



TENDER NO: 2024/143

**APPOINTMENT OF A TURNKEY CONTRACTOR FOR THE DESIGN AND CONSTRUCTION OF A PRE-THICKENER, REHABILITATION OF DIGESTER 5&6 STAIRCASE AND INTERNAL REHABILITATION OF A RESERVOIR IN THE INLAND REGION**

**VOLUME 1 – Tendering Procedures and Returnable Documents**

**Issued by:**

uMngeni-uThukela Water  
310 Burger Street  
Pietermaritzburg

**Tender Queries:**

Contact Name: [Nosipho Mkhize]  
Telephone: [033 341 1062]

**Name of Tenderer:** \_\_\_\_\_

**National Treasury CSD Number:** \_\_\_\_\_

Tip-Offs Anonymous Hotline:	Appeals/Objections
<p>Report unethical conduct at uMngeni-uThukela Water on:</p> <p>Toll Free Number: 0800 864 463 Email: <a href="mailto:umgeniwater@whistleblowing.co.za">umgeniwater@whistleblowing.co.za</a> Toll Free Fax: 0800 212 689 Postal: Freepost KZN665, Musgrave, 4062 SMS: 33490 Online: <a href="http://www.whistleblowing.co.za">www.whistleblowing.co.za</a></p> <p><i>Stop theft / fraud / dishonesty / bribery / blackmail / intimidation, and remain anonymous.</i></p>	<p>Persons aggrieved by tender award decisions taken by uMngeni-uThukela Water, may lodge an appeal within <b>7 calendar days</b> of the date of the intention to award advertisement.</p> <p>UUW shall only consider written appeals/objections clearly stating reasons for appeal directed to:</p> <p>The Supply Chain Management Office, Attention: Supply Chain Management Email: <a href="mailto:appeals@umgeni.co.za">appeals@umgeni.co.za</a></p>

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Tender Number: 2024/143

**Tender Title: APPOINTMENT OF A TURNKEY CONTRACTOR FOR THE DESIGN AND CONSTRUCTION OF A PRE-THICKENER, REHABILITATION OF DIGESTER 5&6 STAIRCASE AND INTERNAL REHABILITATION OF A RESERVOIR IN THE INLAND REGION**

### T1.1 Tender Notice and Invitation to Tender

uMngeni-uThukela Water is a state owned business enterprise that operates within the South African legislative parameters. The primary function of uMngeni-uThukela Water is to supply treated water in bulk to its municipal customers.

Competent and experienced Contractors are invited to Tender for the following:

**APPOINTMENT OF A TURNKEY CONTRACTOR FOR THE DESIGN AND CONSTRUCTION OF A PRE-THICKENER, REHABILITATION OF DIGESTER 5&6 STAIRCASE AND INTERNAL REHABILITATION OF A RESERVOIR IN THE INLAND REGION**

In addition to the Eligibility Criteria specified in Clause F2.1 of the tender document, tenderers are required to fulfil the following:

#### **A CIDB grading of 6CE or higher is required**

Tenderers are required to achieve at least 35% Contract Participation Goals (CPG) including a minimum 10% Black Women participation and another 10% for Local participation of the value of goods, services and works paid to one or more Enterprises (CPG Partner/s) as agreed with uMngeni-uThukela Water before contract award. Tenderers who are the main contractor are not exempt from this requirement and are still required to have a CPG Partner.

Evaluation method:

The tender will firstly be evaluated on eligibility. If found to be eligible, it will be further evaluated in two stages i.e.

- Functionality shall be assessed. A minimum functionality score of seventy (70) points is required for the tender to be considered further.
- Price & Preference goals using the 80/20 Preference Point Scoring System in terms of Preferential Procurement Regulations 2022 will be applied.
- In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations 2022, preference points will be awarded for specific goals as stated in the tender, SBD 6.1 80/20
- Price and Preference goals
  1. In compliance with the Preferential Procurement Regulations 2022, the 80/20 or 90/10 preference point system is applicable: points for this bid shall be awarded for:
    - a) Price; and (80 or 90) and Preference as defined in SBD 6.1 (20)
  2. The Preference Goals that have been identified for this bid is stipulated in SBD 6.1
  3. Preferential goals and applicable points for this tender in terms of Preferential Procurement Regulations 2022, are indicated in the table below:

	Description	80/20	Evidence to be provided
HDI	An entity which is at least 51% Black Owned	10	BBBEE Certificate or Sworn Affidavit
RDP	The promotion of South African owned enterprise	10	Lease Agreement/ Municipal Account/ Letter from the Traditional Authority
<b>Total points for preferential goals</b>		<b>20</b>	

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

The physical address for collection and submission of Tender documents and the submission of Tenders is:

**uMngeni-uThukela Water, 310 Burger Street, Pietermaritzburg.**

Documents will be issued via e-mail from 09h00 to 15h00 | 21 January 2025 | to | 12 February 2025 |

**Tender documents shall only be collected during the said period and hours.**

A compulsory clarification meeting with representatives of uMngeni-uThukela Water will take place at Darvill WWW, New England Road, Willowton, Pietermaritzburg, 3200 **on 12 February 2025** starting at 11h00.

The closing time for submission of Tenders is **12h00 on 27 February 2025**

Tenders are to be deposited in the Tender Box located outside the main entrance at **uMngeni-uThukela Water, 310 Burger Street, Pietermaritzburg.**

*uMngeni-uThukela Water's Standard Conditions of Tender are available on uMngeni-uThukela Water's website <https://www.umgeni.co.za/wp-content/uploads/2023/07/SCM009-Standard-Conditions-of-Tender.pdf>*

*Persons aggrieved by decisions or actions taken by uMngeni-uThukela Water, may lodge an appeal within 7 calendar days of the date of the intention to award advertisement appearing in the relevant print media.*

*The appeal (clearly stating reasons for appeal) and queries with regard to the decision of award are to be directed, in writing only to the Supply Chain Management Office,  
Attention: Supply Chain Management  
Email: [appeals@umgeni.co.za](mailto:appeals@umgeni.co.za)*

*Note that appeals not addressed to the abovementioned e-mail address will not be considered.*

*For any other Tender adverts, please visit this website.*

**uMngeni-uThukela Water Reserves the Right to Award the Contract In Whole or In Part, or not at all.**

## T1.2 TENDER DATA (INCLUDING SPECIAL CONDITIONS OF TENDER)

The general conditions of tender are the uMngeni-uThukela Water Standard Conditions of Tender (document number: SCM009, a copy of which may be obtained from uMngeni-uThukela Water Supply Chain Management office or can be downloaded from the following website:  
<https://www.umgeni.co.za/wp-content/uploads/2023/07/SCM009-Standard-Conditions-of-Tender.pdf>

For purposes of this Contract the following Special Conditions of Tender shall apply:

### F.3.8 Test for responsiveness

Sub-Clause F.3.8.1 Add the following new sub-clause:

“d) meets the minimum Functionality requirements stated in the Tender Data.”

### F3.11.3 Method 2: Functionality, Price and Preference Goals

#### Functionality

Each member of the Employer’s tender evaluation committee is to independently score each tender in respect of functionality offered in accordance with the provisions of F.3.11.9. The committee is then to calculate the final score for each tender as the average of the score from each committee member, rejecting all tender offers that fail to score the minimum number of points stated in the tender data, if any.”

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.

Clause number	Tender Data
	<b>F.1.1 Actions</b>
F.1.1	The Employer is <b>uMngeni-uThukela Water</b>
	<b>F.1.2 Tender Documents</b>
F.1.2	<p>The Tender Documents issued by the Employer comprise the following documents:</p> <p><b>VOLUME 1 – Tendering Procedures and Returnable Documents</b></p> <p><b>Part T1: Tendering procedures</b></p> <p>T1.1 Tender Notice and invitation to Tender</p> <p>T1.2 Tender Data</p> <p><b>Part T2: Returnable Schedules and Documents</b></p> <p>T2.1 List of all Returnable Documents</p> <p>T2.3 Returnable Schedules</p> <p><b>VOLUME 2 – Offer, Contract and Price [Note to compiler: Correct this title if volume 3 is not used. Delete this note]</b></p> <p><b>Part C1: Agreements and Contract Data</b></p> <p>C1.2 Form of Offer, Acceptance and Schedule Deviations</p> <p>C1.8 Contract Data</p> <p>C1.17 Form of Guarantee</p> <p><b>Part C2: Pricing data</b></p> <p>C2.2 Pricing Instructions</p> <p>C2.2 Pricing Schedule</p> <p><b>VOLUME 3 – Scope of Work, Site Information and Annexures</b></p> <p><b>Part C3: Scope of work</b></p> <p>C3.1 Scope of Work</p> <p><b>Part C4: Site Information</b></p>

	<p>C4.1 Site Information <b>Part C5 : Annexures</b> Drawings</p> <p>The Tender Document and the drawings shall be obtained from the Employer or its authorized representative at the physical address stated in the Tender Notice, upon payment of the deposit stated in the Tender Notice. Upon receipt of the Tender documents and prior to the submission of any Tender, the Tenderer shall check the documents issued and the number of pages contained in each document and if any are found to be missing or duplicated or any figure or wording indistinct, the Tenderer shall apply to the Employer's Agent at once to have the same rectified as no liability will be entertained by the Employer or the Employer's Agent in respect of errors in any Tender arising out of any matter referred to in this paragraph. The Tenderer is required to satisfy itself that the Documents received are correct, complete and sufficient to be the basis of a <i>bona fide</i> Tender in every respect.</p> <p>Should any Tenderer not accept that the Documents issued can form the basis of a <i>bona fide</i> Tender, the Employer's Agent shall be requested to correct the discrepancy, ambiguity, missing or illegible information, failing which the Tender submitted by the Tenderer shall be taken that the Tenderer accepts the adequacy of the Tender document.</p> <p>The submission of a <i>bona fide</i> Tender shall absolve the Employer's Agent from any liability whatsoever for any error in a Tender due to the foregoing.</p>								
	<b>F.1.4 Communication and Employer's agent</b>								
F.1.4	<p>The Employer's buyer is :</p> <p><b><u>Tender Queries</u></b></p> <table border="1"> <tr> <td>Name:</td> <td>Nosipho Mkhize</td> </tr> <tr> <td>Address:</td> <td>310 Burger Street , Pietermaritzburg, 3200</td> </tr> <tr> <td>Tel:</td> <td>033 264 1062</td> </tr> <tr> <td>E-mail:</td> <td>nosipho.mkhize@umgeni.co.za</td> </tr> </table>	Name:	Nosipho Mkhize	Address:	310 Burger Street , Pietermaritzburg, 3200	Tel:	033 264 1062	E-mail:	nosipho.mkhize@umgeni.co.za
Name:	Nosipho Mkhize								
Address:	310 Burger Street , Pietermaritzburg, 3200								
Tel:	033 264 1062								
E-mail:	nosipho.mkhize@umgeni.co.za								
	<b>F.2.1 Eligibility</b>								
F.2.1	<p>uMngeni-uThukela will only consider submissions from tenderers who satisfy the following criteria:</p> <ol style="list-style-type: none"> <li>The tenderer completed the Bidders Disclosure Form (T2.2.2)</li> <li>Tenderers are required to achieve at least 35% Contract Participation Goals (CPG) including a minimum 10% Black Women participation and another 10% for Local participation of the value of goods, services and Works paid to one or more Enterprises (CPG Partner/s) as agreed with uMngeni-uThukela before contract award. Tenderers who are the main contractor are not exempt from this requirement and are still required to have a CPG Partner.</li> <li>The Tenderer must have a CIDB grading of 6CE or higher</li> <li>The tenderer must have all the following professionals in their project team: <ul style="list-style-type: none"> <li>Civil (Structural) Engineer/Technologist professionally registered with ECSA</li> <li>Mechanical Engineer/Technologist professionally registered with ECSA</li> <li>Chemical Engineer/Technologist professionally registered with ECSA</li> </ul> </li> </ol>								
	<b>F.2.7 Clarification meeting</b>								
F.2.7	<p>There shall be a compulsory clarification meeting. The details for which are stated in the Tender Notice and Invitation to Tender.</p>								

	Tenderers must sign the attendance list in the name of the tendering entity. Addenda will be issued to and tenders will be received only from those tendering entities appearing on the attendance list.
	<b>F.2.12 Alternative Tender offers</b>
F.2.12	No alternative Tender offers will be considered.
	<b>F.2.13 Submitting a Tender offer</b>
F.2.13.3	Parts of each Tender offer communicated on paper shall be submitted as an original
F.2.13.5 and F.2.13.7	<p>The Employer's details and address for delivery of Tender offers are stated in T1.1 <b>Tender Notice and Invitation to Tender.</b></p> <p><b>Identification details</b> The identification details which must be stated in the Tender offer outer package are:  <b>Tender Number</b>  <b>Title of Tender</b>  <b>Closing Date</b>  <b>Closing Time</b>  <b>Tenderer's Name</b>  <b>Tenderer's Address</b></p> <p>Tenders issued in more than one volume must be returned in the same manner and bound separately as per the Tender volumes issued.</p> <p><i>The Tender box is available to the public 24 hours per day and 7 days per week. It is the Tenderer's sole responsibility to ensure that Tenders are placed in the Tender box and only Tenders that have been placed in the Tender box before the stipulated closing date and time will be considered</i></p>
	<b>F2.13.6 Two Envelope tender Procedure</b>
F.2.13.6	A two-envelope system is not applicable
	<b>F.2.15 Closing time</b>
F.2.15	The closing time for submission of Tender offers is as stated in <b>T.1.1 Tender Notice and Invitation to Tender.</b>
	<b>F.2.16 Tender offer validity</b>
F.2.16.1	The Tender offer validity period is 120 calendar days from the closing date.
	<b>F.2.19 Inspections, tests and analysis</b>
F.2.19	<p>Access shall be provided for the following inspections, tests and analysis:</p> <p>The tenderer is required to arrange with the UUW Engineer for access to site.</p>
	<b>F.2.20 Submit securities, bonds, policies, etc.</b>
F.2.20	The Tenderer is required to submit with his Tender a letter of intent from an approved financial institution registered with the Financial Services Board undertaking to provide the PERFORMANCE GUARANTEE - DEMAND GUARANTEE to the format included in Part T2.2 of this procurement document.
	<b>F.2.23 Certificates</b>

TENDERING PROCEDURES  
T1.6.

F.2.23	The Tenderer is required to submit with his Tender: <ol style="list-style-type: none"> <li>1) A Tax Compliance Status letter (with pin) issued by the South African Revenue Services.</li> <li>2) Central Supplier Database (CSD) Report</li> <li>3) Proof of good standing in terms of the COID Act</li> <li>4) Company Registration Certificate</li> <li>5) Required evidence to claim preference goals as stipulated in <b>TENDER NOTICE AND INVITATION TO TENDER</b></li> <li>6) Valid CIDB certificate</li> </ol>															
<b>F.3.4 Opening of Tender submissions</b>																
F.3.4	Tenders will be opened immediately after the closing time for Tenders as stipulated in T1.1 Tender Notice and Invitation to Tender.															
<b>F3.8 Test for responsiveness</b>																
F.3.8	The minimum qualifying Functionality Evaluation Score shall be (70) seventy points															
<b>F.3.11 Evaluation of Tender offers</b>																
F.3.11.3	The procedure for the evaluation of responsive tenders is Method 2(Functionality, Price and Preference)															
F.3.11.3	The following preference point systems are applicable to all Tenders:															
(4c)	1) 80/20 system for Tenders with a Rand value less than R50 000 000.00, inclusive of VAT, in which 80 points are allocated for price and 20 points for preference in respect of all responsive Tenders received.; and															
(5c)	2) 90/10 system for Tenders with a Rand value more than R50 000 000.00, inclusive of VAT, in which 90 points are allocated for price and 10 points for preference in respect of all responsive Tenders received.															
F.3.11.7	Note: <ul style="list-style-type: none"> <li>- 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.</li> <li>- uMngeni-uThukela Water 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 uMngeni-uThukela Water.</li> </ul>															
F.3.11.9	The table below lists the returnable schedules that set out the scoring criteria and sub-criteria, and the percentage weighting for the score achieved against the relevant schedule: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">Returnable Schedule</th> <th style="text-align: center;">Weighting %</th> </tr> </thead> <tbody> <tr> <td>T2.2.09</td> <td>Tenderer's Experience</td> <td style="text-align: center;">30</td> </tr> <tr> <td>T2.2.11</td> <td>Experience of Key Personnel</td> <td style="text-align: center;">40</td> </tr> <tr> <td>T2.2.15</td> <td>Method Statement</td> <td style="text-align: center;">20</td> </tr> <tr> <td>T2.2.16</td> <td>Preliminary Programme</td> <td style="text-align: center;">10</td> </tr> </tbody> </table> <p><b><u>Failure to score a single point in any of the criteria listed above will deem the bid to be non-responsive and the bidder will be disqualified.</u></b></p> <p>The score allocated by each Bid Evaluation Committee member for a tender shall be the sum, of the scores relevant to each of the above listed returnable schedules multiplied by the percentage weighting for each as shown above.</p>	Returnable Schedule		Weighting %	T2.2.09	Tenderer's Experience	30	T2.2.11	Experience of Key Personnel	40	T2.2.15	Method Statement	20	T2.2.16	Preliminary Programme	10
Returnable Schedule		Weighting %														
T2.2.09	Tenderer's Experience	30														
T2.2.11	Experience of Key Personnel	40														
T2.2.15	Method Statement	20														
T2.2.16	Preliminary Programme	10														
<b>F.3.17 Provide copies of the contracts</b>																



TENDERING PROCEDURES  
T1.7.

F.3.17	The number of paper copies of the signed contract to be provided by the Employer is one (1).
<b>F3.18 Provide written reasons for actions taken</b>	
F3.18	Refer to Section 39 of the Supply Chain Management Policy.
<b>F3.19 Additional Conditions of Tender</b>	
F3.19	<p>Appeals Process</p> <p>Persons aggrieved by decisions or actions taken by uMngeni-uThukela Water, may lodge an appeal within 7 calendar days of the date of the intention to award advertisement appearing in the relevant print media.</p> <p>The appeal (clearly stating reasons for appeal) and queries with regard to the decision of award are to be directed, in writing only to the Supply Chain Management Office, Attention: Supply Chain Management Email: <a href="mailto:appeals@umgeni.co.za">appeals@umgeni.co.za</a></p> <p>Note that appeals not addressed to the abovementioned email will not be considered. <b><i>uMngeni-uThukela Water Reserves The Right To Award The Contract In Whole Or In Part, or not at all.</i></b></p>

FOR INFORMATION USE ONLY

## T2.1 LIST OF ALL RETURNABLE DOCUMENTS AND SCHEDULES

The Tenderer shall complete and submit the following returnable schedules and documents:

	Tenderer's Check List	Page No.
T2.2.1 Authority for Signatory		[T2.3 ]
T2.2.2 Bidders Disclosure		[T2.10 ]
T2.2.3 Tax Compliance Status Letter Requirements or CSD Report		[T2.13 ]
T2.2.4 Proof of Attendance at the Compulsory Clarification/Site Meeting		[T2.15 ]
T2.2.5 Contract Participation Goals (CPG)		[T2.16 ]
T2.2.6 Tenderer's Experience		[T2.19 ]
T2.2.7 Key Personnel Assigned to the Work		[T2.22 ]
T2.2.9 Experience of Key Personnel		[T2.30 ]
T2.2.10 Proposed Organization and Staffing		[T2.33 ]
T2.2.11 Tenderer's Schedule of Plant and Equipment	N/A	[T2.35 ]
T2.2.12 Quality Assurance and Environmental Management		[T2.36 ]
T2.2.13 Method Statement		[T2.38 ]
T2.2.14 Preliminary Programme		[T2.40 ]
T2.2.15 Registration Certificate / Agreement / ID Document		[T2.42 ]
T2.2.16 Amendments, Qualifications and Alternatives		[T2.43 ]
T2.2.17 Record of Addenda to Tender Documents		[T2.45 ]
T2.2.18 VAT Registration Certificate		[T2.46 ]
T2.2.19 Schedule of Proposed Sub-Contractors		[T2.47 ]
T2.2.20 Proof of Purchase of Tender Document		[T2.48 ]
T2.2.21 Goods and Services Sourced Internationally		[T2.49 ]
T2.2.22 SBD 6.1 Preference Points claim in terms of the PPPFA Regulations 2022		[T2.52]
T2.2.23 Letter of Good Standing in terms of COID Act		[T2.59 ]
T2.2.24 Tenderer's Financial Standing		[T2.60 ]
T2.2.25 Suppliers Health and Safety Declaration		[T2.61 ]
T2.2.26 Pro forma OHS Notification		[T2.62 ]
T2.2.27 Letter of Intent for Public Liability		[T2.64 ]
T2.2.28 Letter of Intent for Performance Guarantee		[T2.65 ]
T2.2.29 Registration Certificates		[T2.66 ]
[T2.2.30 Central Supplier Database (CSD) Report ]	[ ]	[T2.67 ]

**T2.2.1 AUTHORITY FOR SIGNATORY**

*Fill in the relevant portion applicable to the type of organization*

**A. COMPANIES**

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

**AUTHORITY BY BOARD OF DIRECTORS**

By resolution passed by the Board of Directors on ..... 20.....

Mr/Mrs ..... (whose signature appears below) has been duly authorized to sign all documents in connection with this Tender on behalf of

(Name of Company) .....

