled and compacted to a density of at least 90% of the modified AASHTO maximum dry density prior to the casting of the reinforced concrete base and bund walls. Details of this concrete structure are given elsewhere.

PSCP 2.2.3.3 Inner Security Enclosure (Transnet Equipment Shelter Type)

The inner security enclosure is to be a precast Rocla Transnet Equipment Shelter or equivalent. Openings in the base of the enclosure are to be positioned appropriately for the final TRU position. This is to be done either during the casting process or by core cutting.

The enclosure is to be placed centrally on the base with the conduits passing through the floor openings and the door facing the outer gate.

Once the enclosure is in position the area around the enclosure is to be screeded with a fall toward the gate opening to ensure that no rain water collects within the bunded area.

PSCP 2.2.3.4 Inner Security Enclosure ("Mega Bunker" Type)

As an alternative to the combination of the steel cabinet and Transnet Equipment Shelter, the TRU may be installed in a precast "Mega Bunker".

This enclosure is to be made of 45 MPa precast concrete and is to have a secure tamper resistant steel door.

PSCP 2.2.3.5 Remotely Monitored Electronic Intruder Detection

PSCP 2.2.3.5.1 General

This component of the work is to be carried out by a specialist sub-contractor. Tenderers are to provide full details of the subcontractor they intend using.

The system required must be able to detect, verify and deter intrusion. In addition response services must be deployed once intrusion is verified.

The electronic security system is to consist of the following:

- Acoustic Fence line Intruder Detection System
- Dual Passive infra-red / Ultrasonic motion detectors
- 48 hour Battery back-up
- 24 hour control room monitoring

The description of how it will operate is given below:

- The fence line intruder detection system will detect sharp frequencies and vibrations associated with intrusion attempts on the outer security barrier. Intrusion attempts detected will send a signal to the Johannesburg Water Telemetry Control Centre (TCC).
- The passive motion detectors will be positioned to detect an intruder within the primary security perimeter or on the Rocla enclosure roof. This will trigger an alarm in the control room and activate an audible siren. The control room operator may then notify the relevant security personnel.

PSCP 2.2.3.5.2 Fence line Intruder Detection System

- The detection system shall make use of an acoustic sensor cable that is attached to the fence to detect any cutting, climbing, lifting or jumping off the fence.
- A single run of the cable in the middle of the fence shall detect intrusion attempts for the whole height of the fence.
- The system shall utilize false alarm filtration as follows:

The equipment shall make use of algorithms to detect only sharp frequencies and vibrations associated with intrusion attempts while filtering the long frequencies from weather and other ambient noise

The system shall have adjustable levels of sensitivity that may be configured as required.

PSCP 2.2.3.5.3 Passive Motion Detectors

- Passive dual infrared / ultrasonic pet immune security grade motion detectors are to be the outdoor type.

Client:		Contractor:	
Witness:		Witness:	

- Two units will be required which will be installed in diagonally opposite corners of the enclosure against the concrete bund walls.

PSCP 2.2.3.5.4 Communication

Security alarm events must use the same communication medium (telemetry) that communicates between the TRU (SMCPR) monitoring and control to the SCADA system of JW.

PSCP 2.2.3.5.5 Battery Back-up and Solar Panel

The back-up battery is to have sufficient capacity to allow the entire electronic monitoring system to operate for 48 hours.

PSCP 2.3 HORIZONTAL GROUND BED CONSTRUCTION

The anode materials are to be installed in horizontal trench. The trench is to be 300 mm wide and 2.5 m deep.

300 mm diameter by 2 m long galvanized canisters packed with calcined petroleum coke shall be installed in the bottom of the trench. Every alternate canister shall contain an MMO anode while the remaining canisters will act as spacers. Anode tails are to be spliced into the ring main cable by means of Y-type epoxy splicing kits.

The ring main cable is to be a continuous 35 mm² PVC/PVC insulated copper cable from the TRU positive terminal.

PSCP 2.4 ANODE MATERIALS

PSCP 2.4.1 MMO ANODES

The anode construction shall be as follows:

Substrate: Ductile Pure Titanium

Length: 1000mm

Diameter: 25mm

Anode Coating: Precious Metal/Metal Oxide Plasma Sprayed Ceramic. Must be able to withstand current density testing of more than 27kA/m².

Environment: Must be able to support oxygen and chlorine evolution.

Tail cable: Size 16mm²

Insulation type: PVC/PVC for horizontal groundbeds and PVDF/HMWPE for deep well Groundbeds

Output current: 8 amps

Life: 160A.years

The ceramic precious metal/metal oxide coating must withstand the evolution of oxygen and chlorine and be compatible to ASTM B338, CP Titanium Grade 1 or 2.

The anode tail to consist in its entirety of a single electrical cable as described above fed through and connected inside.

Connections are to be at the centre of the anode, care has to be exercised so that no copper is exposed to the environment which could result in anode string burnout.

The ends of the tubes have to be effectively sealed against ingress of moisture.

The cable to titanium tube connection resistance should be less than 500µm.