**IN HIS/HER CAPACITY AS:** .....

**SIGNED ON BEHALF OF COMPANY:** .....  
**(PRINT NAME)**

**SIGNATURE OF SIGNATORY:** ..... **DATE:** .....

**WITNESSES:** .....

FOR INFORMATION USE ONLY



**C. SOLE PROPRIETOR (ONE - PERSON BUSINESS)**

I, the undersigned .....

hereby confirm that I am the sole owner of the business trading as

.....

.....  
**SIGNATURE**

.....  
**DATE**

FOR INFORMATION USE ONLY



**D. PARTNERSHIP**

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

Full name of Partner	Residential Address	Signature
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

We, the partners in the business trading as .....

hereby authorize .....  
 to sign this Tender as well as any contract resulting from the Tender and any other documents and correspondence in connection with this Tender and /or contract on behalf of

..... Signature	..... Signature	..... Signature
..... Date	..... Date	..... Date

FOR INFORMATION USE ONLY

**E. CLOSE CORPORATION**

In the case of a close corporation submitting a Tender, a certified copy of the Founding Statement of such corporation shall be included with the Tender, together with the resolution by its members authorizing a member or other official of the corporation to sign the documents on their behalf.

By resolution of members at a meeting on .....  
20 .....

at  
.....

Mr/Ms ....., whose signature appears below, has been authorized to sign all documents in connection with this Tender on behalf of (Name of Close Corporation)

.....  
.....

**SIGNED ON BEHALF OF CLOSE CORPORATION:**

(PRINT NAME) .....

**IN HIS/HER CAPACITY AS** ..... **DATE:** .....

**SIGNATURE OF SIGNATORY:** .....

**WITNESSES:** 1. ....

2. ....

FOR INFORMATION USE ONLY

**G. CO-OPERATIVE**

A certified copy of the Constitution of the co-operative must be included with the Tender, together with the resolution by its members authoring a member or other official of the co-operative to sign the Tender documents on their behalf.

By resolution of members at a meeting on .....  
20 .....

at .....

Mr/Ms ....., whose signature appears below, has been authorized to sign all documents in connection with this Tender on behalf of (Name of Co-Operative)

.....

**SIGNATURE OF AUTHORIZED REPRESENTATIVE/SIGNATORY:**

(PRINT NAME) .....

**IN HIS/HER CAPACITY AS** .....

**DATE:** .....

**SIGNED ON BEHALF OF CO-OPERATIVE:** .....

**NAME IN BLOCK LETTERS:** .....

**WITNESSES:** 1. ....

2. ....

FOR INFORMATION USE ONLY

**H. JOINT VENTURE**

If a tenderer is a joint venture, a certified copy of the resolution/agreement passed/reached signed by the duly authorised representatives of the enterprises, authorising the representatives who sign this tender to do so, as well as to sign any contract resulting from this tender and any other documents and correspondence in connection with the tender and/or contract on behalf of the joint venture must be submitted with this tender, before the closing time and date of the tender.

Authority to sign on behalf of the Joint Venture:

By resolution/agreement passed/reached by the joint venture partners on .....20.....

Mr/Mrs ....., Mr/Mrs .....

Mr/Mrs .....and Mr/Mrs .....  
 (whose signatures appear below) have been duly authorised to sign all documents in connection with this tender on behalf of:

(Name of Joint Venture) .....

In his/her capacity as: .....

Signed on behalf of (COMPANY NAME): .....  
 (PRINT NAME)

Signature ..... Date: .....

In his/her capacity as: .....

Signed on behalf of (COMPANY NAME): .....  
 (PRINT NAME)

Signature ..... Date: .....

In his/her capacity as: .....

Signed on behalf of (COMPANY NAME): .....  
 (PRINT NAME)

Signature ..... Date: .....

In his/her capacity as: .....

Signed on behalf of (COMPANY NAME): .....  
 (PRINT NAME)

Signature ..... Date: .....



**I. CONSORTIUM**

If a tenderer is a consortium, a certified copy of the resolution/agreement passed/reached signed by the duly authorised representatives of the enterprises, authorising the representatives who sign this tender to do so, as well as to sign any contract resulting from this tender and any other documents and correspondence in connection with the tender and/or contract on behalf of the consortium must be submitted with this tender, before the closing time and date of the tender.

Authority to sign on behalf of the consortium:

By resolution/agreement passed/reached by the consortium partners on ..... 20 .....

Mr/Mrs ..... ,  
(whose signature appears below) have been duly authorised to sign all documents in connection with this tender on behalf of:

(Name of Consortium) .....

In his/her capacity as: .....

Signature ..... Date: .....

**NB: FAILURE TO COMPLETE, SIGN AND DATE THE RESOLUTION AS OUTLINED ABOVE MAY RESULT IN THE TENDERER RENDERED INCOMPLETE AND MAY BE DISQUALIFIED/ALTERNATIVELY THE TENDERER MAY ATTACH A SIGNED RESOLUTION ON THE ENTITY'S LETTERHEAD**

**T2.2.2 BIDDER’S DISCLOSURE**

**1. PURPOSE OF THE FORM**

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

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

**2. BIDDER’S DECLARATION**

2.1 Is the bidder, or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest<sup>1</sup> in the enterprise, employed by the state? **YES/NO**

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

Full Name	Identity Number	Name of State institution

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

2.2.1 If so, furnish particulars:

.....  
 .....

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

2.3 Does the bidder or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest in the enterprise have any interest in any other related enterprise whether or not they are bidding for this contract? **YES/NO**

2.3.1 If so, furnish particulars:

.....  
.....

**3 DECLARATION**

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

- 3.1 I have read and I understand the contents of this disclosure;
- 3.2 I understand that the accompanying bid will be disqualified if this disclosure is found not to be true and complete in every respect;
- 3.3 The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium<sup>2</sup> will not be construed as collusive bidding.
- 3.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.
- 3.4 The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.
- 3.5 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.
- 3.6 I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

<sup>2</sup> 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.

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT.  
I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

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

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### T2.2.3 TAX COMPLIANCE STATUS LETTER REQUIREMENTS

It is a condition of a Tender that the taxes of the successful Tenderer **must** be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the Tenderer's tax obligations.

- Bidders must ensure compliance with their tax obligations.
- Bidders are required to submit their unique personal identification number (pin) issued by SARS to enable the organ of state to verify the taxpayer's profile and tax status.
- Application for Tax Compliance Status (TCS) pin may be made via e-filing through the SARS website [www.sars.gov.za](http://www.sars.gov.za).
- Bidders may also submit a printed TCS certificate together with the bid.
- In bids where consortia / joint ventures / sub-contractors are involved, each party must submit a separate TCS certificate / pin / CSD number.
- Where no TCS is available but the bidder is registered on the Central Supplier Database (CSD), a CSD number must be provided.
- No bids will be considered from persons in the service of the state, companies with directors who are persons in the service of the state, or close corporations with members in the service of the state.

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**T2.2.3 TAX COMPLIANCE STATUS LETTER REQUIREMENTS (Continued.....)**

**[Tax Compliance Status (TCS) Letter *obtained from SARS to be inserted here*]**

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**T2.2.4 PROOF OF ATTENDANCE AT THE COMPULSORY CLARIFICATION / SITE MEETING**

**CERTIFICATE OF ATTENDANCE**

TENDER No. [ 2024/143 ]

This is to certify that

(Tenderer) .....

of (address) .....

.....  
 .....

was represented by the person(s) named below at the compulsory meeting held for all Tenderers at (location).....

..... on (date) .....

starting at (time) .....

I / We acknowledge that the purpose of the meeting was to acquaint myself / ourselves with the site of the works and / or matters incidental to doing the work specified in the Tender documents in order for me / us to take account of everything necessary when compiling our rates and prices included in the Tender.

**Particulars of person(s) attending the meeting:**

Name: ..... Signature: .....

Capacity: .....

Name: ..... Signature: .....

Capacity: .....

**Attendance of the above person(s) at the meeting is confirmed by the Purchaser's representative, namely:**

Name: ..... Signature: .....

Capacity: ..... Date and Time: .....

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## T2.2.5 CONTRACT PARTICIPATION GOALS

### Objective

The objective of uMngeni-uThukela Water's empowerment initiative is to bring about meaningful transformation in all procurement projects and in particular in the built environment / construction and consulting industry through achieving one or more of the following objectives:

- Meaningful Economic Participation;
- Local Economic Development;
- Transfer of Technical, Management and Entrepreneurial Skills; and
- Creation of sustainable Black Enterprises

### Contract Participation Goals

Contract Participation Goal (CPG) – the **final** value of services paid to the CPG Partner/s based on the **final** contract value.

At the time of awarding the contract the 35% minimum CPG amount will be based on the contract award value exclusive of the following:

- VAT, CPA and Contingencies.

During contract implementation, adjustments relating to Provisional Sums and Contingencies linked to the CPG allocation will be agreed upon between the parties to the contract, as and when the need arises.

**CPG Partner/s** – Service provider/s selected from uMngeni-uThukela Water's Supply Chain Management (SCM) Enterprise Development Database. However, should the database not contain suitable CPG Partner/s, the tenderer may propose suitable CPG Partner/s for uMngeni-uThukela Water's consideration.

Tenderers (the main contractor irrespective of BBBEE classification) who are on uMngeni -uThukela Water's SCM Enterprise Development Database are not exempt from this requirement and are still required to have a CPG Partner.

Tenderers are required to achieve at least 35% Contract Participation Goals (CPG) including a minimum 10% Black Women participation and another 10% for Local participation and another 10% for Local participation of the value of goods, services and Works paid to one or more enterprises (CPG Partner/s)

- 35% includes any special materials
- 35% excludes VAT, CPA and Contingencies.
- The tenderer will be required to achieve the actual Rand value committed for CPG, adjusted according to the following:
  - Variation Orders – Each VO will be evaluated by the Employer's Agent and the Project Manager to determine whether it should be counted, in its entirety or partially, as part of CPG or not.
  - Re-measurable Items (including CPA, and provisional sums) – Each re-measurable item change will be evaluated by the Employer's Agent and the Project Manager to determine whether it should be counted as part of CPG or not.

Within 2 weeks of the award of contract, the tenderer will be required to submit a cash flow projection for the main contractor and the CPG Partner/s

### Applicability

The CPG target is applicable to all contracts to be adjudicated through uMngeni-uThukela Water's procurement process and shall be achieved through the following mechanisms:-

- CPG Partner/s selection is concluded **after** adjudication of tenders and **before** contract award is made.
- The CPG Partner/s shall be selected according to the following criteria:



- CPG Partner/s are to be obtained from uMngeni-uThukela Water's database of suppliers specifically earmarked for CPG purposes.
- In the event of services where uMngeni-uThukela Water does not have an applicable service provider on its database, the tenderer may propose a suitable CPG Partner/s for consideration by uMngeni-uThukela Water.
- Main service provider may propose a suitable CPG Partner/s, but uMngeni-uThukela Water reserves the right to provide or arrange a CPG Partner/s to work with the successful company.
- Sub-contracting of the CPG Partner/s at the same rate / price that the tenderer would have offered to uMngeni-uThukela Water whilst making profit margins consistent to the profit margins that the main contractor would have made under normal trading processes.
- Value of the work to be sub contracted shall be at least **35% (minimum of 10% shall be due to Black Women participation and another 10% for Local participation and another 10% for Local participation)** of the total contract value excluding VAT, CPA and Contingencies.
- CPA is payable to the CPG Partner/s as per the indices stipulated in the contract document.
- The work allocated to the CPG Partner shall be performed by the CPG Partner directly and may not be allocated or sub-contracted out to other contractors/consultants/service providers.
- The main contractor **shall not** substitute any CPG Partner/s without the written approval of uMngeni-uThukela Water.
- The working capital arrangements between the main contractor and the CPG Partner/s must be agreed upon between the two parties prior to commencement of works to ensure that the CPG Partner does not have cash flow challenges during contract implementation.

### Invoicing and Payment

The monthly measurement and payment will be according to the following guideline:

- Submission of payment certificate to the Employer's Agent by the Contractor – by 20<sup>th</sup> of each month, or the nearest previous working day. The submission from the contractor shall include the signature of the CPG Partner indicating agreement with the measurements and rates applicable to the work undertaken by the CPG Partner.
- I. Submission to uMngeni-uThukela by the Employer's Agent – by 25<sup>th</sup> of each month, or the nearest previous working day;
- II. Payment to the Contractor – on the last day of the following month;
- III. The CPG Partner must be paid within reasonable time but no later than 3 working days after the Main Contractor has been paid by uMngeni-uThukela Water; and
- IV. The submission from the Contractor must include a schedule that clearly shows the following:
  - Total Contract Sum
  - Total amount payable to CPG Partner/s excluding current month
  - Amount payable to CPG Partner for current month
  - % split of Total amount payable to Main contractor and CPG Partner/s

### Monitoring and Reporting on CPG

- uMngeni-uThukela Water will monitor CPG implementation on site. This may include direct contact with CPG Partner/s on site for verification purposes.
- The CPG Partner shall be in agreement with the measurement and payment for work completed, for the purposes of submitting payment certificates, as determined by the Contractor. Should disagreements arise, uMngeni-uThukela Water reserves the right to intervene to resolve the disagreement.
- CPG Partner/s shall attend all contractual meetings relevant to their scope of work including contract award negotiations, monthly contract site meetings and technical meetings.

### Eligibility Criteria

For tenders where the CPG target is applicable, those that do not offer a **minimum** CPG participation of **35%** (including minimum 10% Black Women participation and another 10% for Local participation) according to the requirements mentioned above, will be deemed **ineligible**.

## DECLARATION REGARDING CONTRACT PARTICIPATION GOALS

I, the undersigned, in submitting the accompanying bid:

\_\_\_\_\_ (Bid Number and Description)

in response to the invitation for the bid made by: **UMNGENI-UTHUKELA WATER** do hereby make the following declaration and certify the statements contained herein 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 Declaration and the fully completed bid document accompanying this declaration;
2. I understand and declare that the accompanying bid will, and must, be disqualified if this Declaration is found not to be true and complete in every respect;
3. I understand and declare that in the event that this bid is successful, I will be required to, and shall, fully implement the commitments that are submitted with this bid, in particular regarding the Bidder's contract participation goals and commitments towards the allocation of certain portion of the contract to small and emerging entities (CPG Partner/s). Failure to implement such commitments as outlined in the bid document (in particular, as detailed in the bill of quantities) and or failure to provide the relevant information within the prescribed period as determined in the Letter of Intention to Award the Bid, shall automatically disqualify this bid from further consideration and the Employer has the right to, and must, then award the bid to the next highest ranked bidder; and as a result I or the bidder or any of its directors shall have no recourse against uMngeni-uThukela Water.
4. I am authorized by the bidder to sign this Declaration, and to submit the accompanying bid, on behalf of the bidder;
5. 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;
6. I am aware that, and do consent to, the disqualification of my or the bidder's future bids with uMngeni-uThukela in the event that the commitments made herein are not fulfilled and that such non-fulfillment amounts to abuse of uMngeni-uThukela Water's supply chain policies and procedures and/or empowerment objectives which must be penalized, over and above the contractual sanctions as agreed to in line with the contract signed with uMngeni-uThukela Water, with a sanction of restricting me and or my company (the bidder) and or any of its directors from conducting business with uMngeni-uThukela Water for a period not exceeding ten (10) years.
7. I consent that should my company (the Bidder) deviate from the commitments and the spirit of the CPG objectives as agreed to, shall amount to a repudiation of the contractual arrangement between the two parties (uMngeni-uThukela Water and the Bidder); and uMngeni-uThukela Water shall have the right to terminate the contract with immediate effect and without giving my company (the Bidder) prior notice to remedy the breach.

\_\_\_\_\_  
Full Names & Surname  
(Duly authorized)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Position

\_\_\_\_\_  
Name of Bidder



Scoring of the Tenderer's experience will be as follows: [ 30 ]

DESCRIPTION	MAX POSSIBLE SCORE
<p>Company experience in projects comprising of construction and rehabilitation of civil structures and/or structural concrete water and waste retaining structures to the value more than R5 000 000.00 (submit proof of previous experience, completion certificates and award letters).</p> <ul style="list-style-type: none"> <li>• 2 projects – 25 points</li> <li>• 3 projects – 35 points</li> </ul> <p>5 additional points for every project more than 3 projects to a maximum of 50 points</p> <p>Company experience in projects comprising of mechanical work, structural steel fabrication and installation to the value more than R5 000 000.00 (submit proof of previous experience, completion certificates and award letters).</p> <ul style="list-style-type: none"> <li>• 2 projects – 25 points</li> <li>• 3 projects – 35 points</li> </ul> <p>5 additional points for every project more than 3 projects to a maximum of 50 points</p> <p><b>Award letter and completion certificates must be attached as proof on all projects. No points will be awarded if no proof is submitted.</b></p>	<p><b>100</b></p>

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**T2.2.6 TENDERER'S EXPERIENCE (Continued)**

INSERT HERE

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**T2.2.7 KEY PERSONNEL ASSIGNED TO THE WORK**

Insert in the table below the key personnel and their proposed function

**KEY PERSONNEL SCHEDULE**

No.	Proposed Function	Key Person Name
1.	Civil (Structural) Engineer/Technologist	
2.	Mechanical Engineer/Technologist	
3.	Chemical Engineer/Technologist	
4.	Foreman	

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**T2.2.8 EXPERIENCE OF KEY PERSONNEL**

Provide relevant information as prescribed below for the following Key Persons proposed in the tender to fulfil the following positions:

**Key Person Positions**

- A. Civil (Structural) Engineer/Technologist**
- B. Mechanical Engineer/Technologist**
- C. Chemical Engineer/Technologist**
- D. Foreman**

The experience of each key person, relevant to the scope of work, will be evaluated from the points below:

- 1) General experience (total duration of activity), level of education and training and positions held by the key person.
- 2) The education, training and experience of the person, in the specific sector, field, subject, etc. which is directly linked to the scope of work.

A CV of each key person of not more than 3 pages should be attached to this schedule.

Each CV should be structured under the following headings:

1. Personal particulars
  - name
  - date and place of birth
  - place (s) of tertiary education and dates associated therewith
2. Qualifications
3. Name of current employer and position in enterprise
4. Overview last 10 years of experience (year, organization, position and projects)
5. Outline of recent assignments / experience that has a bearing on the scope of work

The scoring of the experience of key staff will be as follows: [ 30 ]

<p>The proposed study team for the study including CV's showing experience in projects of a similar nature.</p> <p><b>Experience of Civil (Structural) Engineer/Technologist on successful design and inspection of structural concrete water retaining structures (minimum NQF Level 7 and ECSA registration as an Engineer or Technologist)</b></p> <ul style="list-style-type: none"> <li>• 1 project – 6 points</li> <li>• 2 projects – 10 points</li> <li>• 3 projects – 14 points</li> </ul> <p>2 additional points for every project more than 3 projects to a maximum of 20 points</p> <p><b>Experience of Mechanical Engineer/Technologist on successful design of structural steel fabrication and installation (minimum NQF Level 7 and ECSA registration as an Engineer or Technologist)</b></p> <ul style="list-style-type: none"> <li>• 1 project – 6 points</li> <li>• 2 projects – 10 points</li> <li>• 3 projects – 14 points</li> </ul> <p>2 additional points for every project more than 3 projects to a maximum of 20 points</p>	<p><b>100</b></p>
---	-------------------

<p><b>Experience of Chemical Engineer/Technologist on successful design of treatment process in the water and or waste water treatment process (minimum NQF Level 7 and ECSA registration as an Engineer or Technologist)</b></p> <ul style="list-style-type: none"> <li>• 1 project – 6 points</li> <li>• 2 projects – 10 points</li> <li>• 3 projects – 14 points</li> </ul> <p>2 additional points for every project more than 3 projects to a maximum of 20 points</p> <p><b>Experience of Foreman with experience in concrete and/or steel structures (minimum NQF Level 6- N Dip in Civil Engineering)</b></p> <ul style="list-style-type: none"> <li>• 2 projects – 14 points</li> <li>• 3 projects – 21 points</li> <li>• 4 projects – 28 points</li> </ul> <p>4 additional points for every project more than 4 projects to a maximum of 40 points</p>	
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**T2.2.8 EXPERIENCE OF KEY PERSONNEL (Continued)**

**INSERT KEY PERSONNEL CVs HERE**

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## T2.2.9 PROPOSED ORGANIZATION AND STAFFING- NOT APPLICABLE

The Tenderer should propose the structure and composition of their team i.e. the main disciplines involved, the key staff member / expert responsible for each discipline, and the proposed technical and support staff and site staff. The roles and responsibilities of each key staff member / expert should be set out as job descriptions. In the case of an association / joint venture / consortium, it should, indicate how the duties and responsibilities are to be shared.

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**T2.2.9 PROPOSED ORGANIZATION AND STAFFING (Continued)**

INSERT HERE

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**T2.2.10 TENDERER'S SCHEDULE OF PLANT AND EQUIPMENT – NOT APPLICABLE [ ]**

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

- (a) **Details of major equipment that is owned by me / us and immediately available for this contract.**

DESCRIPTION (type, size, capacity etc.)	QUANTITY	YEAR OF MANUFACTURE

*Attach additional pages if more space is required*

- (b) **Details of major equipment that will be hired, or acquired for this contract if my / our Tender is accepted**

DESCRIPTION (type, size, capacity etc.)	QUANTITY	HOW ACQUIRED	
		HIRE/BUY	SOURCE

*Attach additional pages if more space is required*

The Tenderer undertakes to bring onto site without additional cost to the Employer any additional plant not listed but which may be necessary to complete the contract within the specified contract period.

**Failure to complete this form properly and correctly, will lead to the conclusion that the Tenderer does not have the necessary plant and equipment resources at its disposal, which will prejudice its Tender.**

SIGNATURE: ..... DATE: .....  
(of person authorized to sign on behalf of the Tenderer)



**T2.2.11 QUALITY ASSURANCE AND ENVIRONMENTAL MANAGEMENT- NOT TO BE SCORED BUT MUST BE SUBMITTED AS A RETURNABLE DOCUMENT**

1. Does the Tenderer have a quality management system which is certified in terms of ISO 9001: 2015 ..... 

YES	NO
-----	----

2. If "yes", Tenderer to supply brief summary of structure of system:  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

3. If "no", does the Tenderer intend to apply for certification? ..... 

YES	NO
-----	----

  
By when? ..... 

Date
------

OR

4. If "no", does the Tenderer have its own system? ..... 

YES	NO
-----	----

5. If "yes", please supply details of the system .....  
.....  
.....  
.....  
.....  
.....

6. Does the Tenderer have an environmental management system which is certified in terms of ISO 14001 ..... 

YES	NO
-----	----

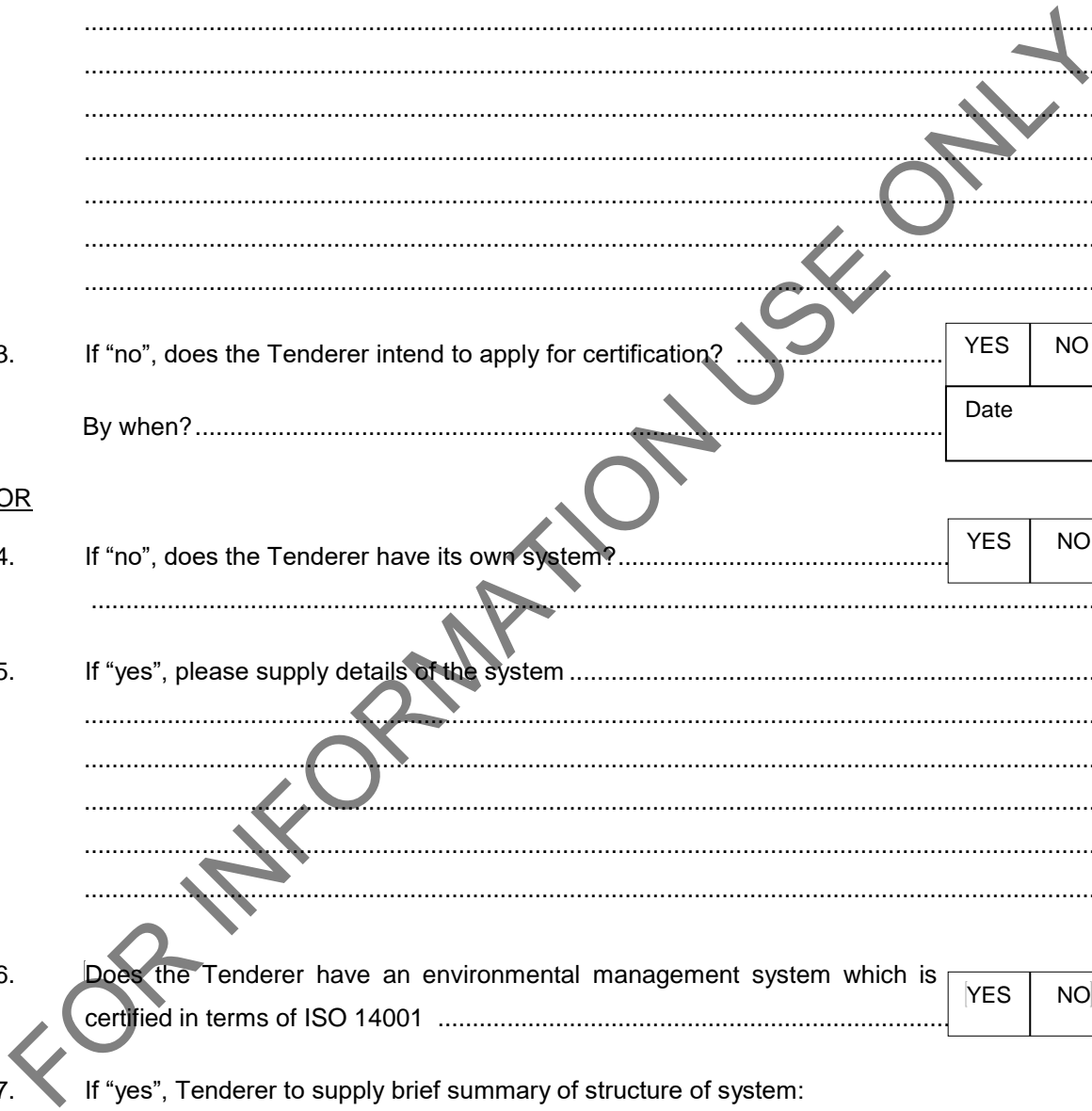
7. If "yes", Tenderer to supply brief summary of structure of system:  
.....  
.....  
.....  
.....  
.....  
.....

8. If "no", does the Tenderer intend to apply for certification? ..... 

YES	NO
-----	----

  
Date ..... 

Date
------





By when?.....

OR

9. If “no”, does the Tenderer have its own system?..... 

YES	NO
-----	----

10. If “yes”, please supply details of the system .....  
.....  
.....  
.....  
.....

If the Tenderer does not intend to apply for certification it shall submit details of the quality / environmental management system presently in place. |

**The Tenderer shall insert here a copy of the company’s quality assurance plan, control procedures and the relevant documentation supporting its commitment to environmental management. The successful Tenderer shall furnish the Employer a detailed Quality Control Plan (QCP) and Procedure for all materials, such as valves, pumps, motors, pipes, specials and fittings for approval prior to any fabrication, coating, lining and delivery. In the event of these documents being too extensive to be included in the procurement document, an abbreviated version of the master document will be included, referring to the master document.**

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## T2.2.12 METHOD STATEMENT [ 20 ]

The method statement must respond to the Scope of Work and outline the proposed approach / methodology. The method statement should articulate what value the Tenderer will add in achieving the stated objectives for the project.

The Tenderer must explain his / her understanding of the objectives of the assignment and the Purchaser's stated and implied requirements, highlight the issues of importance, and explain the technical approach they would adopt to address them. The approach paper should explain the methodologies which are to be adopted, demonstrate the compatibility of those methodologies with the proposed approach. The approach should also include a quality plan which outlines processes, procedures and associated resources, applied by whom and when, to meet the requirements and indicate how risks will be managed and what contribution can be made regarding value management.

The enclosed scope of work is to be implemented in a brownfield and live system environment, therefore the proposed method statement shall be drafted in this view, with the following noted:

### Site A – Pre-thickener and staircase

- The pre-thickener is currently offline and locked-out due to its failed and unsafe state. The access and work plan should deal with all risks associated with working on heights and sewage handling around this process unit.
- The Staircase is approximately 20 meters high (from ground level) and the area is exposed to gases such as Methane.
- This unit also requires the ability to work at an elevated heights and in the chemical exposed environment therefore precautions are to be considered.
- A detailed understanding of the site operation will be crucial for the work method statement development, to ensure the risk mitigation and proper work plan.
- The site is a sewer purification plant: the planning and access to site will have to be properly done to ensure control.
- The use of site facilities will require proper planning and prior approval.

### Site B – Clarendon Reservoir

- The reservoir is a live system currently in-use and will be required to be shut down during the project implementation.
- The customer demands remain, therefore the work should be expedited to ensure the system is resuscitated without causing major challenges with the water supply scheme.
- This unit also requires the ability to work at an elevated heights and in the remote environment.
- The access to site is through heavy vegetation, nature and environmental requirement will have to be taken into consideration prior and during work execution and post work execution.

The tenderer is required to submit two separate method statements for Site A and B described above, and in their method statements the approach should include but not limited to the following:

- ✓ **Project programming**
  - Sequence of construction
  - Fit project deliverable timelines
- ✓ **Quality management system**
  - Concrete works
  - Steel and GRP fabrication
  - Factory Acceptance Test (FAT)
- ✓ **Outline the plant and equipment to be used during the implementation of the project**
  - Schedule of plant and material
- ✓ **Operational environment**
  - Working on heights
  - Working in the vicinity of gas emissions (methane and other gases) - Site A
  - Working in the sewage exposed environment – Site A
  - Working on a live or operational system where work has to be accelerated
  - Working in the remote areas where access is challenging, especially in rainy weather – Site B

- Access controlled environment, permits for access will be granted prior
- ✓ Shutdown planning, testing and commissioning

The Tenderer must attach his / her approach paper to this page. The approach paper should not be longer than 8 pages.

The scoring of the approach paper will be as follows: [ 20 ]

Technical approach and methodology	
<b>No submission (score 0)</b>	No Method Statement submitted
<b>Poor (score 40)</b>	The technical approach and / or methodology is poor / is unlikely to satisfy project objectives or requirements. The Tenderer has misunderstood certain aspects of the scope of work and does not deal with the critical aspects of the project.
<b>Satisfactory (score 70)</b>	The approach is generic but tailored to address the general project objectives and methodology. The approach deals with the critical characteristics of the project.
<b>Good (score 90)</b>	The approach is specifically tailored to address the specific project objectives and methodology and is sufficiently flexible to accommodate changes that may occur during execution. The quality plan and approach to managing risk is specifically tailored to the critical characteristics of the project.
<b>Very good (score 100)</b>	Besides meeting the “good” rating, the important issues are approached in an innovative and efficient way, indicating that the Tenderer has outstanding knowledge of state-of-the- art approaches. The approach paper details ways to improve the project outcomes and the quality of the outputs.



---

**T2.2.12 METHOD STATEMENT (Continued)**

**INSERT HERE**

FOR INFORMATION USE ONLY

**T2.2.13 PRELIMINARY PROGRAMME (10)**

The Tenderer shall detail below or attach a preliminary programme reflecting the proposed sequence and tempo of execution of the main work components. The programme shall be in accordance with the information supplied in the Contract, requirements of the Project Specifications and with all other aspects of his Tender.

The Preliminary Programme must demonstrate the following:

- Fits project deliverable timelines;
- Work sequencing;
- Shutdown scheduling;
- Important activities are scheduled and detailed;
- Optimized use of resources and demonstration of how resources will be utilized/split/shared effectively and efficiently between the two sites (Darvill and Reservoir);
- Work plan permits flexibility to accommodate contingencies.

The contract should note that the contract is required to be completed, commissioned and handed over to the Purchaser by the date specified in the contract data.

PROGRAMME											
Component / sub component	WEEKS / MONTHS										

**Note:** The programme must be based on the completion time as specified in the Contract Data. No other completion time that may be indicated on this programme will be regarded as an alternative offer, unless it is listed in supported by a detailed statement to that effect, all as specified in the Tender Data.

Scoring of the preliminary programme will be as follows: [ 10 ]

	Suitability of programme
<b>No submission (score 0)</b>	No preliminary programme submitted
<b>Poor (score 40)</b>	Programme is inadequate and/or considered unrealistic and does not achieve required completion date
<b>Satisfactory (score 70)</b>	Programme is considered realistic and adequately shows the main components and compliance with completion date
<b>Good (score 90)</b>	Programme is considered realistic and includes the main components and sub components and compliance with completion date
<b>Very good (score 100)</b>	Programme is considered realistic and includes the main components and subcomponents and linkages and compliance with completion date

---

**T2.2.13 PRELIMINARY PROGRAMME (Continued)**

**INSERT HERE**

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**T.2.2.14 REGISTRATION CERTIFICATE / AGREEMENT / ID DOCUMENT**

***Important note to Tenderer: The relevant supporting documents to the organization tendering i.e. Registration Certificates for Companies, Close Corporations and Partnerships, or Agreements and Powers of Attorney for Joint Ventures and Consortiums, or ID documents for Sole Proprietors, all as referred to in the foregoing forms and in T2.1, must be inserted here***

**INSERT HERE**

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**T2.2.15 AMENDMENTS, QUALIFICATIONS AND ALTERNATIVES**

*(This is not an invitation for amendments, deviations or alternatives but should the Tenderer desire to make any departures from the provisions of this contract he shall set out his proposals clearly hereunder. uMngeni-uThukela Water will not consider any amendment, alternative offers or discounts unless forms (a), (b) and (c) have been completed to the satisfaction of the Purchaser).*

I / We herewith propose the amendments, alternatives and discounts as set out in the tables below:

**(a) AMENDMENTS [NOT APPLICABLE]**

PAGE, CLAUSE OR ITEM NO.	PROPOSED AMENDMENT

- [Notes: (1) Proposals for amendments to the General and Special Conditions of Contract are not acceptable, and will be ignored;  
(2) The Tenderer must give full details of all the financial implications of the amendments and qualifications in a covering letter attached to his Tender.*

**(b) ALTERNATIVES - NOT APPLICABLE**

PROPOSED ALTERNATIVE	DESCRIPTION OF ALTERNATIVE

- [Notes: (1) Individual alternative items that do not justify an alternative Tender, and an alternative offer for time for completion should be listed here.  
(2) In the case of a major alternative to any part of the work, a separate Bill of Quantities, programme, etc., and a detailed statement setting out the salient features of the proposed alternatives must accompany the Tender.  
(3) Alternative Tenders involving technical modifications to the design of the works and methods of construction shall be treated separately from the main Tender offer.]*

(c) UNCONDITIONAL DISCOUNTS

ITEM ON WHICH DISCOUNT IS OFFERED	DESCRIPTION OF DISCOUNT OFFERED

**[Note: The Tenderer must give full details of the discounts offered in a covering letter attached to his Tender, failing which, the offer for a discount may have to be disregarded.]**

Signature..... Date.....

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**T2.2.17 VAT REGISTRATION CERTIFICATE**

*[VAT Registration Certificate obtained from SARS to be inserted here]*

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**T2.2.18 SCHEDULE OF PROPOSED SUB-CONTRACTORS**

**Important note to Tenderer: The relevant supporting documents to the organization tendering i.e. Registration Certificates for Companies, Close Corporations and Partnerships, or Agreements and Powers of Attorney for Joint Ventures and Consortiums, or ID documents for Sole Proprietors, all as referred to in the foregoing forms and in T2.1, must be inserted here**

We notify you that it is our intention to employ the following Sub-Contractors for work in this contract. If we are awarded a contract we agree that this notification does not change the requirement for us to submit the names of proposed Sub-Contractors in accordance with requirements in the contract for such appointments. If there are no such requirements in the contract, then your written acceptance of this list shall be binding between us.

	Name and address of proposed Sub-Contractor	Nature and extent of work	Previous experience with Sub-Contractor
1.			
2.			
3.			
4.			
5.			

Signature ..... Date .....

Name ..... Position .....

Tenderer .....

---

**T2.2.19 PROOF OF PURCHASE OF TENDER DOCUMENT** [ ]

**INSERT HERE**

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## T2.2.20 GOODS AND SERVICES SOURCED INTERNATIONALLY

### INTRODUCTION

The National Industrial Participation (NIP) Programme, which is applicable to all government procurement contracts that have an imported content, became effective on the 1 September 1996. The NIP policy and guidelines were fully endorsed by Cabinet on 30 April 1997. In terms of the Cabinet decision, all state and State Owned Entity purchases / lease contracts (for goods, works and services) entered into after this date, are subject to the NIP requirements. NIP is obligatory and therefore must be complied with. The Industrial Participation Secretariat (IPS) of the Department of Trade and Industry (DTI) is charged with the responsibility of administering the programme.

### 1. PILLARS OF THE PROGRAMME

1.1 The NIP obligation is benchmarked on the imported content of the contract. Any contract having an imported content equal to or exceeding US\$ 10 million or other currency equivalent to US\$ 10 million will have a NIP obligation. This threshold of US\$ 10 million can be reached as follows:

- (a) Any single contract with imported content exceeding US\$10 million.  
or
- (b) Multiple contracts for the same goods, works or services each with imported content exceeding US\$3 million awarded to one seller over a 2 year period which in total exceeds US\$10 million.  
or
- (c) A contract with a renewable option clause, where should the option be exercised the total value of the imported content will exceed US\$10 million.  
or
- (d) Multiple Contractors of the same goods, works or services under the same contract, where the value of the imported content of each allocation is equal to or exceeds US\$ 3 million worth of goods, works or services to the same government institution, which in total over a two (2) year period exceeds US\$10 million.

1.2 The NIP obligation applicable to Contractors in respect of sub-paragraphs 1.1 (a) to 1.1 (c) above will amount to 30 % of the imported content whilst Contractors in respect of paragraph 1.1 (d) shall incur 30% of the total NIP obligation on a pro-rata basis.

1.3 To satisfy the NIP obligation, the DTI would negotiate and conclude agreements such as investments, joint ventures, sub-contracting, licensee production, export promotion, sourcing arrangements and research and development (R&D) with partners or Contractors.

1.4 A period of seven years has been identified as the time frame within which to discharge the obligation.

### 2. REQUIREMENTS OF THE DEPARTMENT OF TRADE AND INDUSTRY

2.1 In order to ensure effective implementation of the programme, successful tenderers (Contractors) are required to, immediately after the award of a contract that is in excess of R10 million (ten million Rands), submit details of such a contract to the DTI for reporting purposes.

2.2 The purpose for reporting details of contracts in excess of the amount of R10 million (ten million Rands) is to cater for multiple contracts for the same goods, works or services; renewable contracts and multiple Contractors for the same goods, works or services under the same contract as provided for in paragraphs 1.1.(b) to 1.1. (d) above.

### 3. TENDER SUBMISSION AND CONTRACT REPORTING REQUIREMENTS OF TENDERERS AND SUCCESSFUL TENDERERS (CONTRACTORS)

3.1 Tenderers are required to sign and submit this Section together with the tender on the closing date and time.

3.2

3.3 In order to accommodate multiple contracts for the same goods, works or services; renewable contracts and multiple Contractors for the same goods, works or services under the same contract as indicated in sub-paragraphs 1.1 (b) to 1.1(d) above and to enable the DTI in determining the NIP obligation, successful tenderers (Contractors) are required, immediately after being officially notified about any successful tender with a value in excess of R10 million (ten million Rands), to contact and furnish the DTI with the following information:

- Tender / contract number.
- Description of the goods, works or services.
- Date on which the contract was accepted.
- Name, address and contact details of the government institution.
- Value of the contract.
- Imported content of the contract, if possible.

3.4 The information required in paragraph 3.2 above must be sent to the Department of Trade and Industry, Private Bag X 84, Pretoria, 0001 for the attention of Mr Elias Malapane within five (5) working days after award of the contract. Mr Malapane may be contacted on telephone (012) 3941401, facsimile (012) 3942401 or e-mail at Elias@thedti.gov.za for further details about the programme.

**4. PROCESS TO SATISFY THE NIP OBLIGATION**

4.1 Once the successful tenderer (Contractor) has made contact with and furnished the DTI with the information required, the following steps will be followed:

- (a) the Contractor and the DTI will determine the NIP obligation;
- (b) the Contractor and the DTI will sign the NIP obligation agreement;
- (c) the Contractor will submit a performance guarantee to the DTI;
- (d) the Contractor will submit a business concept for consideration and approval by the DTI;
- (e) upon approval of the business concept by the DTI, the Contractor will submit detailed business plans outlining the business concepts;
- (f) the Contractor will implement the business plans; and
- (g) the Contractor will submit bi-annual progress reports on approved plans to the DTI.

4.2 The NIP obligation agreement is between the DTI and the successful tenderer (Contractor) and, therefore, does not involve the purchasing institution.

Tender number .....	closing date .....
Name of tenderer .....	
Postal address .....	
.....	
Signature .....	Name (in print) .....
Date .....	



**T2.2.21 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 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and
  - the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

**1.2 To be completed by the organ of state**

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

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

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

**1.4 To be completed by the organ of state:**

The maximum points for this tender are allocated as follows:

	POINTS
<b>PRICE</b>	80
<b>SPECIFIC GOALS</b>	20
<b>Total points for Price and SPECIFIC GOALS</b>	<b>100</b>

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

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

**2. DEFINITIONS**

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

### 3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

#### 3.1. POINTS AWARDED FOR PRICE

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

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

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

Where

- Ps = Points scored for price of tender under consideration
- Pt = Price of tender under consideration
- Pmin = Price of lowest acceptable tender

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

##### 3.2.1. POINTS AWARDED FOR PRICE

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

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

Where

- Ps = Points scored for price of tender under consideration
- Pt = Price of tender under consideration
- Pmax = Price of highest acceptable tender

**4. POINTS AWARDED FOR SPECIFIC GOALS**

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

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

- (a) an invitation for tender for income-generating contracts, that either the 80/20 or 90/10 preference point system will apply and that the highest acceptable tender will be used to determine the applicable preference point system; or
- (b) any other invitation for tender, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable tender will be used to determine the applicable preference point system,

then the organ of state must indicate the points allocated for specific goals for both the 90/10 and 80/20 preference point system.