Anode tail cables shall be of sufficient length to connect directly to the anode termination cabinet without joints.

Testing of anodes:

An anode will be randomly selected from the batch to be supplied and tested as detailed below.

An accredited third party laboratory, such as MINTEK, will test the anodes in order to confirm compliance with the specification. The client prior to testing must approve details of the third party laboratory.

Client:		Contractor:	
Witness:		Witness:	

<u>Test</u>	<u>Minimum requirement / test method</u>
Test solution	10 % by volume Sulphate Acid (H ₂ SO ₄)
Test temperature	Less than 50°C for duration of the test
Test current density	20 000A/m ² minimum
Test duration	Minimum of 36 days at the specified current density
Coating adhesion test	The coating adhesion shall comply in full to ASTM B571
X-ray	The tubular anode may be x-rayed at the client's discretion in order to ensure that bubbles are not contained within the epoxy sealant
Metallurgical/SEM analysis	Anodes will be sectioned and the MMO/PMO coating verified.

PSCP 2.4.2 HIGH SILICON IRON ANODES

The Silicon Iron anodes shall be centrifugally cast tubular anodes and manufactured in accordance with BS5750 or ISO9002.

The anodes shall typically have an external diameter of 71 mm and an internal diameter of 45 mm, and be nominally 1065 mm long.

The anode shall possess a steel terminal which shall be located centrally within the walls in order to ensure that the anode is consumed uniformly and to ensure that a balanced spread of current is achieved throughout its length.

A PVC/PVC (double insulated), colour red, stranded copper cable 16 mm² with a minimum length of 2 m shall be brazed to the steel terminal. The connection area shall be filled with a two pack, solvent free epoxy resin, type Epikote Resin/Epikure D505 hardener or equivalent. The epoxy shall be cast in two separate installations for each end.

Great care must be taken to ensure that the PVC insulation is not damaged by the brazing. Care must also be taken to ensure that the epoxy covers a minimum of 30 mm of the PVC/PVC insulation of the cable.

The anode connection and encapsulation shall be suitable for continuous use in wet conditions for 20 years.

Care must be taken not to damage the PVC/PVC cable insulation. If there is any sign of damage, an appropriate length of cable, with the defect, must be cut off.

The anodes shall be free from defects which may impair the anode performance. The anode shall be free from internal porosity, blow holes, cracks or inclusions.

The weight of the anode, without cable and epoxy shall be a minimum of 14 kg and possess a minimum density of 7,0 g/ml.

The anode life shall be 40 Amp years minimum as determined for use without coke.

PSCP 2.5 CALCINED PETROLEUM COKE

The coke backfill shall be as per the Johannesburg Water Cathodic Protection Specification (2015).

PSCP 2.6 COATING REPAIR AT CABLE TO PIPE CONNECTIONS

Coating repair at points where cables have been connected to the pipeline shall be by means of Poly-isobutene Self-Healing Visco-Elastic material. Personnel performing the coating repair work shall be certified as competent by the coating manufacturer.

The procedure is as follows:

- The areas to be coated have to be clean, dry, and free from grease and dust. All contamination has to be removed. Degrease surfaces with isopropanol.
- Cover the cable connection and cable with CZH paste or equivalent and mould to create a smooth profile.
- Cover the entire exposed area with Wrapping Band CZH P or equivalent. The applied coating patch is to have a 100mm overlap onto the existing coating.
- Cover the entire area of wrapping band material with PVC Outer wrap.

Client:		Contractor:	
Witness:		Witness:	

PSCP 2.7 MONITORING ENCLOSURES (BELOW GROUND TYPE)

PSCP 2.7.1 GENERAL

All monitoring facilities are to be housed in dedicated reinforced concrete underground chambers with lockable polymer lid. All cables are to enter the chamber at the bottom and are to be completely encased in concrete with only the monitoring studs being exposed. Each monitoring facility is to include a cable connection and permanent reference electrode per pipeline.

Monitoring facilities are to be installed at 1 km intervals or as indicated by the CP design engineer.

PSCP 2.7.2 MONITORING ENCLOSURE

The enclosure is to be constructed as follows:

- A precast 600 mm diameter x 600 mm deep concrete manhole complete with a plastic composite lockable lid (Maverick HH109GY or equivalent) is to be installed such that the roof slab is 50 mm above natural ground level. All cabling is to be brought into the enclosure prior to the entire manhole being completely encased in 200 mm of 40 MPA concrete.
- Each of the cables are to be connected to a 250 mm long x 12 mm diameter 304L stainless steel threaded rod. The connection is to be by means of a tinned copper lug and two stainless nuts and washers. The entire threaded rod is to be insulated with a heat shrink sleeve and the cable/rod connection is to be encapsulated in an epoxy splicing kit such that the heat shrink sleeve and cable insulation protrude into the epoxy by at least 50 mm.
- The stainless steel rods are then to be secured in a vertical position and arranged in a logical order prior to the manhole being filled with 40 MPa concrete to such a level 300 mm below the manhole lid. The rods are to protrude above the concrete level by 10 mm. Each protruding stud is to be identified by means of hard stamped aluminium labels which are to be secured to the concrete by means of suitable knock-in nails.
- Each of the protruding studs is to have a hole drilled in the centre to allow for the insertion of banana plugs.