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

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

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

The specific goals allocated points in terms of this tender	Number of points allocated (80/20 system) (To be completed by the organ of state)	Number of points claimed (90/10 system) (To be completed by the tenderer)	Number of points claimed (80/20 system) (To be completed by the tenderer)
An entity which is at least 51% Black Owned	10	N/A	
The promotion of South African owned enterprise	10	N/A	

**DECLARATION WITH REGARD TO COMPANY/FIRM**

4.3. Name of company/firm.....

4.4. Company registration number: .....

4.5. TYPE OF COMPANY/ FIRM

- Partnership/Joint Venture / Consortium
- One-person business/sole propriety
- Close corporation
- Public Company



- Personal Liability Company
- (Pty) Limited
- Non-Profit Company
- State Owned Company

[TICK APPLICABLE BOX]

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

- i) The information furnished is true and correct;
- ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
- iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;
- iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –
  - (a) disqualify the person from the tendering process;
  - (b) recover costs, losses or damages it has incurred or suffered as a result of that person’s conduct;
  - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
  - (d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and
  - (e) forward the matter for criminal prosecution, if deemed necessary.

	..... <b>SIGNATURE(S) OF TENDERER(S)</b>
<b>SURNAME AND NAME:</b>	.....
<b>DATE:</b>	.....
<b>ADDRESS:</b>	.....
	.....
	.....
	.....

**T2.2.22 .../continued PREFERENCE GOALS SUPPORTING DOCUMENTS**

**Tenderers not submitting valid supporting documents in respect of Preference points claimed for specific goals do not qualify for preference points but will not be disqualified from the tendering process**

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**T2.2.22 LETTER OF GOOD STANDING IN TERMS OF COID ACT**

**(Compensation for Occupational Injuries and Diseases Act)**

**INSERT HERE**

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**T2.2.23 TENDERER’S FINANCIAL STANDING**

**In terms of the standard conditions of Tender, the Tenderer shall provide information about its commercial position, which includes information necessary for the Purchaser to evaluate the Tenderer's financial standing.**

To that end the Tenderer must provide with its Tender a bank rating, certified by its banker, to the effect that it will be able to successfully complete the contract at the Tendered amount within the specified time for completion.

**However, should the Tenderer be unable to provide a bank rating with its Tender, it shall state the reasons as to why it is unable to do so, and in addition provide the following details of its banker and bank account that it intends to use for project:**

Name of account holder: .....

Name of Bank: ..... Branch: .....

Account number: ..... Type of account: .....

Telephone number: ..... Facsimile number: .....

Name of contact person (at bank):.....

***Failure to provide either the required bank details or a certified bank rating with its Tender, will lead to the conclusion that the Tenderer does not have the necessary financial resources at its disposal to complete the contract successfully within the specified time for completion.***

The Purchaser undertakes to treat the information thus obtained as confidential, strictly for the use of evaluation of the Tender submitted by the Tenderer.

SIGNATURE: ..... DATE: .....  
 (of person authorized to sign on behalf of the Tenderer)

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## T2.2.24 CONTRACTORS HEALTH AND SAFETY DECLARATION

In terms of Clause 5(1) 9(h) of the OHS Act 1993 Construction Regulations 2014 (referred to as "the Regulations" hereafter), a Contractor may only be appointed to perform construction work if the Purchaser is satisfied that the Contractor has the necessary competencies and resources to carry out the work safely in accordance with the Occupational Health and Safety Act No 85 of 1993 and the OHS Act 1993 Construction Regulations 2014.

To that effect a person duly authorized by the Tenderer must complete and sign the declaration hereafter in detail.

### Declaration by Tenderer

1. I the undersigned hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act No 85 of 1993 (as amended by the Occupational Health and Safety Amendment Act No 181 of 1993), and the OHS Act 1993 Construction Regulations 2014.
2. I hereby declare that my company / enterprise have the competence and the necessary resources to safely carry out the construction work under this contract in compliance with the Construction Regulations and the Purchaser's Health and Safety Specifications.
3. I hereby undertake, if my Tender is accepted, to provide a sufficiently documented Health and Safety Plan in accordance with CR7(1) of the Construction Regulations, approved by the Purchaser or its representative, before I will be allowed to commence with construction work under the contract. I hereby agree that my company/enterprise will not have a claim for compensation for delay or extension of time because of my failure to obtain the necessary approval for the said safety plan.
4. I confirm that copies of my company's approved Health and Safety Plan, the Purchaser's Safety Specifications as well as the OHS Act 1993 Construction Regulations 2014 will be provided on site and will at all times be available for inspection by the Contractor's personnel, the Purchaser's personnel, the Employer's Agent, visitors, and officials and inspectors of the Department of Labour.
5. I hereby confirm that adequate provision has been made in my Tendered rates and prices in the bill of quantities to cover the cost of all resources, actions, training and all health and safety measures envisaged in the OHS Act 1993 Construction Regulations 2014, including the cost for specific items that may be scheduled in the bill of quantities.
6. I hereby confirm that I will be liable for any penalties that may be applied by the Purchaser in terms of the said Regulations for failure on my part to comply with the provisions of the Act and the Regulations as set out in Regulation 30 of the Regulations.
7. I agree that my failure to complete and execute this declaration to the satisfaction of the Purchaser will mean that I am unable to comply with the requirements of the OHS Act 1993 Construction Regulations 2014, and accept that my Tender will be prejudiced and may be rejected at the discretion of the Purchaser.
8. I am aware of the fact that, should I be awarded the contract, I must submit the notification required in terms of Regulation 4 of the OHS Act 1993 Construction Regulations 2014 (*example attached hereafter*) before I will be allowed to proceed with any work under the contract.

SIGNATURE: ..... DATE: .....  
(of person authorized to sign on behalf of the Tenderer)

**T2.2.25 PRO FORMA OHS NOTIFICATION**

**PRO FORMA NOTIFICATION FORM IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT 1993, CONSTRUCTION REGULATIONS 2014**

***[In terms of Regulation 4 of the Construction Regulations 2014, the successful Tenderer must complete and forward this form prior to commencement of work to the office of the Department of Labour.]***

1. (a) Name and postal address of Contractor:

.....

(b) Name of Contractor's contact person:

Telephone number:

2. Contractor's compensation registration number:

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

(b) Name of Purchaser's contact person or agent:

Telephone number:

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

.....

(b) Name of designer's contact person:

Telephone number:

5. Name of Contractor's construction supervisor on site appointed in terms of Regulation 6(1):

Telephone number:

6. Name/s of Contractor's sub-ordinate supervisors on site appointed in terms of regulation 6(2).

.....

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

8. Nature of the construction work:

.....

9. Expected commencement date:

10. Expected completion date:

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

12. Planned number of Sub-Contractors on the construction site accountable to Contractor:

13. Name(s) of Sub-Contractors already chosen:

.....

.....

SIGNED BY:

CONTRACTOR: ..... DATE: .....

PURCHASER: ..... DATE: .....

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**T2.2.26 LETTER OF INTENT FOR PUBLIC LIABILITY**

**INSERT HERE**

FOR INFORMATION USE ONLY



**T2.2.27 LETTER OF INTENT FOR PERFORMANCE GUARANTEE**

[The Tenderer must attach hereto a letter from the bank or institution with whom it has made the necessary arrangements, to the effect that the said bank or institution will be prepared to provide the required performance guarantee when asked to do so. The Tenderer must also attach proof that the institution that will provide the performance guarantee is registered and in good standing with the Financial Services Conduct Authority.

INSERT HERE

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## T2.2.28 REGISTRATION CERTIFICATES

Insert required registration Certificates such as CIDB, ECSA, etc. here.

FOR INFORMATION USE ONLY

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## T2.2.29 CENTRAL SUPPLIER DATABASE (CSD) REPORT

FOR INFORMATION USE ONLY

**Disclaimer**  
Personal Information (PI) requested in this form is mandatory for operational and administrative processes, and to comply with regulatory requirements. uMngeni-uThukela Water will take reasonable steps to ensure that the Personal Information collected on this form is processed responsibly, kept safe and confidential, and does not unjustifiably infringe your privacy. This is in compliance to the Protection of Personal Information Act No. 4 of 2013.



TENDER NO: 2024/143

**APPOINTMENT OF A TURNKEY CONTRACTOR FOR THE DESIGN AND CONSTRUCTION OF A PRE-THICKENER, REHABILITATION OF DIGESTER 5&6 STAIRCASE AND INTERNAL REHABILITATION OF A RESERVOIR IN THE INLAND REGION**

**VOLUME 2 – Agreements, Contract, Pricing and Scope**

**Issued by:**

uMngeni-uThukela Water  
310 Burger Street  
Pietermaritzburg  
3201

**Tender Queries:**

Contact Name: [Nosipho Mkhize ]  
Telephone: [033 341 1062.]

**Name of Tenderer:** .....

**National Treasury CSD Number:** .....

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## C.1 AGREEMENTS AND CONTRACT DATA

### **IMPORTANT NOTE ON C1.1:**

**ALL Tenderers MUST complete and sign Form A: OFFER (the first page hereafter).**

**Form B: ACCEPTANCE will be signed by the Employer and then only in the case of the successful Tenderer.**

**Form C: SCHEDULE OF DEVIATIONS must be signed by the Employer as well as the successful Tenderer at the close of the process of offer and acceptance.**

**Form D: CONFIRMATION OF RECEIPT must be signed by the successful Tenderer on receipt of a fully completed original copy of the Agreement including the Schedule of Deviations, if any.**

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

**A: OFFER**

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract in respect of the following works:

**TENDER NO.: 2024/143 APPOINTMENT OF A TURNKEY CONTRACTOR FOR THE DESIGN AND CONSTRUCTION OF A PRE-THICKENER, REHABILITATION OF DIGESTER 5&6 STAIRCASE AND INTERNAL REHABILITATION OF A RESERVOIR IN THE INLAND REGION**

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

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

**The offered total of the prices inclusive of Value Added Tax is:**

R ..... (In words.....)

.....),  
This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document to the Tenderer before the end of the period of validity stated in the Tender Data, whereupon the Tenderer becomes the party named as the Contractor in the Conditions of Contract identified in the Contract Data.

**FOR THE TENDERER:**

**Signature:** (of person authorized to sign the tender)  
.....

**Name:** (of signatory in capitals)  
.....

**Capacity:** (of signatory)  
.....

**Name of Tenderer:** (organization)  
.....

**Address:**  
.....

**Telephone number:** ..... **Fax number:** .....

**CIDB Registration Number of Tenderer:**  
.....

**WITNESS:**

**Signature:**.....

**Name:** (in capitals) .....

**Date:** .....



**B: ACCEPTANCE**

By signing this part of the Form of Offer and Acceptance, the Employer identified below accepts the Tenderer's Offer. In consideration thereof, the Employer shall pay the Contractor the amount due in accordance with the Conditions of Contract as set out in the General and Special Conditions of Contract, and identified in the Contract Data. Acceptance of the Tenderer's Offer shall form an agreement between the Employer and the Tenderer upon the terms and conditions contained in this Agreement and in the Contract that is the subject of this Agreement.

The terms of the contract are contained in

- C.1 Agreements and Contract Data, (which includes this Agreement)
- C.2 Pricing Data, including the Bill of Quantities
- C.3 Scope of Work
- C.4 Site Information
- C.5 Annexures

And the schedules, forms, drawings and documents or parts thereof, which may be incorporated by reference into Sections C.1 to C.5 above.

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 changes to the terms of the Offer agreed by the Tenderer and the Employer during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Agreement. No amendments to or deviations from said documents are valid unless contained in this Schedule, which must be duly signed by the authorised representative(s) of both parties.

The Tenderer shall within two weeks after receiving a completed copy of this Agreement, including the Schedule of Deviations (if any), contact the Employer's Agent (whose details are given in the Contract Data) to arrange the delivery of any 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 days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the contents of this Agreement, this Agreement shall constitute a binding contract between the parties.

**FOR THE EMPLOYER:**

**Signature:** .....

**Name:** *(of signatory in capitals)* .....

**Capacity:** *(of signatory)* .....

**Name of Employer:** *(organization)* .....

Address: .....

Telephone number: ..... Fax number: .....

**WITNESS:**

**Signature:** ..... **Name:** *(in capitals)* .....

**Date:** .....



**C: SCHEDULE OF DEVIATIONS**

The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permitted in terms of the Tender Data and the Conditions of Tender.

A Tenderer's covering letter shall not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid become the subject of agreements reached during the process of offer and acceptance, the outcome of such agreement shall be recorded here.

Any other matter arising from the process of offer and acceptance either as a confirmation, clarification or change to the tender documents and which it is agreed by the Parties becomes an obligation of the contract shall also be recorded here.

Any change or addition to the tender documents arising from the above agreements and recorded here, shall also be incorporated into the final draft of the Contract.

1. **Subject:** .....  
**Details:** .....  
 .....
2. **Subject:** .....  
**Details:** .....  
 .....
3. **Subject:** .....  
**Details:** .....  
 .....
4. **Subject:** .....  
**Details:** .....  
 .....
5. **Subject:** .....  
**Details:** .....  
 .....
6. **Subject:** .....  
**Details:** .....  
 .....
7. **Subject:** .....  
**Details:** .....  
 .....

By the duly authorized representatives signing this Schedule of Deviations, the Employer and the Tenderer agree to and accept the foregoing Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, as well as any confirmation, clarification or change to the terms of the offer agreed by the Tenderer and the Employer during this process of offer and acceptance.

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



**FOR THE TENDERER:**

Signature: .....

Name: .....

Capacity: .....

Tenderer: *(Name and address of organization)* .....

.....

**Witness:**

Signature: .....

Name: .....

Date: .....

**FOR THE EMPLOYER:**

Signature: .....

Name: .....

Capacity: .....

Employer: *(Name and address of organization)* .....

.....

**Witness:**

Signature: .....

Name: .....

Date: .....

FOR INFORMATION USE ONLY



**D: CONFIRMATION OF RECEIPT**

**TENDER NO.: 2024/143 APPOINTMENT OF A TURNKEY CONTRACTOR FOR THE DESIGN AND CONSTRUCTION OF A PRE-THICKENER, REHABILITATION OF DIGESTER 5&6 STAIRCASE AND INTERNAL REHABILITATION OF A RESERVOIR IN THE INLAND REGION**

The Tenderer, (now Contractor), identified in the Offer part of this Agreement hereby confirms receipt from the Employer, identified in the Acceptance part of this Agreement, of one fully completed original copy of this Agreement, including the Schedule of Deviations (if any) on this

the ..... (day) of .....(month) 202..... (year)

at ..... (place)

**FOR THE CONTRACTOR:**

Signature: .....

Name: .....

Capacity: .....

**Signature and name of witness:**

Signature: .....

Name: .....

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## C1.2 CONTRACT DATA

### C1.2.1 CONDITIONS OF CONTRACT

#### **GENERAL CONDITIONS OF CONTRACT**

The **General Conditions of Contract for Construction Works, Third Edition (2015)**, published by the South African Institution of Civil Engineering, Private Bag X200, Halfway House, 1685 (Short title: "GCC 2015"), is applicable to this Contract and is obtainable from [www.saice.org.za](http://www.saice.org.za).

It is agreed that the only variations from the said General Conditions of Contract are those set out hereafter under "Special Conditions of Contract".

#### **SPECIAL CONDITIONS OF CONTRACT**

##### 1. GENERAL

These Special Conditions of Contract (SCC) form an integral part of the Contract. They shall amplify, modify or supersede, as the case may be, the GCC 2015 to the extent specified below, and shall take precedence and shall govern.

The clauses of the SCC hereafter are numbered "SCC" followed in each case by the number of the applicable Clause or Sub-Clause in the GCC 2015, and if applicable, the heading, or (where a new condition that has no relation to the existing clauses is introduced) by a number that follows after the last Clause number in the GCC 2015.

##### **SCC 1.1 Definitions**

***Add the following at the end of Sub-Clause 1.1.1:***

SCC 1.1.1.35 "Client", as used in the Occupational Health and Safety Act, 1993 and the Construction Regulations, 2014, shall have the same meaning as "Employer".

SCC 1.1.1.36 "Principal Contractor", as used in the Occupational Health and Safety Act, 1993 and the Construction Regulations, 2014, shall have the same meaning as "Contractor".

##### **SCC 4.4 Sub-Contracting**

SCC 4.4.1 ***Insert the following after the existing wording:***

"The Contractor shall not sub-contract any Works to Sub-Contractors who are not appropriately registered and graded by the Construction Industry Development Board (CIDB). Proof of registration and grading shall be submitted to the Employer's Agent prior to the award of any such work to a Sub-Contractor.

The Employer reserves the right to refuse payment to the Contractor for work carried out by Sub-Contractors who were not appropriately registered and graded by the CIDB at the time the work was being carried out.

Subsequent registration and grading by the CIDB of Sub-Contractors shall have no force or effect in curing the non-compliance retrospectively."

SCC 4.4.4 ***Insert the following after the existing wording:***

“The contractual relationship between the Contractor and any of its CPG Partners shall be the same as if the Contractor had appointed the CPG Partner in terms of Clause

4.4.3. However, the requirements of and the procedures set out under PS 12 Selected Sub-Contractors included in Section C.3 Scope of Work shall not apply to CPG Partners.

The contractual relationship between the Contractor and its CPG Partners shall be as agreed upon between the Employer and the Contractor during the process of CPG negotiations prior to the award of the Contract, and as recorded in the Schedule of Deviations.”

SCC 4.4.5 ***Insert the following after the existing wording:***

“The provisions of this Sub-clause shall apply to the appointment of CPG Partners.”

SCC 4.4.6 ***Insert the following after the existing wording:***

“The provisions of this Sub-clause shall apply to the appointment of CPG Partners.”

SCC 4.4.7 ***Insert the following after the existing wording:***

“The provisions of this Sub-clause shall apply to the appointment of CPG Partners.”

**SCC 4.5 Notices and fees**

SCC 4.5.2 **Employer’s responsibility for approval**

***Insert the following after the existing wording:***

“The Employer shall be responsible for obtaining any construction work permit which may be required in terms of Regulation 3(1) of the Construction Regulations, 2014 (promulgated under Section 43 of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)).”

SCC 4.5.3 **Contractor’s responsibility for consents**

***Insert the following after the existing wording:***

“Failure by the Contractor to provide in a proper and timeous manner all the necessary information and documents as required by Regulation 3(5) of the Construction Regulations, 2014, or as requested by the Employer or his agent, shall result in any claim which the Contractor may make in connection therewith for an extension of time, any direct or indirect costs, or any damages claim, being rejected.”

SCC 4.5.4 **Contractor to be compensated**

***Insert the following after the existing wording:***

“The costs incurred by the Contractor in providing the necessary information and documents pursuant to the application for a construction work permit required by Regulation 3(1) of the Construction Regulations, 2014 shall be deemed to be included in the Contractor’s rates and prices, whether itemized separately in the Bill of Quantities or not.”

**SCC 5.1 Time calculations**

The phrase “*shall be excluded from the calculation of the time-span concerned*” shall be separated from Sub-clause 5.1.1.2 and shall be positioned in a new line below it.

- SCC 5.1.1 The entire Sub-clause 5.1.1 shall read as follows:
- “5.1.1 Except where otherwise provided in the Contract, where a specific time-span is stipulated in the Contract for carrying out any task, or for the termination of any right, or the duration of any event or circumstance,
- 5.1.1.1 The special non-working days set out in the Contract Data that fall within the said time-span, as well as
- 5.1.2 The day on which the time-span commences
- shall be excluded from the calculation of the time-span concerned.”
- SCC 5.3 Commencement of the Works**
- SCC 5.3.1 ***Insert the following after the existing wording:***
- “In the event of a construction work permit being required (as contemplated under Regulation 3 of the Construction Regulations, 2014), commencement of the Works shall only be legally permissible once a construction work permit has been issued by the relevant authority.
- The Contractor shall be required to make an allowance of **50 (fifty) days** from the Commencement Date of the Contract in his initial programme of Works required to be submitted in terms of Clause 5.6.1 so as to allow for the construction work permit to be issued by the Department of Labour, provided that should the Contractor fail to include such an allowance of the said 50 days, he shall be deemed to have done so.
- In the event that the construction work permit shall have been issued within the 50 (fifty) day allowance period, the Due Completion Date shall be adjusted accordingly by the Employer’s Agent, with due cognisance being taken as to the date on which the construction work permit was actually issued.”
- SCC 5.3.2 ***Insert the following after the existing wording:***
- “or alternatively, the Employer reserves the right, in its sole discretion, to grant to the Contractor an extension of time for Practical Completion, but without the payment of additional time-related General Items or any other compensation, for a period of not more than 28 (twenty eight) days, to allow the Contractor to submit the documentation referred to in Clause 5.3.1.”
- SCC 5.7 Progress of the Works**
- SCC 5.7.1 ***Substitute the fourth sentence (starting with “Such steps ...”) with the following:***
- “Such steps shall be subject to the approval of the Employer’s Agent, which approval shall not be unreasonably withheld”.
- SCC 5.7.2 ***Delete the second paragraph and substitute with the following:***
- “In such an event, the additional costs incurred, by acceding to the Contractor’s request, shall be deducted from the amount payable to the Contractor”.
- SCC 5.14 Completion**

SCC 5.14.5.1 **Amend this Sub-Clause as follows:**

In the second line, substitute the word “Guarantor” with “Contractor”.

SCC 6.5 **Dayworks**

SCC 6.5.1.3 **Amend this Sub-Clause as follows:**

In the last line, substitute the word “plant” with the words “construction equipment”.

SCC 6.7 **Measurement of the Works**

SCC 6.7.2 **Delete the words:**

“The Employer’s Agent shall ascertain and determine the value of the Works but, when required to do so by the Employer’s Agent”.

**And insert the following at the end of the paragraph:**

“This measurement shall take place on or before, but not later than, the 20<sup>th</sup> of the month, but should the 20<sup>th</sup> be a ‘non-working’ day, it shall take place on the last working day prior to the 20<sup>th</sup>.”

SCC 6.9 **Vesting of Plant and Materials**

SCC 6.9.3 **Identification of Plant and materials**

**Add the following at the end of Sub-Clause 6.9.3:**

**“Storage of Plant**

In consideration of receiving, from the Employer, payment on account, after the deduction of retention monies, in respect of items of Plant stored at the Contractor's workshop or his suppliers' premises or his other storage facilities, the Contractor shall complete the standard Employer Certificate of Indemnity. In so doing, the Contractor:

- (a) acknowledges that the items of Plant are the sole property of, and are held on behalf of, the Employer;
- (b) indemnifies the Employer against any loss or damage whatsoever of or to the said items of Plant whilst in the Contractor's possession or in transit and undertakes to effect adequate insurance against these risks in the name of the Employer and to produce such insurance to the Employer’s Agent;
- (c) undertakes to deliver and install, at the site, the said Plant when required by the Employer;
- (d) undertakes that no payment has been received, in respect of the said items of Plant, from any other of his clients or employers and that the Employer has prior claim to the value of payments so received for same, prior to all others, from any assets of the Contractor's company; and
- (e) undertakes to act in accordance with such instructions as received from the Employer, through its officers or agents, to protect the interests of the Employer.

Payment for Plant stored at the Contractor's workshop or his suppliers' premises or

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his or any other storage facilities, shall be at the sole discretion of the Employer's Agent, and the Employer's Agent reserves the right to amend the requirements of the standard Certificate of Indemnity."

**SCC 6.10 Payments**

SCC 6.10.4 Substitute the words "within 28 days" with "on or before but not later than the last day of the month following the month".

SCC 6.10.6.2 **Amend this Sub-Clause as follows:**

Delete the words "Contractor's Bank" and substitute with the words "Employer's Bank".

SCC 6.10.8 Substitute the words "within 28 days" with "on or before but not later than the last day of the month following the month".

SCC 6.10.9 Substitute the words "within 28 days of the date of such certificate" with "on or before but not later than the last day of the month following the month in which the Employer's Agent has signed such payment certificate."

**SCC 8.6 Insurances**

**The following deletions, substitutions and insertions are effected as indicated below:**

SCC 8.6.1 Substitute the word "Contractor" in the second line with "Employer" and insert the words "and all Sub-Contractors, including CPG Partners, engaged in the Works under valid sub-contract agreements with the Contractor" after the word "Contractor" at the end of the Paragraph.

SCC 8.6.1.4 Substitute the word "Contractor" in the sixth line with "Employer".

SCC 8.6.2 Substitute the word "Contractor" in the third line with "Employer".

SCC 8.6.4 Substitute the word "Contractor" in the second line with "Employer".

SCC 8.6.5 Substitute the word "Employer" in the fourth line with "Contractor".

SCC 8.6.6 Substitute the word "Contractor" with "Employer", and "Employer's Agent" with "Contractor", and insert the words "upon request" after the word "shall" and before the word "produce".

SCC 8.6.7 Substitute the word "Contractor" with "Employer," and "Employer" with "Contractor", wherever they appear in this Sub-clause.

**Add the following at the end of Sub-Clause 8.6.7:**

SCC 8.6.8 The requirements and procedures set out under Annexure C5.1 included under Section C.5 Annexures shall apply to the Contract.

**SCC 9.1 Termination of Contract**

**SCC 9.1.4 Increased Costs**

**Add the following at the end of Sub-Clause 9.1.4:**



The provisions of this Sub-clause shall only apply in the event of actual termination of the Contract.

**SCC 10.1 Contractor's claim**

**SCC 10.1.4 Contractor's failure to comply with notice period**

*Insert the following words in the 3<sup>rd</sup> line after "Clause 10.1.2":*

"or the Contractor fails to comply with the requirements of Clause 10.1.1.3".

**SCC 10.1.5 Employer's Agent's ruling on Contractor's claim**

*Add the following after the existing wording:*

"and provided that:

10.1.5.3 in the event that the Employer is required to give specific approval for the said period of 28 days to be extended (as required by Clause 3.2.3 and as stated in the Contract Data), and the Employer's Agent fails to obtain such specific approval within the said 28 day period, the Contractor's claim shall be deemed to have been rejected in its entirety."

**SCC 10.2 Dissatisfaction claim**

**SCC 10.2.3 Employer's Agent's ruling on dissatisfaction**

*Add the following after the first sentence:*

"provided that, in the event that the Employer's Agent fails to give his ruling within the said period of 28 days, the Contractor's dissatisfaction claim shall be deemed to have been rejected in its entirety."

## C1.2.2 CONTRACT DATA

### PART 1: DATA PROVIDED BY THE EMPLOYER

#### CONTRACT SPECIFIC DATA

The following Contract Specific Data, referring to the General Conditions of Contract as stated above, are applicable to this Contract:

COMPULSORY DATA	
GCC Ref. Clause No.	
1.1.1.15	<b>Name of Employer: uMngeni-uThukela Water</b>
1.2.1.2	<p><b>Address of Employer:</b></p> <p>Physical: 310 Burger Street Pietermaritzburg 3201 KwaZulu-Natal</p> <p>Postal: P O Box 9 Pietermaritzburg 3200 KwaZulu-Natal</p> <p>Telephone No: : 033 341 111      E-mail: Info@umgeni.co.za</p>
1.1.1.16	<b>Name of Employer's Agent : Thoko Makhasi</b>
1.2.1.2	<p>Physical: 310 Burger Street Pietermaritzburg 3201 KwaZulu-Natal</p> <p>Postal: P O Box 9 Pietermaritzburg KwaZulu-Natal</p> <p>Telephone No: 033 846 1813 E-mail: Thoko.Makhasi@umgeni.co.za</p>
1.1.1.13	<b>The Defects Liability Period is 12 months</b>
1.1.1.26/ 6.7.1	<b>The Pricing Strategy is Fixed Price</b>
5.3	<b>Commencement of Works</b>
5.3.1	<p>The documentation required before commencing with the Works are:</p> <ol style="list-style-type: none"> <li>1. Health and Safety Plan (Refer to Clause 4.3);</li> <li>2. A signed agreement between the Employer and the Contractor for the works to be completed by the Contractor in terms of the provision of Section 37(2) of the Occupational Health and Safety Act ( Act No 85 of 1993) and the Construction regulations of February 2014. (Refer to Clause 4.3);</li> <li>3. Proof of payment to the Employer, that the Contractor had paid all contributions required in terms of the Compensation for Occupational Injuries and Diseases Act ( No 130 of 1993). (Refer to Clause 4.3);</li> <li>4. Initial Programme (Refer to Clause 5.6);</li> <li>5. Security (Refer to Clause 6.2.1 below);</li> <li>6. Insurance (Refer Clause 8.6); and</li> </ol> <p>Information and documents required from the Contractor for a construction work permit (if applicable) issued in terms of Regulation 3 of the Construction</p>

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	Regulations, 2014 (Refer to SCC 4.5.2, SCC 4.5.3, SCC 4.5.4 and SCC 5.3.1 above.
5.3.2	The time to submit the documentation required before commencement with Works execution is 14 (Fourteen) days.
5.5.1/ 1.1.1.14	<b>Time for Practical Completion</b> The time for achieving Practical Completion of the entire Works is 12 (Twelve) months from the Commencement Date of the Contract including special non-working days.  The time, from the Commencement Date for achieving Practical Completion of the portions as set out in the Scope of Works are: 12 months
5.6.1 & SCC 5.3.1	<b>Programme</b> The Contractor shall deliver his programme of works within 14 days from the Commencement Date (Inception). <b>Note: Refer to Project Specifications regarding required format, etc.</b>
5.8.1 & 5.1.1.1	<b>Non-working times and special non-working days</b> The non-working days are Sundays.  The special non-working days are:  1. all public holidays as declared in terms of Section 2A of the Public Holidays Act, 1994 (Act No. 36 of 1994); and 2. the year-end break commencing with the close of business on the last working day prior to 16 December and ending with the start of business on the 1 <sup>st</sup> working day in January of the next year.
5.13.1	<b>Penalty for Delay</b> The penalty for failing to complete the Works by the Due Completion Date shall be R. (inclusive of VAT) per day.
5.16.3	<b>Latent Defects Liability Period</b> The latent defects liability period is • Ten (10) Years for Civil Engineering Works • Five (5) Years for Mechanical Works
6.2.1 & 6.2.2	<b>Security</b> The security to be provided by the Contractor shall be a Performance Guarantee (Demand Guarantee) of 10% (ten percent) of the Contract Sum (inclusive of VAT) delivered within the time stated in Clause 5.3.2 above. The Guarantee shall remain valid and enforceable until the Certificate of Completion is issued, whereafter the Guarantee shall be returned to the Contractor.  Should the Contractor fail to provide the required Performance Guarantee within the time period stated in Clause 5.3.2 above, or if the Performance Guarantee differs substantially from the <i>pro forma</i> included under Section C1.3 Form of Guarantee, a security of 10% (ten percent) of the Contract Sum shall be retained by the Employer, in addition to the retention withheld in terms of Clause 6.10.3 below, subject to the provision that the Contractor may, at any time during the course of the Contract, provide a correctly worded and valid Performance Guarantee in fulfillment of his

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	obligations under the Contract in order to have the security being withheld for this purpose released to him.
6.10	<b>Payments</b>
6.10.1.5	The percentage limit for Plant and materials referred to in Clause 6.9.1 not yet supplied to Site or not yet built into the Permanent Works is: 80%.
6.10.3	<b>Retention Money</b> The percentage retention on the amounts due to the Contractor is 10%. The limit of retention money is 5% of the Contract Price. <b>A guarantee in lieu of retention money is not permitted.</b>
8.6.1	<b>Insurances</b> ( <i>Insurance cover requirements must be confirmed with the Risk Department on award before signing of contract</i> )
8.6.1.1.2	The Value of Plant and materials supplied by the Employer to be included in the insurance sum is R 0 (zero Rand) (inclusive of VAT).
8.6.1.1.3	The amount to cover professional fees for repairing damage and loss to be included in the insurance sum is R 1 000 000 (One Million Rand) (exclusive of VAT).
8.6.1.3	The limit of indemnity for liability insurance is: Public Liability R10 000 000 (Ten Million Rand) (exclusive of VAT).
8.6.1.5	The Contractor is required to provide the following additional or varied insurances: 1. Professional Indemnity Minimum Cover is: R5 000 000 (Five million rand) Period of cover: For the period of performance The supplier may take additional cover based on other perceived risk exposures
8.6.2	Deductibles for which the Contractor is liable for payment are: <i>subject to annual escalation(s) as per uMngeni-Uthukela Water annual summary of insurance arrangements and claims procedure):</i>
8.6.2.1	Contract Works Deductible – R50 000 ,00 Fifty Thousand Rand (exclusive of VAT) for each and every incident. In respect of Storm Perils and flooding 10% of claim minimum R1000 000 Theft of, or any attempt threat 10% of claim minimum R50 000
8.6.2.2	Public Liability Deductible – R 15 000 (Fifteen Thousand Rand ) (exclusive of VAT) for each and every incident.
8.6.2.3	SASRIA Deductible 0.1% (Zero-point One Percent) of contract value minimum R2 500, 00 (Two Thousand Five Hundred Rand) maximum R25,000 (Twenty-Five Thousand Rand) (exclusive of VAT) for each and every incident.
10.5	<b>Adjudication</b> Dispute resolution shall be by <i>ad-hoc</i> adjudication.  The Adjudication Board Rules in GCC 2015 shall apply.  The Pro Forma Adjudication Board Member Agreement (GCC 2015 Appendix 5) shall be used for the appointment of members.
10.5.3	The number of Adjudication Board Members to be appointed is 1 (one).
10.7.1	<b>Arbitration</b>

	If a dispute is, after adjudication, still unresolved, the dispute shall be resolved by arbitration.		
<b>OPTIONAL DATA</b>			
3.2.3	<p><b>Specific approval of the Employer required</b> The Employer's Agent shall obtain the <u>specific approval</u> of the Employer in writing before carrying out any of the following:</p> <ol style="list-style-type: none"> <li>(1) Any expenditure beyond the approved Contract Sum as defined in terms of Clause 1.1.1.11.</li> <li>(2) The issuing of any instruction to the Contractor to commence carrying out of the Works in terms of <b>Clause 5.3.1</b>.</li> <li>(3) The issuing of an instruction to accelerate the progress in terms of Clause 5.7.3.</li> <li>(4) The reduction of a penalty for delay in terms of Clause 5.13.2.</li> <li>(5) The determination of additional or reduced costs arising from changes in legislation in terms of Clause 6.8.4.</li> <li>(6) The agreeing of any adjustment of the sums for general items in terms of Clause 6.11.1.</li> <li>(7) Authorizing the Contractor to repair and make good in terms of Clause 8.2.2.2.</li> <li>(8) The agreeing of an extension to the 28 day period in terms Clause 10.1.5.1.</li> <li>(9) Changes to the Specifications related to Equipment and Materials which may have an impact on the Operation &amp; Maintenance (O&amp;M) of the Works.</li> </ol> <p>The onus shall be on the Contractor to obtain confirmation of the Employer's specific approval in respect of the above.</p> <p>Any instruction by the Employer's Agent that is given without the Employer's specific approval shall have no force or effect, and the Contractor shall have no claim against the Employer under such circumstances.</p>		
5.4	<b>Access to the Site</b>		
5.4.2 and C4.2	<p>The access to and possession of the Site shall not be exclusive to the Contractor. The limitations are set out below:</p> <ol style="list-style-type: none"> <li>(a) The Contractor should inform the Security Office and the Senior Operator at the Control Room and sign the work permit before work commence on site.</li> <li>(b) Access through the main gate between 06:00 and 18:00.</li> <li>(c) The plant operational requirements may require the contractor to give full site control to uMngeni-uThukela Water.</li> </ol>		
6.8	<b>Adjustment in rates and/prices</b>		
6.8.2	Contract Price Adjustment will not be applicable.		
6.8.3	<p><b>Variation in cost of special materials</b> Price adjustments for variations in the cost of special materials is not allowed.</p>		
6.9.1.2	<p><b>Vesting of Materials</b> The following Plant and materials shall be subject to the conditions of Clause 6.9.1.2.</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"><u>Plant / Material</u></td> <td style="width: 50%;"><u>Stored at</u></td> </tr> </table>	<u>Plant / Material</u>	<u>Stored at</u>
<u>Plant / Material</u>	<u>Stored at</u>		

<b>CONTRACT PRICE ADJUSTMENT SCHEDULE (if applicable in terms of Clause 6.8.2 above)</b>	
	<p>Values of the coefficients shall be:</p> <p><b>X</b> = 0,15;    <b>a</b> (labour) = 0,30    <b>b</b> (plant) = 0,25;    <b>c</b> (materials) = 0,35;    <b>d</b> (fuel) = 0,10</p> <p><i>Note to compiler: These coefficients are to be checked for each individual contract</i></p> <p>The Site is situated in: ...Kwa-Zulu Natal... Province.</p> <p>The base month is: ... <i>October 2024</i>... (the month prior to that in which tenders closed).</p> <p><b>The indices for “L”, “P”, “M” and “F” are the following as published by Statistics South Africa (if the indices are published by a different organisation, for example SEIFSA, then delete “Statistics South Africa” and replace by the applicable publishing organisation):</b></p> <ol style="list-style-type: none"> <li>1. “L” is the “Labour Index” and shall be the (... <i>give the name of the relevant labour index</i> ...) and as published in the (... <i>give the name of the statistical publication where the index can be found</i>).</li> <li>2. “P” is the “Contractor’s Equipment Index” and shall be the (... <i>give the name of the relevant Contractor’s Equipment index</i> ...) and as published in the (... <i>give the name of the statistical publication where the index can be found</i>).</li> <li>3. “M” is the “Materials Index” and shall be the (... <i>give the name of the relevant materials index</i> ...) and as published in the (... <i>give the name of the statistical publication where the index can be found</i>).</li> <li>4. “F” is the “Fuel Index” and shall be the (... <i>give the name of the relevant fuel index</i> ...) and as published in the (... <i>give the name of the statistical publication where the index can be found</i>).</li> </ol>

FOR INFORMATION ONLY



**PART 2: DATA PROVIDED BY THE CONTRACTOR**

The Contractor is advised to read the **General Conditions of Contract for Construction Works, Third Edition (2015)** in order to understand the implications of this Data which is required to be provided.

GCC REF. CLAUSE No																			
1.1.1.9	<b>Name of Contractor:</b> .....																		
1.2.1.2	<b>Address of Contractor:</b>  Physical: ..... Postal: ..... ..... .....  Telephone No: ..... Fax No: ..... E-mail: .....																		
6.2.1	<b>Security</b> Security is to be provided by the Contractor shall be as stipulated in the data provided by the Employer in Clauses 6.2.1 and 6.2.2.																		
6.8.3	The variations in cost of special materials will be based on the following:  <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Special Material</th> <th style="text-align: left;">Unit</th> <th style="text-align: left;">Rate or Price</th> </tr> </thead> <tbody> <tr> <td>.....</td> <td>.....</td> <td>.....</td> </tr> <tr> <td>.....</td> <td>.....</td> <td>.....</td> </tr> <tr> <td>.....</td> <td>.....</td> <td>.....</td> </tr> <tr> <td>.....</td> <td>.....</td> <td>.....</td> </tr> <tr> <td>.....</td> <td>.....</td> <td>.....</td> </tr> </tbody> </table>	Special Material	Unit	Rate or Price	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Special Material	Unit	Rate or Price																	
.....	.....	.....																	
.....	.....	.....																	
.....	.....	.....																	
.....	.....	.....																	
.....	.....	.....																	

FOR INFORMATION USE ONLY



**C1.3 FORM OF GUARANTEE**

**[Note to Tenderer: This form should not be completed for the tender, but will be completed by the appointed Contractor.]**

**PRO FORMA FORM OF PERFORMANCE GUARANTEE - DEMAND GUARANTEE**

Name of Project: .....

Contract Number & Title: .....

Name and address of Beneficiary:  
.....  
(whom the Contract defines as the Employer)

We have been informed that (... name of Contractor and company registration number ...) (hereinafter called the "Principal") is your contractor under the above-named Contract, which requires him to obtain a Performance Guarantee.

At the request of the Principal, we (... names and capacities of persons authorised to issue the guarantee ...) of (... name of Financial Institution registered with the Financial Services Board ...) hereby irrevocably undertake to pay you, the Employer, any sum or sums not exceeding in total the amount of (... amount in figures and words ...) (the "guaranteed amount"), upon receipt by us of your demand in writing and your written statement stating:

that the Principal is in breach of his obligation(s) under the Contract.

Any demand for payment must contain your authorised representative's signature. The demand must be received by us at this office on or before (... the date 70 days after the date on which the Completion Certificate for the Works is due to be issued ...), when this guarantee shall expire and shall be returned to us.

We have been informed that the Beneficiary may require the Principal to extend this guarantee if the Completion Certificate under the Contract has not been issued by the date 28 days prior to such expiry date. We undertake to pay you such guaranteed amount upon receipt by us, within a period of 7 days, of your demand in writing and your written statement that the Completion Certificate has not been issued for reasons attributable to the Principal, and that this guarantee has not been extended.

This guarantee shall be governed by South African Law and shall be subject to the Uniform rules for Demand Guarantees, published as number 458 by the International Chamber of Commerce, except as stated above.

Signed at ..... on this ..... day of ..... 20 .....

Guarantors' names and signatures: .....

Witnesses' names and signatures: .....



#### C1.4 ADJUDICATION BOARD MEMBER AGREEMENT

**[Note to Tenderer: This form should not be completed for the tender, but will be completed by the appointed Contractor.]**

##### **PRO FORMA** **ADJUDICATION BOARD MEMBER AGREEMENT**

This Agreement is entered into between:

Adjudication Board Member: (Name, physical address, postal address, e-mail address, fax number, telephone number and mobile number.)

Contractor: (Name, physical address, postal address, e-mail address, fax number, telephone number and mobile number.)

Employer: (Name, physical address, postal address, e-mail address, fax number, telephone number and mobile number.)

The Contractor and the Employer will hereinafter be collectively referred to as "the Parties".

The Parties entered into a Contract for (*name of project*) which provides that a dispute under or in connection with the General Conditions of Contract for Construction Works, Third Edition (2015) must be referred to (*ad hoc adjudication / standing adjudication*)\* (Delete as applicable).

The undersigned natural person has been appointed to serve as Adjudication Board Member and together with the undersigned Parties agree as follows:

1. The Adjudication Board Member accepts to perform his duties in accordance with the terms of the Contract, the General Conditions of Contract for Construction Works' Adjudication Board Rules and this Agreement.
2. The Adjudicator undertakes to remain independent and impartial of the Contractor, Employer and Employer's Agent for the duration of the Adjudication Board proceedings.
3. The Adjudication Board Member agrees to serve for the duration of the Adjudication Board proceedings.
4. The Parties may at any time, without cause and with immediate effect, jointly terminate this Agreement.
5. Unless the Parties agree, the Adjudication Board Member shall not act as arbitrator or representative of either Party in any subsequent proceedings between the Parties under the Contract. No Party may call the Adjudication Board Member as a witness in any such subsequent proceedings.
6. The standing Adjudication Board's duties shall end upon the Adjudication Board Member(s) receiving notice from the Parties of their joint decision to disband the Adjudication Board.
7. The Adjudication Board Member shall be paid in respect of time spent upon or in connection with the adjudication including time spent traveling:

7.1 A monthly retainer of (*amount*) for (*number*) of months, and/or



C1.21

- 7.2 A daily fee of (*amount*) based on a (*number*) hour day, and/or
- 7.3 An hourly fee of (*amount*), and/or
- 7.4 A non-recurrent appointment fee of (*amount*) which shall be accounted for in the final sums payable.