PSCP 2.7.3 CABLES

A single 10 mm² monitoring cable is to be thermit welded to each pipe and fed through to the monitoring enclosure. The cables from the permanent reference electrode and coupon associated with each pipe are also to feed through to the enclosure.

All cables are to be laid at pipe depth and are to be encapsulated in 300 mm of 40 MPa concrete.

PSCP 2.8 GRADIENT CONTROL MATS

PSCP 2.8.1 GENERAL

The gradient control mat (GCM) is to be made of 100 mm x 100 mm x 4 mm steel wire weldmesh. The mat is to be hot dip galvanized to SANS 121-2000.

The GCM is to be installed around the outside of the valve chamber at a depth of 0.5 m in a 1.2m wide border.

In the case of existing chambers, the same type of grid is to be installed on the chamber floor and then covered with a 70 mm concrete screed.

In the case of new chambers, the internal grid is to be installed underneath the blinding prior to the casting of the chamber floor.

Four 1.2 m Long 14.5 kg magnesium anodes installed horizontally 300mm below the outer grid and connected to the grid by means of 16 mm² PVC/PVC insulated cable. Cable connections are to be thermit welded.

PSCP 2.8.2 GRADIENT CONTROL MAT CONNECTIONS

The separate components (the external and internal mats) of the GCM are to be connected to the pipeline by via a suitable link panel installed inside a monitoring enclosure. Each connection is to comprise twin parallel black 16 mm² PVC/PVC insulated copper cables.

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Witness:		Witness:	

Should the external part of the GCM be made up of sections, these sections are to be interconnected by means of twin parallel 16 mm² PVC/PVC insulated copper cables.

Connection between the mat and the cables is to be by means of thermit welding.

The pipe coating shall be made good according to the Technical Specification for making good of coating systems.

The thermit welded cable GCM connections are to be completely sealed using epoxy filled cable splicing kits.

PSCP 2.9 SOLID STATE DECOUPLING DEVICES

The PCR is a solid-state device designed to simultaneously provide DC decoupling and AC continuity/grounding when used with cathodically protected structures, such as pipelines, tanks, grounding systems, and cable casings. By decoupling the cathodic protection system from grounding systems and other structures, the CP requirements can be minimized, while maintaining an effective ground or bond rated for AC faults and lightning current. The devices are maintenance-free, with no requirements for periodic service or testing.

PCR devices will be installed inside the valve chambers or pump stations.

PSCP 2.9.1 AC FAULT CURRENT RATINGS

Typical ratings are (Amps AC-RMS Symmetrical):

Rating at 30 Cycles for 50 Hz – 3500 A

PSCP 2.9.2 OTHER RATINGS AND CERTIFICATIONS

- Threshold Voltage (absolute)
-12/+1V
- AC Steady-State Current (amperes - rms) 50Hz
45A
- Lightning Surge Current
100kA crest (8 x 20 µs waveform)
- Environmental rating
IP68 Submersible (to 2m depth)
- Hazardous Location Certifications
Rating Class I, Division 2, Groups A, B, C, D, Temp Code T5

PSCP 2.9.3 CERTIFICATION REQUIREMENTS

Equipment is to be certified by a SANAS accredited testing laboratory. Certification is to cover the following :

- Safety Grounding

Providing an "effective ground-fault current path" as defined in one of the following:

- 2002 NFPA 70 (US National Electrical Code - NEC), Article 250.2, and required in 50.4(A)(5)
- Canadian Standards Association CSA C22.2 No. 0.4-M1982 (reaffirmed 1999), using Canadian Electrical Code Part I, section 10-500, 10-806 as a guide.

Providing over-voltage protection in accordance with the applicable requirements of ANSI C62.11

- Blocking Cathodic Protection Current

Providing DC isolation of objectionable DC ground currents from cathodic protection systems as defined in NFPA 70, Article 250.6(E)

- Hazardous Location Use

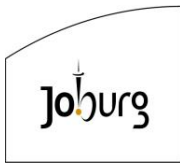
The PCR shall be certified for use in Class I, Division 2, Groups A, B, C, D hazardous locations by UL and C-UL, according to one of the following:

Client:		Contractor:	
Witness:		Witness:	

- U.S. National Electrical Code section 500-505
- UL 1604: "Electrical Equipment for Use in Class I and Class II, Division 2, and Class III Hazardous (Classified) Locations"
- CSA C22.2 No.213-M1987: "Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations"
- ATEX directive 94/9/EC, according to the standard EN50021:1999 "Electrical apparatus for potentially explosive atmospheres - Type of protection 'n'.
- Environmental Rating

The PCR shall be certified to environmental rating IP68 (submersible to 2 m).

Client:		Contractor:	
Witness:		Witness:	



Client:		Contractor:	
Witness:		Witness:	