8. The Adjudication Board Member’s expenses incurred in adjudication work shall be reimbursed at cost.

On submission of an invoice for fees and expenses to the Parties, the Parties shall pay the full amount within 28 days of receipt of the invoice. Late payment of such invoice shall attract interest at prime plus 3% points compounded monthly at the prime rate charged by the Adjudication Board Member’s bank.

This Agreement is entered into by:

(Signature): ..... (Signature):..... (Signature):.....

Name:..... Name:..... Name:.....

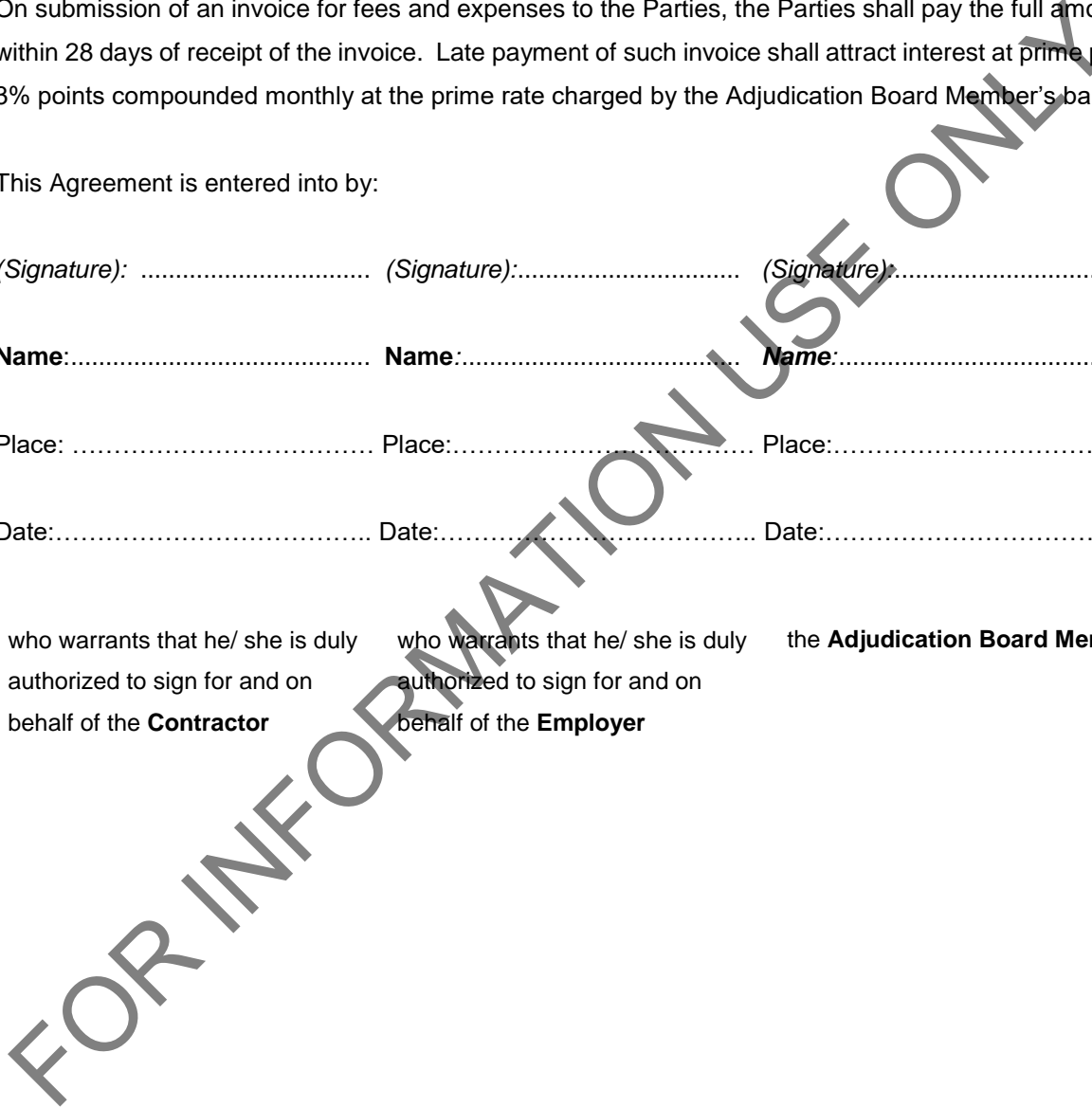
Place: ..... Place:..... Place:.....

Date:..... Date:..... Date:.....

who warrants that he/ she is duly authorized to sign for and on behalf of the **Contractor**

who warrants that he/ she is duly authorized to sign for and on behalf of the **Employer**

the **Adjudication Board Member**





**C1.5 AGREEMENT IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT No. 85 OF 1993**

*[Note to Tenderer: This form should not be completed for the tender, but will be completed by the appointed Contractor.]*

**PRO FORMA**  
**AGREEMENT IN TERMS OF SECTION 37(2) OF THE**  
**OCCUPATIONAL HEALTH AND SAFETY ACT No 85 OF 1993**

THIS AGREEMENT is made between .....  
(hereinafter called the EMPLOYER) of the one part, herein represented by: .....  
.....  
in his capacity as: ..... ;  
AND: .....  
(hereinafter called the CONTRACTOR) of the other part, herein represented by: .....  
.....  
in his capacity as: .....  
duly authorized to sign on behalf of the Contractor.

**WHEREAS** the CONTRACTOR is the Mandatary of the EMPLOYER in consequence of an agreement between the CONTRACTOR and the EMPLOYER in respect of

**CONTRACT No: 2024/143** **APPOINTMENT OF A TURNKEY CONTRACTOR FOR THE RECONSTRUCTION TURNKEY CONTRACTOR FOR THE DESIGN AND CONSTRUCTION OF A PRE-THICKENER, REHABILITATION OF DIGESTER 5&6 STAIRCASE AND INTERNAL REHABILITATION OF A RESERVOIR IN THE INLAND REGION**  
for the construction, completion and maintenance of the works;

AND WHEREAS the EMPLOYER and the CONTRACTOR have agreed to enter into an agreement in terms of the provisions of Section 37(2) of the Occupational Health and Safety Act No 85 of 1993, as amended (hereinafter referred to as "the ACT");

**NOW THEREFORE** the parties agree as follows:

1. The CONTRACTOR undertakes to acquaint the appropriate officials and employees of the CONTRACTOR with all relevant provisions of the ACT and the Regulations promulgated in terms thereof.
2. The CONTRACTOR undertakes to fully comply with all relevant duties, obligations and prohibitions imposed in terms of the ACT and Regulations: Provided that should the EMPLOYER have prescribed certain arrangements and procedures that same shall be observed and adhered to by the CONTRACTOR, his officials and employees. The CONTRACTOR shall bear the onus of acquainting himself / herself / itself with such arrangements and procedures.
3. The CONTRACTOR hereby accepts sole liability for such due compliance with the relevant duties, obligations, prohibitions, arrangements and procedures, if any, imposed by the ACT and Regulations, and the CONTRACTOR expressly absolves the EMPLOYER and the



C1.23

EMPLOYER'S AGENT from being obliged to comply with any of the aforesaid duties, obligations, prohibitions, arrangements and procedures in respect of the work included in the Contract.

- 4. The CONTRACTOR agrees that any duly authorized officials of the EMPLOYER shall be entitled, although not obliged, to take such steps as may be necessary to ensure that the CONTRACTOR has complied with his undertakings as more fully set out in paragraphs 1 and 2 above, which steps may include, but shall not be limited to, the right to inspect any appropriate site or premises occupied by the CONTRACTOR, or to take such steps it may deem necessary to remedy the default of the CONTRACTOR at the cost of the CONTRACTOR.
- 5. The CONTRACTOR shall be obliged to report forthwith to the EMPLOYER any investigation, complaint or criminal charge which may arise as a consequence of the provisions of the ACT and Regulations, pursuant to work performed in terms of this Agreement, and shall, on written demand, provide full details in writing of such investigation, complaint or criminal charge.

Thus signed at ..... for and on behalf of the **CONTRACTOR**  
on this the ..... day of ..... 20 .....

Signature:

Name and Surname: .....

Capacity:

**Witness:**

- 1. ....
- 2. ....

Thus signed at ..... for and on behalf of the **EMPLOYER**  
on this the ..... day of ..... 20 .....

Signature:

Name and Surname: .....

Capacity:

**Witness:**

- 1. ....
- 2. ....

C2.1.

## C2.1 PRICING INSTRUCTIONS

### 1. GENERAL

The Bill of Quantities forms part of the Contract Documents and must be read and priced in conjunction with all the other documents comprising the Contract Documents, which include the Conditions of Tender, Conditions of Contract, the Specifications (including the Project Specification) and the Drawings.

The Tenderer is advised to check the number of pages and should any be found missing or in duplicate or the figures or writing indistinct or these Bill of Quantities contain any obvious errors, the Tenderer must inform the Employer's Agent at once and have it rectified. No liability whatsoever will be admitted in respect of errors due to the foregoing.

Should there be any doubt or obscurity as to the meaning of any particular item, the Tenderer must obtain an explanation of it, in writing, from the Employer's Agent. No claims for extras arising from any such doubt or obscurity will be admitted after delivery of the tender.

### 2. DESCRIPTION OF ITEMS IN THE SCHEDULE

The Bill of Quantities has been drawn up generally in accordance with Civil Engineering Quantities 1990 issued by the South African Institution of Civil Engineers.

The short descriptions of the items in the Bill of Quantities are for identification purposes only and comply in general with the measurement and payment clauses of the Standardized Specifications, the Project Specifications and the Particular Specifications, read together with the relevant clauses of the Scope of Work and directives on the Drawings, set out what ancillary or associated work and activities are included in the rates for the operations specified.

### 3. QUANTITIES REFLECTED IN THE SCHEDULE

The quantities given in the Bill of Quantities are the estimated quantities of work to be done, and for a Re-measurement Contract, will be subject to re-measurement during the execution of the work. The Contractor shall obtain the Employer's Agent's detailed instructions for all work before ordering any materials or executing work or making arrangements for it. Any additional works or any extension of work quantities over and above that contained in the Bill of Quantities shall be agreed before the work is completed in the form of an Extra Works Authorization in the case of additional works or a Change Order in the case of an increase in quantities, whichever is the applicable. All documentation must be signed by the Employer's Agent before the work is commenced and such additional works or increased quantities will not be paid for if certified for payment without the approved documentation.

The Works as finally completed in accordance with the Contract shall be measured and paid for as specified in the Bill of Quantities, and the contract price for the completed contract shall be computed at the relevant unit rates and prices, all in accordance with the General and Special Conditions of Contract, the Specifications and Project Specifications and the Drawings. Unless otherwise stated, items are measured net in accordance with the Drawings, and no allowance has been made for waste.

The validity of the Contract will in no way be affected by differences between the quantities in the Bill of Quantities and the quantities finally certified for payment.

### 4. PRICING OF THE BILL OF QUANTITIES

All unit prices, extensions and totals must be filled in **black ink**. Unit prices, extensions and totals submitted in electronic format will not be acceptable.

The prices and rates to be inserted by the Tenderer in the Bill of Quantities shall be the full inclusive prices to be paid by the Employer for the work described under the several items, and shall include full

## C2.2.

compensation for all costs and expenses that may be required in and for the completion of the work and maintenance during the defects liability period of all the work described and as shown on the

Drawings as well as all overheads, profits, incidentals and the cost of all general risks, liabilities and obligations set forth or implied in the documents on which the Tender is based. Reasonable unit rates and prices shall be entered in the Bill of Quantities as these will be used as a basis for assessment of payment for additional work that may have to be carried out.

Each item shall be priced and extended to the "Total" column by the Tenderer, with the exception of the items for which only rates are required, or items which already have Prime Cost or Provisional Sums affixed thereto. If the Contractor omits to price any items in the Bill of Quantities, then these items will be considered to have a nil rate or price.

All items for which terminology such as "inclusive" or "not applicable" have been added by the Tenderer will be regarded as having a nil rate which shall be valid irrespective of any change in quantities during the execution of the Contract.

The Tenderer shall fill in rates for all items where the words "rate only" appears in the "Total" column. "Rate Only" items have been included where:

- (a) an alternative item or material is contemplated and may be used at the discretion of the Employer's Agent;
- (b) variations of specified components in the make-up of a pay item may be expected; and
- (c) no work under the item is foreseen at tender stage but the possibility that such work may be required is not excluded.

For "Rate Only" items, no quantities are given in the "Quantity" column but the quoted rate shall apply in the event of work under this item being required. The Tenderer shall, however, note that in terms of the Tender Data, the Tenderer may be asked to reconsider any such rates which the Employer may regard as unbalanced.

All rates and amounts quoted in the Bill of Quantities shall be in Rand and cents and shall include all levies and taxes (other than VAT). VAT will be added in the summary of the Bill of Quantities.

## 5. GOODS AND SERVICES SOURCED INTERNATIONALLY

It will be the Contractor's responsibility to obtain Forward Cover to avoid price increases for the Employer on any goods and services in this category. In failing to do that, any increase in prices on these items, after the Commencement Date of the Contract, shall be for the Contractor's account.

## 6. PROVISIONAL SUMS

Where Provisional sums or Prime Cost sums are provided for items in the Bill of Quantities, payment for the work done under such items will be made in accordance with Clause 6.6 of the General Conditions of Contract for Construction Works, Third Edition (2015) (GCC 2015). The Employer reserves the right, during the execution of the works, to adjust the stated amounts upwards or downwards according to the work actually done under the item, or the item may be omitted altogether, without affecting the validity of the Contract.

The Tenderer shall not under any circumstances whatsoever delete or amend any of the sums inserted in the "Amount" column of the Bill of Quantities and in the Summary of the Bill of Quantities unless ordered or authorized in writing by the Employer before closure of tenders. **Unauthorized changes made by the Tenderer to provisional items in the Bill of Quantities, or to the stated provisional percentages and sums in the Summary of the Bill of Quantities, will not be tolerated and any changes to same shall be considered to be an alternative tender and thus non-responsive.**

## 7. CORRECTION OF ENTRIES

C2.3.

Incorrect entries shall not be erased or obliterated with correction fluid but must be crossed out neatly. The correct figures must be entered above or adjacent to the deleted entry, and the alteration must be initialed by the Tenderer.

## 8. ARITHMETICAL ERRORS

Arithmetical errors found in the Bill of Quantities as a result of faulty multiplication or addition will be corrected by the Employer's Agent at the tender evaluation stage, as set out in the Standard Conditions of Tender Clause F3.9.

## 9. MONTHLY PAYMENTS

Unless otherwise specified in the Specifications and Project Specifications, progress payments in Interim Certificates, referred to in Clause 6.10 of the GCC 2015, in respect of "sum" items in the Bill of Quantities shall be by means of interim progress installments assessed by the Employer's Agent and based on the measure in which the work actually carried out relates to the extent of the work to be done by the Contractor.

## 10. CONTINGENCY

The sum provided under contingency in the Bill of Quantities is under the sole control of the Employer and may be deducted in whole or in part and shall only be expended by written order of the Employer as a Variation Order.

## 11. ASSET CODES

The alphabetical characters appearing in the "AC" column (if applicable) in the Bill of Quantities are for the Employer's administrative purposes only and do not have any relevance to the rates tendered.

*Note to document compiler: The extreme right hand column of the BoQ is to be titled "AC" and the relevant Asset Code from the list below inserted for each major section in the BoQ.*

C = Civil infrastructure  
M = Mechanical infrastructure  
E = Electrical infrastructure  
I = Instrumentation

*Note to document compiler: Select from the above list for each major section in the Bill of Quantities*

## 12. UNITS OF MEASUREMENT

The units of measurement described in the Bill of Quantities are metric units for which the standard international abbreviations are used. Abbreviations used in the Bill of Quantities, including some non-standard abbreviations, are as follows:

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

C2.4.

## C2.2 BILL OF QUANTITIES

TENDER NO: 2024/143 APPOINTMENT OF A TURNKEY CONTRACTOR FOR THE DESIGN AND CONSTRUCTION OF A PRE- THICKENER, REHABILITATION OF DIGESTER 5&6 STAIRCASE AND INTERNAL REHABILITATION OF A RESERVOIR IN THE INLAND REGION

ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
1.		<b>PART 1: PRELIMINARY AND GENERAL</b>				
1.1	SANS 1200a	<b>SCHEDULE 1.1: SCHEDULED FIXED-CHARGE ITEMS AND VALUE-RELATED ITEMS</b>				
1.1.1	8.3.1	<b>Contractual Requirements</b>				
1.1.1.1		Sureties	Sum	1		
1.1.1.2		Professional Indemnity Insurance	Sum	1		
1.1.1.3		Insurance of the works and plant	Sum	1		
1.1.1.4		Third party or public liability insurance	Sum	1		
1.1.1.5		Unemployment Insurance	Sum	1		
1.1.2	8.3.2.1	<b>FACILITIES FOR EMPLOYER'S AGENT</b>				
1.1.2.1		Provide one container for office use fully equipped with light, furniture, aircon, electrical connection outlets, coffee station, etc.	Sum	1		
1.1.2.2	8.3.2.1 (e)	Ablutions	Sum	1		
1.1.2.3	8.3.2.1 (g)	Water supplies, electric power and communications	Sum	1		
1.1.3	8.3.2.2	<b>Facilities for Contractor:</b>				
1.1.3.1	8.3.2.2 (a)	Offices and storage sheds	Sum	1		
1.1.3.2	8.3.2.2 (e)	Ablution and latrine facilities	Sum	1		
1.1.3.3	8.3.2.2 (f)	Tools, equipment and design software	Sum	1		
1.1.3.4	8.3.2.2 (g)	Water supplies, electric power, and communication	Sum	1		
1.1.3.5	8.3.2.2 (h)	Dealing with water	Sum	1		
1.1.3.6	8.3.2.2 (i)	Access this includes scaffolding	Sum	1		
1.1.3.7	8.3.2.2 (j)	Plant	Sum	1		
1.1.3.8	8.3.4	Removal of site establishment	Sum	1		
1.1.3.9		Health and safety file obligations for the contract and COVID-19 safety requirements	Sum	1		
1.1.3.10		Site security for the duration of the contract at Clarendon Reservoir	Sum	1		
<b>Subtotal of Schedule 1.1: Fixed Charged Items</b>						
<b>MANDATORY:</b> Add 35% of Summary of Section 1.1 for P&G for Emerging Contractors (Should this item not be priced by the Contractor it will be deemed that the above mentioned required 35% is inclusive in their Tendered Rates for P&G for Emerging Contractors)					35%	
<b>Total Section 1.1 Fixed Charged Items Carried Forward To Total Summary (Subtotal 1.1 + Mandatory)</b>						



C2.5.

ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
<b>1.2</b>	<b>SABS 1200 A, PSA</b>	<b>SCHEDULE 1.2 : PRELIMINARY AND GENERAL TIME RELATED ITEMS</b>				
		<b>Operate and maintain facilities on site</b>				
<b>1.2.1</b>		<b>CONTRACTUAL REQUIREMENTS</b>				
1.2.1.1	8.4.1	Contractual Requirements for the duration of the Contract	Sum	1		
<b>1.2.2</b>	<b>8.4.2.1</b>	<b>Facilities for Employer's Agent</b>				
1.2.2.1	8.4.2.1 (a),	Provide one container for office use fully equipped with light, furniture, aircon, electrical connection outlets, coffee station, etc.	Sum	1		
1.2.2.2	8.4.2.1 (b),	Ablutions	Sum	1		
1.2.2.3		Water supplies, electric power and communications	Sum	1		
<b>1.2.3</b>	<b>8.4.2.2</b>	<b>Facilities for Contractor:</b>				
1.2.3.1		Offices and storage sheds	Sum	1		
1.2.3.2	8.4.2.2 (e)	Ablution and latrine facilities	Sum	1		
1.2.3.3	8.4.2.2 (f)	Tools, equipment and design software	Sum	1		
1.2.3.4	8.4.2.2 (g)	Water supplies, electric power and communication	Sum	1		
1.2.3.5	8.4.2.2 (h),	Dealing with water	Sum	1		
1.2.3.6	8.4.2.2 (i)	Access	Sum	1		
1.2.3.7	8.4.2.2 (j)	Plant	Sum	1		
1.2.3.8		Health and safety file obligations for the contract	Sum	1		
1.2.3.9	8.4.3	Supervision for the duration of design and construction	Sum	1		
1.2.3.10	8.4.4	Company and head office overhead costs for the duration of the Contract	Sum	1		
1.2.3.11	PS 5.15	Site security for the duration of the contract	Sum	1		
<b>1.2.4</b>		<b>OTHER TIME RELATED OBLIGATIONS:</b>				
1.2.4.1	PSA 8.4.2.1 i) PSAB 5.9	Community Liaison officer (4 no. of for the different site locations) (CLO)	Prov. sum	1	R200 000	R200 000
1.2.4.2	A 8.5 b) 2)	Contractor's mark up on above Item	%	R200 000	10%	R20 000
1.2.4.3		Location of all services and proving of same as well as updating of existing records of services.	Sum	1		
1.2.4.4.		Provision of photographic record of progress with the Works as agreed with the Engineer	Sum	1		
1.2.4.5		Contractor's responsibility for Construction Programme	Sum	1		
<b>TOTAL CARRIED FORWARD</b>						

C2.6.

ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
<b>TOTAL BROUGHT FORWARD</b>						
1.2.4.6		Contractors responsibility for monthly reporting and meeting attendance	Sum	1		
<b>1.2.5</b>		<b><u>SUMS STATED PROVISIONALLY BY THE EMPLOYER'S AGENT</u></b>				
1.2.5.1	PSL1	Appointment of a professional service provider to undertake requirements of this contract- Stages 1-6 normal services and level 3 construction monitoring additional services as per ECSA Gazetted tariff of fees.	Prov Sum	1	R2 000 000	R2000 000
1.2.5.2		Contractor's mark up on above Item	%	R200 000	10%	R200 000
1.2.5.3		Provide a Level 3 Site Monitoring service as per ECSA guidelines including transport and accommodation.	Prov Sum	1	R750 000	R750 000
1.2.5.4		Contractor's mark up on above Item	%	R750 000	10%	R75 000
<b>Subtotal of Section 1.2: Time Related Items</b>						
<b>MANDATORY:</b> Add 35% of Summary of Section 1.2 for P&G for Emerging Contractors (Should this item not be priced by the Contractor it will be deemed that the above mentioned required 35% is inclusive in their Tendered Rates for P&G for Emerging Contractors					35%	
<b>Total Section 1.2 Time Related Items Carried Forward To Total Summary (Subtotal 1.2 + Mandatory)</b>						

ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
<b>1.3</b>		<b>SCHEDULE 1.3: OTHER PRELIMINARY AND GENERAL ITEMS</b>				
<b>1.3.1</b>		<b>FACTORY ACCEPTANCE TESTING AND INSPECTIONS BY UUV PERSONNEL</b>				
1.3.1.1		Travel and accommodation for Factory Acceptance Testing and Factory Witness Inspections for quality inspections of Mechanical, Civil and Electrical equipment by the Employer and Engineer is measured under a Provisional Sum under Schedule 2	Prov Sum	1	R 200 000	R 200 000
		Contractor's mark up on above Item	%	R200 000	10%	R20 000
<b>1.3.2</b>		<b>AS-BUILTS</b>				
1.3.2.1		As-built Survey for entire rising main pipeline from raw water pump station to the Harding water treatment plant inclusive of pump station building	Sum	1		
1.3.2.2		Provision of full set of dimensioned marked up Record Drawings in A0 Hardcopy and Electronic PDF format	Sum	1		

C2.7.

1.3.2.3		Provide as-built drawings and wiring diagrams of the complete electrical installation	Sum	1		
<b>1.3.3</b>		<b>DOCUMENTATION</b>				
		<b>Prepare and submit Operation and Maintenance Manuals to the Engineer's satisfaction, for:</b>				
1.3.3.1		3 x sets manufacturers and supplier schedules, operation and maintenance manuals and drawings (hard copy + CD of Electronic PDF format)	Sum	1		
1.3.3.2		Providing 2 draft copies of the Installation, Operation and Maintenance Manual complete with instrumentation system to the Engineer's acceptance prior to commissioning of the Works; until acceptance	Sum	1		
1.3.3.3		Providing 3 final copies of the Installation, Operation and Maintenance Manual of Mechanical, Electrical and complete with instrumentation system to the Engineer's approval after commissioning prior to Issuing of Practical Completion Certificate	Sum	1		
<b>TOTAL CARRIED FORWARD</b>						
ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
<b>TOTAL BROUGHT FORWARD</b>						
<b>1.3.4</b>		<b>TESTS AND COMMISSIONING</b>				
		<b>Civil</b>				
1.3.4.1		Guarantee and Maintenance of complete civil installation for 12 months after Practical Completion and handover to the Client.	Sum	1		
		<b>Mechanical</b>				
1.3.4.2		Guarantee and Maintenance of complete mechanical installation for 12 months after Practical Completion and handover to the Client.	Sum	1		
1.3.4.3		Conduct FATs & SATs under Engineer, x2 uMngeni-uThukela Water Engineer's and their representative's attendance and supervision	Sum	1		
1.3.4.4		Flight and accommodation for x2 UUW representative to witness FAT	Sum	1		
		<b>Electrical and Instrument</b>				
1.3.4.5		Guarantee and full maintenance of the Instrumentation Installation	Sum	1		

C2.8.

		system for 12 months after Practical Completion and handover to the Client.				
1.3.4.6		Flight and accommodation for x2 Uuw representative to witness FAT	Sum	1		
1.3.4.7		Issue final Electrical & instrumentation compliance and test and commissioning certificates	Sum	1		
<b>1.3.5</b>		<b>EMPLOYER'S STAFF TRAINING</b>				
1.3.5.1		Operations and Maintenance Training and Skills Transfer of uMngeni-uThukela Water Staff. Contractor to allow for a period of the entire contract duration	Sum	1		
1.3.5.2		Training: Allow for 10 days of training for 10 people from Maintenance and 10 people from Operations of maintenance of equipment	Sum	1		
<b>Total Section 1.3 Other Preliminary and General Items Carried Forward To Total Summary</b>						<b>R</b>

ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
<b>PART 2: DESIGN, CONSTRUCT AND COMMISSIONING OF NEW PRE-THICKENER</b>						
<b>2.1.</b>	<b>ASSESSMENTS AND DESIGN</b>					
Review with reference to design drawings for Pre-thickener No.2 and Redesign a new pre-thickener to mirror pre-thickener No.2. This work must include but not limited: the Civil structure, Mechanical, Electrical and Instrumentation work. The Design amendment to the existing design must be presented to the Employers Agent prior to construction of the unit.						
2.1.1		Structural concrete and civil engineering design works	Sum	1		
2.1.2		Steel works and mechanical engineering works	Sum	1		
2.1.3		Electrical and Instrument	Sum	1		
2.1.4		Linking/programming of the unit to the SCADA	Sum	1		
<b>2.2</b>	<b>CONSTRUCTION OF NEW PRETHICKENER</b>					
2.2.1		Earthworks	Sum	1		
2.2.2		Concrete work	Sum	1		
2.2.3		Pipework	Sum	1		
2.2.4		Mechanical work	Sum	1		
2.2.5		Electrical work	Sum	1		
2.2.6		Instrumentation work	Sum	1		
<b>2.3</b>	<b>DEMOLITION AND REMOVAL OF PRE-THICKENER NO.1</b>					
2.3.1	PSR 2	Demolition and disposal of concrete and masonry work.	Sum	1		
2.3.2		Dismantling and disposal of steel walk way and stair case.	Sum	1		

C2.9.

2.3.3		Dismantling and disposal of pre thickener steel bridge and rotating mechanical components.	Sum	1		
2.3.4		De-sludge, clean the tank of all debris and disinfect the tank surfaces internally.	Sum	1		
2.3.5		Dismantling and disposal of all electrical elements.	Sum	1		
2.3.6		Earthworks and rehabilitation.	Sum	1		
<b>2.4</b>	<b>COMMISSIONING AND HANDOVER</b>					
2.4.1		Cold Commissioning	Sum	1		
2.4.2		Hot Commissioning	Sum	1		
2.4.3		Operation and Maintenance Manuals	Sum	1		
2.4.4		As-Built Drawings (including P&ID)	Sum	1		
<b>PART 2 SUBTOTAL CARRIED FORWARD TO TOTAL SUMMARY</b>						
ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
<b>PART 3: REHABILITATION AND INSTALLATION OF DIGESTER 5&amp;6 STAIRCASE</b>						
<b>3.1</b>	<b>ASSESSMENT AND DESIGN</b>					
3.1.1		Conduct a thorough study/assessment of the Staircase. Compilation and submission of the report to the Engineers.	Sum	1		
3.1.2		Redesign the digester 5&6 access stair case to mirror the current digester 7&8 access, this work must include Structural, Civil and other related work.	Sum	1		
<b>3.2</b>	<b>ACCESS FOR STAIRCASE REHABILITATION</b>					
	PSR 1	Temporary access structure and work platforms				
3.2.1		Staircase (Max Height 20 m)	Sum	1		
3.2.2		Crane /Lifting equipment	Sum	1		
<b>3.3</b>	<b>DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK</b>					
3.3.1	PSR 2	Dismantling of existing digester 5&6 access stair case.	Sum	1		
3.3.2		Demolishing of existing concrete bases/plinth.	Sum	1		
<b>3.4</b>	<b>FABRICATION, INSTALLATION AND IMPLEMENTATION OF THE DESIGNS</b>					
3.4.1		Manufacture/fabrication supply and deliver of Staircase steel element as per specifications.	Sum	1		
3.4.2		Installation of new staircase as per specification.	Sum	1		
3.4.3		Construction of new concrete footings and anchors.	Sum	1		
3.4.4		Provide the as-built drawings and all relevant certification.	Sum	1		
<b>PART 3 SUBTOTAL CARRIED FORWARD TO SUMMARY</b>						

C2.10.

ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
<b>PART 4: REHABILITATION OF CLARENDON RESERVOIR</b>						
<b>4.1</b>	<b>ASSESSMENT AND REPAIR WORKS</b>					
4.1.1		Conduct a thorough study/assessment of the Staircase and Compilation and submission of the report to the Engineers	Sum	1		
4.1.2		Redesign the stair case to mirror the current digester 7&8, this work must include Structural and Civil	Sum	1		
<b>4.2</b>	<b>ACCESS FOR CLARENDON RESERVOIR REHABILITATION</b>					
	PSR 1.1	Temporary access structure and work platforms				
4.2.1		Reservoir (Max Height Externally -5 m; Max Height internally 7 m)	Sum	1		
4.2.2		Crane /Lifting equipment	Sum	1		
4.2.3		Internal Lighting for the reservoir	Sum	1		
<b>4.3</b>	<b>DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK</b>					
4.3.1	PSR 5.1.3	Construction joint :Removal of existing joint sealant and clean all joints by mechanical method	Sum	1		
4.3.2		Reservoir Floor Slab: Removal of existing joint sealant and clean all joints by mechanical method	Sum	1		
4.3.3	PSR 2.2	Removal of existing cat ladders and cage	Sum	1		
4.3.4		Removal of overflow pipes	Sum	1		
4.3.5		Cleaning and preparation of corroded pipe	Sum	1		
<b>4.4</b>	<b>REHABILITATION/REPAIRS TO CONCRETE WORK AND EXPANSION JOINTS</b>					
4.4.1		Construction joint and walls :Installation of new joint system as per manufacture and approved design specification	Sum	1		
4.4.2		Reservoir Floor Slab: Removal of existing joint sealant and clean all joints by mechanical method Installation of new joint system as per manufacture and approved design specification	Sum	1		
4.4.3	PSR 5.1.3	External rehabilitation and sealing	Budget ary Sum	1	R500 000	R500 000
<b>4.5</b>	<b>REHABILITATION/REPAIRS TO STEEL ELEMENTS AND PIPES</b>					
	PSR 6.1	Repair pipework coating in accordance to the particular specification, complete inclusive of labour, materials, plant, supervision and QA/QC defects as directed by the Engineer for:				
4.5.1		ND 450 mm outlet pipe	Sum	1		
4.5.2		ND 600 mm Inlet pipe	Sum	1		
4.5.3		DN 200 mm Scour pipe	Sum	1		

C2.11.

TOTAL CARRIED FORWARD						
ITEM No	PAYMENT REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R-C
<b>TOTAL BROUGHT FORWARD</b>						
4.5.4		Replacement of DN 450 mm overflow pipe within the reservoir	Sum	1		
4.5.5	PSR 7	Rehabilitation and replacement of internal cat ladder and cage 7 m height	Sum	1		
4.5.6		Rehabilitation of external cat ladder and cage 6 m height	Sum	1		
4.5.7		Rehabilitation of handrails around the reservoir	Sum	1		
<b>PART 4 SUBTOTAL CARRIED FORWARD TO SUMMARY</b>						

**SUMMARY OF BILL OF QUANTITIES**

PART	DESCRIPTION	AMOUNT R-C
<b>PART 1</b>	<b>PRELIMINARY AND GENERAL</b>	
	SECTION 1.1: FIXED CHARGED ITEMS	
	SECTION 1.2: TIME RELATED ITEMS	
	SECTION 1.3: OTHER PRELIMINARY AND GENERAL ITEMS	
<b>PART 2:</b>	<b>DESIGN, CONSTRUCT AND COMMISSIONING OF NEW PRE-THICKENER</b>	
<b>PART 3</b>	<b>REHABILITATION AND INSTALLATION OF DIGESTER 5&amp;6 STAIRCASE</b>	
<b>PART 4</b>	<b>REHABILITATION OF CLARENDON RESERVOIR</b>	
<b>A SUBTOTAL</b> <i>(Use to calculate CPG amount and percentage)</i>		
<b>B CONTINGENCIES</b> Add 10% of Subtotal A		
<b>C SUBTOTAL (A + B)</b>		
<b>D CONTRACT PRICE ADJUSTMENT</b> <i>(The provisional sum provided here may be employed only as necessary in terms of the Contract Price Adjustment Schedule)</i>		
<b>E SUBTOTAL (C+ D)</b>		
<b>F VALUE ADDED TAX</b> Add 15 % of Subtotal E		
<b>TOTAL (E+F) CARRIED TO "SECTION A: OFFER" OF C1.1 FORM OF OFFER AND ACCEPTANCE</b>		

SIGNED ON BEHALF OF TENDERER: .....

**C3.1 STANDARD SPECIFICATIONS C3.2**

**C3.2 AMENDMENTS TO THE STANDARD SPECIFICATIONS C3.3**

INTRODUCTION.....	C3.4
PSAA: GENERAL .....	C3.4
PSAB: EMPLOYER'S AGENT'S OFFICE .....	C3.7
PSC: SITE CLEARANCE .....	C3.10
PSDA: EARTHWORKS (Small Works).....	C3.12
PSGA: CONCRETE (Small Works) .....	C3.27
PSL: MEDIUM PRESSURE PIPELINES .....	C3.36
PRS: PROJECT SPECIFIC SPECIFICATION AND STANDARDS. ....	C3.46

**C3.3 UMNGENI – UTHUKELA WATER PARTICULAR SPECIFICATIONS C3.6**

**C3.4 AMENDMENTS TO THE UMNGENI-UTHUKELA WATER PARTICULAR SPECIFICATIONS**

- C3.4.1 UMNGENI-UTHUKELA WATER PARTICULAR SPECIFICATION FOR 164mm to 2230mm DIAMETER STEEL PIPE, SPECIALS, COATINGS AND LININGS
- C3.4.2 UMNGENI-UTHUKELA WATER PARTICULAR SPECIFICATION FOR WEDGE GATE AND RESILIENT SEAL VALVES
- C3.4.3 AMENDMENTS TO THE PARTICULAR SPECIFICATION FOR VALVES
- C3.4.4 AMENDMENTS TO PARTICULAR SPECIFICATION FOR ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION PROJECTS
- C3.4.5 UMNGENI-UTHUKELA WATER TECHNICAL SPECIFICATION FOR ELECTRICAL INSTALLATIONS

**C3.5 PROJECT SPECIFICATIONS C3.10**

STATUS .....	C3.68
PS-1 PROJECT DESCRIPTION .....	C3.68
PS-2 OVERVIEW AND DETAILS OF CONTRACT .....	C3.68
PS-3 DESCRIPTION OF SITE AND ACCESS .....	C3.69
PS-4 NATURE OF GROUND AND SUBSOIL CONDITIONS .....	C3.69
PS-5 DRAWINGS.....	C3.70
PS-6 CONSTRUCTION AND MANAGEMENT REQUIREMENTS.....	C3.72
PS-7 CONSTRUCTION PROGRAMME .....	C3.73
PS-8 SITE FACILITIES AVAILABLE .....	C3.74
PS-9 SITE FACILITIES REQUIRED .....	C3.75
PS-10 OCCUPATIONAL HEALTH AND SAFETY .....	C3.75
PS-11 ENVIRONMENTAL MANAGEMENT .....	C3.76
PS-12 SELECTED SUBCONTRACTORS .....	C3.76
PS-13 GUIDELINES FOR THE RECRUITMENT OF LOCAL LABOUR FOR THE IMPLEMENTATION OF WATER INFRASTRUCTURE PROJECTS .....	C3.77
PS-14 SPECIALIST.....	C3.80
PS-15 SHUTDOWN OPERATIONS.....	C3.80



### C3.1 STANDARD SPECIFICATIONS

The standard specifications on which this contract is based are the South African Bureau of Standards Standardized Specifications for Civil Engineering Construction SABS 1200 series. Although not bound in nor issued with this Document, the following Sections of the Standardized Specifications of SABS 1200 shall form part of this Contract:

*("SABS" has been changed to "SANS, without change to the contents of the specifications.)*

AA	1986	-	GENERAL (Small Works)
AB	1986	-	EMPLOYER'S AGENT'S OFFICE
C	1982	-	SITE CLEARANCE
DA	1990	-	EARTHWORKS (Small Works)
GA	1982	-	CONCRETE (Small Works)
HA	1990	-	STRUCTURAL STEELWORK (Sundry Items)
L	1983	-	MEDIUM PRESSURE PIPELINE
LB	1983	-	BEDDING (Pipes)

The following SANS specifications are also referred to in this document and the Contractor is advised to obtain them from Standards South Africa (a division of SABS) in Pretoria.

SANS 1921 (2004): Construction and Management Requirements for Works Contracts  
Part 1: General Engineering and Construction Works;  
Part 2: Accommodation of Traffic on Public Roads Occupied by the Contractor;  
Part 5: Earthworks activities which are to be performed by hand;

SANS ISO 1461(2009): Hot – dip galvanised coatings on fabricated iron and steel articles.

SANS 1083 (2006): Aggregates from natural sources - Aggregates for concrete

SANS 50197 1 and 2: Common cement

#### **Preface on Interim Situation until Full Suite of SANS Series of Specifications are Available**

The Bill of Quantities is based on the SABS 1200 system of specifications and measurement.

Where SANS specifications are available, these have been incorporated into the "Contract" section of this document.

Where overlapping specifications from the SANS 2001 series of specifications occur the appropriate SABS 1200 specifications have been incorporated in the Project Specifications. In such cases, the requirements of the latter shall prevail over the requirements of the SANS specification(s).

The payment clauses in the Bill of Quantities are based on the SABS 1200 series of specifications for consistency and the Tenderer is required to ensure that he has priced all of the requirements pertaining to the SABS specifications.

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## C3.2 AMENDMENTS TO STANDARD SPECIFICATIONS

### INTRODUCTION

In certain clauses the standard, standardized and particular specifications allow a choice to be specified in the project specifications between alternative materials or methods of construction and for additional requirements to be specified to suit a particular contract. Details of such alternative or additional requirements applicable to this contract are contained in this part of the project specifications. It also contains additional specifications required for this particular Contract.

The number of each clause and each payment item in this part of the project specifications consists of the prefix PS followed by a number corresponding to the number of the relevant clause or payment item in the standard specifications. The number of a new clause or payment item, which does not form part of a clause or a payment item in the standard specifications and which is included here, is also prefixed by PS, but followed by a new number which follows on the last clause or item number used in the relevant section of the standard specifications

FOR INFORMATION USE ONLY

*PSAA: GENERAL (Small Works)*  
(Applicable to SABS 1200 AA – 1986)

## **PSAA GENERAL (Small Works)** **(Applicable to SANS 1200 AA – 1986)**

### **PSAA GENERAL**

#### **PSAA 3 MATERIALS**

##### **PSAA 3.1 QUALITY AND SAMPLES**

*Add to the Sub-Clause:*

No used or recycled material may be used in the Works unless expressly authorised by the Employer's Agent.

Samples of concrete aggregates are to be delivered to an approved laboratory and results shall be approved by the Employer's Agent prior to use.

Alternative materials or equipment proposed by the Contractor shall be tested. The test, as well as the materials or equipment, shall be approved by the Employer's Agent prior to any such materials or equipment being built into the works and all costs involved in testing shall be deemed to be included in the rates tendered.

### **PSAA 4 PLANT**

#### **PSAA 4.1 CONTRACTOR'S OFFICES AND STORES**

*Add to the Sub-Clause:*

Neither housing nor shelters are available for the Contractor's Employees, and the Contractor shall make his own arrangements to house his Employees and transport them to the site. The Contractor shall use taxis approved by the Employer's Agent to transport his staff to and from site (i.e. no transporting of staff on the back of 'bakkies' shall be permitting).

The Contractor's camp shall be kept neat and clean at all times and all surplus or rejected material shall be removed from the site.

The temporary facilities and ablution facilities shall comply with the requirements of the Local Authority; and upon completion of the Works, or as soon as the Contractor's facilities are no longer required, the Contractor shall remove such facilities and clear away all surface indications of their presence. The site is to be rehabilitated to its original conditions or better and shall be approved by the Employer's Agent.

### **PSAA 5 CONSTRUCTION**

#### **PSAA 5.4 PROTECTION OF OVERHEAD AND UNDERGROUND SERVICES**

*Add to the Sub-Clause as the first sentence;*

"This clause also covers all visible services."

*Add to the Sub-Clause:*

Where work is carried out in the proximity of buildings, bridges, buried services, tanks, pipes, walls or other structures, the Contractor is reminded of his obligation to take all necessary precautions required in terms of the regulations framed under the Occupational Health and Safety Act (Act N° 85 of 1993) to ensure the safety of structures and services that are at risk.

The exact location of the existing services and/or structures shall be proved by hand excavation or special equipment prior to the commencement of any work in the vicinity.

#### **PSAA 5.4 SAFETY**

*Delete the wording and replace with:*

Project Site Specific Health and Safety specifications attached under C5 in Volume 3 shall apply.

#### **PSAA 5.5 GROUND AND ACCESS TO WORKS**

*Add to the Sub-Clause the following:*

"On completion of operations the Contractor shall restore the ground surface, wherever it may have been disturbed, to its original condition by filling in all ruts with material similar to the material within the rut and levelling the ground and, where necessary, planting grass and shrubs as may be required. Any boundary fences which have been removed or damaged by his operations and activities shall be repaired and/or reinstated at the Contractor's expense. Ground restoration must include proper placement of topsoil profile".

#### **PSAA 6 TOLERANCES**

##### **PSA 6.2 DEGREES OF ACCURACY**

*Add to Sub-Clause:*

Generally, Degree of Accuracy II shall be applicable to the whole of the Works, unless specified otherwise (refer specifically to PSDA 6 and PSGA 6).

**PSAA 8 MEASUREMENT AND PAYMENT**

**PSAA 8.2.2 Time-Related Items**

Re-word the third and fourth lines to read:

*“incremental amounts will be”*

*Add to the Sub Clause:*

Notwithstanding the provisions of Sub-Clause 8.2.2, an approved extension of time will not qualify the Contractor to receive any payment for that portion of fixed charge and value-related items which has become regarded as "time-related" items in terms of PSA 8.2.2 above.

**PSAA 8.3 SCHEDULED FIXED-CHARGE AND VALUE-RELATED ITEMS**

**PSAA 8.3.2 Establishment of Facilities on the Site**

**PSAA 8.3.2 a) Facilities for the Engineer**

*Add the following additional sub-items:*

- (e) Survey instruments and assistants..... Unit: Sum
- (f) Site Instruction books.....Unit: Sum
- (g) Internet Connections..... Unit: Sum

The tendered rate shall cover all costs as specified in Sub-Clause 8.3.2.3 of SANS 1200 A (*and Clauses PSAB3.2 and 4.2 if applicable*).

**PSAA 8.3.2 b) Facilities for Contractor**

For this Contract the facilities for the Contractor will not be measured and paid for separately as itemized in Sub-Clause 8.3.2.2. The sub-items (a) to (j) are to be consolidated into one item and payment under Item PSA

8.3.2.2 Shall be deemed to cover all these sub items.

**PSAA 8.4 SCHEDULED TIME-RELATED ITEMS**

**PSAA 8.4.2 Operation and Maintenance of Facilities on Site**

**PSAA 8.4.2 a) Facilities for Engineer**

*Add the following additional sub-items:*

- (i) Community Liaison officer.....Unit: Day

The tendered rates shall cover all costs as specified in Sub-Clause 8.4.2.3 of SANS 1200A and 5.5 of SANS 1200AB and as specified in clauses PSAB 3.2 and 4.2.

## **PSAB ENGINEER'S OFFICE**

**(Applicable to SANS 1200 AB-1986)**

Delete the word "Engineer" wherever it appears in this Specification, and replace with "Employer's Agent".

## **PSAB 2 INTERPRETATIONS**

### **PSAB 2.3 DEFINITIONS**

Delete the first two lines and substitute the following:

For the purposes of this specification the definitions given in SANS 1200 AA shall apply:

Add the following:

**Community Liaison Officer (CLO).** The party on Site who represents the Contractor and Employer with regards to link between the affected and interested local community members and the Contractor and Employer.

The CLO shall reside within the Project area for the duration of the Works. The CLO is the mouthpiece of the community to the project and vice versa. S/he will be responsible for ensuring stability within the project, Interact with all stakeholders on crucial issues to ensure smooth running of the project. In addition, the incumbent is expected to develop and sustain communication channels between stakeholders in promotion of workmanship so as to prevent conflicts and disruption of the project. The Community Liaison Officer reports to the Institutional and Social Development (ISD) and the Contractor on community related issues.

## **PSAB 3 MATERIALS**

### **PAB 3.1 NAMEBOARDS**

In the 3rd line delete "the South African Institution of Civil Engineers" and substitute with "UMngeni-uThukela Water".

Add the following:

The position of the name boards will be subject to the Employer's Agent's approval and must in no way obstruct sight lines for road, rail or pedestrian traffic. All arrangements regarding permission and approval from the controlling authority as far as location are concerned are the Contractor's responsibility.

The name boards shall conform to the standard layout and design as formulated by UMngeni-uThukela Water.

## **PSAB 4 PLANT**

### **PSAB 4.1 TELEPHONE**

Delete Sub-Clause and substitute the following:-

The Contractor shall provide one Contract Cellular phone (Smart phone) and furthermore, include a Contract a sum of R 770 per month for a period of time equal to 4 months (estimated Time for Completion of the Contract (see Contract Data)); to cover the cost of the Employer's Agent and his/her representative's cellular telephone calls.

The Contractor shall also provide one Contract Cellular phone (Smart phone) and include a sum of R 770 per month for a period of time equal to 4 months (estimated time to Completion of the Contract (see Contract Data)) to cover the cost of the CLO's cellular telephone calls.

*Add new Sub-Clause:-*

#### **PSAB 4.2 SURVEY EQUIPMENT**

The Contractor shall provide the following survey equipment on the site from the commencement to the completion of the works:

- One tachometer capable of reading to twenty seconds of arc plus tripod
- One automatic reading level plus tripod for Employer's Agent's
- One levelling staff (5m long, 1cm graduations)
- One staff angle bubble
- One metal change-point for levelling
- One separate plumb-bob
- One spirit level (one metre long)
- One hammer (2kg) with steel or wooden pegs as necessary
- Two canvas carry bags
- One 50m steel tape
- One 5m (or longer) retractable steel tape

The equipment may be shared by arrangement between the Contractor and the Employer's Agent or his representative on Site. The Contractor shall keep the equipment continuously insured against any loss, damage, or breakage and he shall indemnify the Employer's Agent and the Employer against any claims in this regard. Upon completion of the Works the survey equipment as listed above shall revert to the Contractor.

The Contractor shall maintain the equipment in good working order and keep it clean until the completion of the works.

*Add new Sub-Clause:-*

#### **PSAB 5 CONSTRUCTION**

##### **PSAB 5.4 TELEPHONE**

*Delete the last sentence.*

##### **PSAB 5.5 SURVEY ASSISTANTS**

*Delete the first sentence and substitute the following:*

The Contractor shall make available to the Employer's Agent two suitably educated labourers for use on and about the site for survey and other work directed by the Employer's Agent at all reasonable times.

*Add new Sub-Clause:*

#### **PSAB 5.6 SITE INSTRUCTION BOOKS**

The Contractor shall provide, to the Employer's Agent, 2 No. 150 page x A4 "Site Instruction" books. Said books shall have triplicate pages for each instruction – stating one for Contractor, Employer's Agent (these two pages being perforated along the page margin and able to be removed) and Office purposes

*Add new Sub-Clause:*

#### **PSAB 5.9 Community Liaison officer (CLO)**

The Contractor shall appoint a CLO approved by Employer's Agent to act as an intermediary between the Contractor and Employer with regards to issues and employment of local community members on Site, etc. The CLO will form part of the Employer's Agent team.

An item with Provisional Sum has been allocated for this appointment.

#### **PSAB 8 MEASUREMENT AND PAYMENT**

##### **PSAB 8.1 Scheduled Items**

*Delete the 1st sentence and substitute the following:*

Items will be scheduled in terms of Sub-Clauses 8.3.2 & 8.4.2 of SANS1200 A.

##### **PSAB 8.2.1 Fixed and Time-related Charges**

*Delete the 1st sentence and substitute the following:*

The terms of Sub-Clause 8.2 of SANS 1200 A shall apply.

#### **PSC SITE CLEARANCE**

**(Applicable SANS 1200 C - 1980 As Amended 1982)**

##### **PSC 1 SCOPE**

Add the following sub-clause:

The requirements of the "uMngeni-uThukela Water Particular Specification for Environmental Management of

Construction Projects" and/or the Project Specific Environmental Management Plan shall take precedence over SANS 1200 C - 1980 as amended.



### PSC 3 MATERIALS

#### PSC 3.1 Disposal of Material

Delete this clause and refer to Clause PSZB 5.2 of the “uMngeni-uThukela Water Particular Specification for Environmental Management of Construction Projects” and Project specific Environmental Management Plan. In all events, the latter takes precedence.

### PSC 5 CONSTRUCTION

### PSC 8 MEASUREMENT AND PAYMENT

#### PSC 8.2 SCHEDULED ITEMS

**PSC 8.2.7 Dismantle and remove pipeline, pipe fittings, valves, etc.**.....Unit: Sum

**PSC 8.2.11 Temporary Fencing**.....Unit: m

Payment will be made for the provision of *temporary fencing* (inclusive of gate/s) in the manner specified in PSC 5.3.1.

The rate shall include for maintaining such *temporary fencing* in good condition, including daily surveillance, repair or replacement (e.g. due to theft thereof), throughout the duration of construction and removal on completion of the works.

#### PSDA 5 CONSTRUCTION

*Reword heading:*

**PSDA 5.1.1.1 Barricading and Lighting** (Refer SANS 1921-1 Clause 4.18.2 and 4.18.3) *Delete the Sub-Clause and substitute:*

Without limiting any obligation which the Contractor may have in terms of any Act, Ordinance or other legislation, the Contractor shall ensure that all excavations which are accessible to the public or which is adjacent to a public road or thoroughfare, or by which the safety of persons may be endangered are protected as set out in Clause 13 of the General Safety Regulations of the Occupational Health and Safety Act, 1993 and that Watchmen are employed to ensure that barricades, barriers and lights are effective at all times.

All excavations shall be protected in accordance with PSC 5.3.1

*Reword heading:*

#### PSDA 5.1.1.3 c) Negligence

The Contractor shall be liable for all damages to services caused as a result of the Contractor's negligence.

### **PSD 5.1.5 Excessive Pollution**

(Refer SANS 1921-1 Clause 4.19)

Add the words "noise and", before the word "dust" in the first line.

Clause 4.19 of SANS 1921-1 shall apply.

*Add new Sub-Clause:*

### **PSDA 5.1.9 Existing Services**

*Add to the Sub-Clause: Clause 4.17 of SANS 1921-1 shall apply*

Where a service is damaged because of the Contractor's negligence, he shall be liable for the costs involved in the repair of the service and any other costs consequent upon the interruption of the damaged services.

## **PSDA METHODS AND PROCEDURES**

### **PSDA 5.2.3 Disposal**

*Add to Sub-Clause:*

The Contractor shall identify the closest landfill site and shall obtain all necessary approval to dispose of any solid waste generated by the construction activities (the cost of said approvals being to the Contractor's expense).

### **PSGA CONCRETE (SMALL WORKS) (As applicable to SANS 1200 GA - 1982)**

## **PSGA 2 DEFINITIONS**

### **PSGA 2.3(A) GENERAL**

*Add to the Sub-Clause:*

**Adverse weather:** Cold weather or weather in which:

- (a) the ambient temperature is above 32°C, or
- (b) the relative humidity is low, or
- (c) the wind velocity is high

or weather in which any combination of these three conditions occurs, and which tend to impair the quality of fresh or hardened concrete or otherwise causes the concrete to have abnormal properties.

### **PSGA 2.3(B)**

**QUALITY** *Add to the Sub-Clause:*

**Consistency:** The extent, as measured by the slump test, to which fresh concrete resists flow or deformation.

## **PSGA 2.4 EXPLANATION OF TERMS**

*Add new Sub-Clause:*

### **PSGA 2.4.3 Exposure Conditions**

#### **Mild Conditions**

Conditions under which the concrete is protected from the weather and exposed only to air.

#### **Moderate Conditions**

Conditions under which the concrete is:

- (a) sheltered from severe rain and is not subject to freezing when wet, or
- (b) buried in non-aggressive soil, or
- (c) continuously under fresh water.

#### **Severe Conditions**

Conditions under which the concrete is exposed or subjected to any of the following:

- (a) driving rain
- (b) alternate wetting and drying out
- (c) freezing when wet
- (d) fresh water (at the water-line)
- (e) splashing or spraying with fresh water
- (f) corrosive fumes or heavy condensation of water
- (g) aggressive soil
- (h) salt-laden air

### **PSGA-3 MATERIALS**

#### **PSGA-3.2 CEMENT**

##### **PSGA-3.2.1 Applicable specifications**

*Delete the sub-clause and replace with the following:*

The standard cement specifications SABS 471, SABS 626 and SABS 831, have been withdrawn and are replaced by SANS 50197-1 **and -2**: Common cements, and SANS 50413-1 **and - 2**: Masonry cement. These specifications will be applicable to this contract and the descriptions and types of cements, where specified, will be based on the designations as defined in these specifications.

Unless agreed to otherwise by the Employer's Agent, the cement used on the works shall be either Type Cem I, Type Cem II/A-S or Cem II/B-S (all of minimum strength Class 32,5) – refer table 1 of SANS 50197-1.

##### **PSGA 3.2.2 Storage of**

**Cement** *Add to the Sub-Clause:*

Cement shall not be kept in storage for longer than 8 weeks without the Employer's Agent's permission. Cement, if not delivered in bulk for storage in an approved silo, must be stored in a separate room with a raised floor constructed of heavy planks supported on bricks, or similar. This room must be completely damp-proof and well ventilated. Cement must be used in the order that it is delivered. Any bags of cement that show any degree of hydration or setting shall be removed from the site and replaced at the Contractor's expense.

### **PSGA 3.3 WATER**

*Replace entire contents with the following:*

*Dependable equipment shall be provided for measuring the mixing water either by mass or by volume to an accuracy within 3 per cent.*

*The accuracy of the measuring device provided shall be checked whenever required by the engineer or his representative by allowing it to discharge into vessels of accurately known capacity.*

*The total quantity of water allowed for shall include the free water present in the aggregates. The moisture content of the fine aggregate shall be determined at the beginning and half way through each concreting shift, after showers of rain or at such other intervals as may be required by the engineer*

### **PSGA 3.4 AGGREGATES**

#### **PSGA 3.4.2 Use of Plumbs**

##### **PSGA 3.4.2 g**

*Add New Sub-Clause:*

The use of plumbs will not be permitted in any of the strength concrete specified on the Works.

##### **PSGA 3.4.4 Aggregate quality Add New Sub-Clause:**

Fine aggregate must be clean, naturally occurring siliceous sand. The broken shell content determined in accordance with SANS Method 847 must not exceed 30 percent in the case of 26.5mm aggregate size and 25 percent in the case of 19.0mm aggregate size respectively.

The results of grading analysis tests on all the aggregates shall be kept. Sand from a source selected by the Contractor and approved by the Employer's Agent after testing by the Contractor will be used

under this Contract. Fine and coarse aggregates must comply fully with the requirements of SANS 1083.

### **PSGA 5 CONSTRUCTION**

#### **PSGA 5.2.1 Classification of Finishes**

Classification

Surface finishes to exposed (non-formed) concrete faces shall be classified as hereunder –  
Class 3 – wood float finish

Class 4 – steel trowel finish

Class 3 – wood float finish - Immediately after placing, the concrete shall be screeded as in Class 1. Thereafter, when the concrete has begun to dry, the surface shall be brought to a smooth and even finish using a wood float and including any additional 4:1 sand and cement as necessary.

Class 4 – Steel Float Finish -Immediately after placing, the concrete shall be screeded as in Class 1. Thereafter, when the concrete has begun to dry, the surface shall be brought to a smooth and even finish using a steel float and including any additional 4:1 sand and cement as necessary.

## **PSGA 5.5 Concrete**

### **PSGA 5.5.1 Quality**

#### **PSGA 5.5.1.1 General**

Add to G 5.5.1.1

The concrete shall also comply with the requirements for Durability stated in P.S.G 7.3.8

#### **PSGA 5.5.1.4 Chloride Content**

Replace the entire contents of the clause with:

The chloride content, measured as Cl<sup>-</sup>, of all concrete in the structure as measured by BS 1881:124:1988 shall not exceed 0.2% mass cement.

The maximum chloride content of fine aggregate shall be 0.2 % by mass as Cl<sup>-</sup> as measured by SANS Method 830:1976.

#### **PSGA 5.5.1.7 Strength Concrete**

Add to G 5.5.1.7

The cubes from the trial concrete mix are to be tested at a nominated concrete design laboratory, and only the results of these tests will be considered for approval.

The minimum content of combined cementitious material shall not be less than 325kg/m<sup>3</sup> and the maximum water/cement ratio shall be 0,5. The Contractor shall also submit for approval the proposed slumps and the proportions in which he proposes to use the materials for each grade of concrete in each type of construction.

In addition he shall state the minimum cement / water ratio in terms of total water in the mix for each grade of concrete, and the use of any admixtures.

No structural concrete shall be placed on the job until the contractor has satisfied the engineer as to the suitability of the mixes concerned.

The Contractor shall be deemed to have satisfied himself, before tendering, of his ability to produce concrete of the required quality with available materials conforming to the specification.

### **PSGA 5.5.2 Mixing**

#### **PSGA 5.5.3.1 Mixing at Construction Site.**

Add the following:

Mixing shall continue until there is a uniform distribution of the materials and the mixture is uniform in colour. The minimum period of mixing shall be not less than that recommended by the manufacturers at the recommended speed and not more than 30 minutes. The entire contents of the mixer shall be removed from the drum before the materials for the succeeding batch are loaded.

Where hand mixing is permitted, the quantities of cement used shall be increased by not less than 10% over those determined for the appropriate mix design. The concrete shall be mixed on a clean and watertight platform.

#### PSGA 5.5.4 Placing

Add the following:

Freshly placed concrete shall be protected from rain damage.

No concrete shall be placed if the air temperature in the shade is falling and is below 8°C or is rising and is below 5°C. Concreting shall not commence if the air temperature in the shade is above 35°C. The temperature of the concrete at the point of placing shall not exceed 30°C unless otherwise specified.

#### PSGA 5.5.8 Curing and Protection

Replace entire contents of G 5.5.8e with:

Covering with an inner hessian membrane and an outer plastic membrane. The hessian membrane is to be kept continuously damp by an independent automatic sprinkler system. The hessian and plastic membranes are to be firmly secured and kept flush to the concrete surface at all times.

Add the following:

(f) retaining forms in place

(g) Steam curing may be used on approval as specified by the engineer, provided that the rate of increase in temperature does not exceed more than 20°C per hour. Steam curing at higher than atmospheric pressure shall not be permitted if the concrete contains limestone aggregate. Humidity shall be kept between 90% and 100%.

(h) The use of curing compounds will not be permitted

Delete the last two sentences of G 5.5.8 and replace with:

The minimum period of curing various types of cement shall be as follows from the date and time of casting:

- |     |                            |   |                     |
|-----|----------------------------|---|---------------------|
| (a) | CEM I                      | - | 7 days (168 hours)  |
| (b) | CEM II (max. 29% extender) | - | 8 days (192 hours)  |
| (c) | CEM II (30-35% extender);  | - | 10 days (240 hours) |

During periods of extreme temperatures, these periods may be increased at the discretion of the Engineer. The temperature of concrete shall be retained above 5°C for a period of 3 days after placement. Should the environment in which the concrete is placed be such that temperatures drop below 5°C in the concrete, then use shall be made of insulated formwork to retain the heat generated by cement hydration within the concrete.

Curing methods to be utilised for water retaining structures

Concrete Element	Curing Method
Reservoir water tank floor slab (including screed)	G 5.5.8, (a), (b) or (d)
Reservoir water tank walls	G 5.5.8. (e)*
Top surface reservoir roof slab	G 5.5.8 (d)
Soffit of the reservoir roof slab	G 5.5.8 (f)
Reservoir internal columns	G 5.5.8 (e)*

\* - As amended

The rates for "Curing of Concrete" in the Schedule of Quantities will be paid to the Contractor on the successful outcome of the durability tests.

### PSGA 7 TESTS

#### PSGA 7.1 Facilities and Frequency of Sampling

##### PSGA 7.1.2 Frequency of Sampling

##### PSGA 7.1.2.2 Replace the entire contents of the clause with:

The Contractor shall provide the following number of sets of three standard metric 150mm metal cube moulds for the volume of concrete poured as per the table below:

Table 4 - Frequency of compressive strength tests

Volume of pour (m3)	Number of sets
0 – 25	2
26 – 50	4
51 – 100	6
101 – 200	8
+ 201	10 (or as required by the Engineer)

These sets of concrete cubes will be crushed when they are 7 and 28 days old.

Provide sufficient extra cube moulds for 3 days, 7 day, etc, crushing tests to be made as he so requires for his own purposes ie for shutter stripping, post-stressing cables.

Make and cure all cubes on site under the supervision of the engineer or his representative, in accordance with SANS Method 863.

Be represented at the crushing test if he so wishes. Transport all cubes to the nominated laboratory between 7:30am and 11am on the last working day prior to the date of test. Only the results from this laboratory will be considered and will be the sole basis on which concrete is accepted or rejected.

### PSGA 7.3.7 Costs of Tests

The costs of all tests required by the engineer or his representative shall be borne by the Employer except that costs of tests as set out hereunder shall be borne by the contractor –

- (a) preliminary tests on materials and of mix proportions;
- (b) all tests as may be made necessary by reason of the provisions of clause SANS 1200 G 7.3.5;
- (c) such tests, including concrete coring and load tests, as may in the opinion of the engineer be made necessary by failure on the part of the contractor to meet the requirements of this specification.

### PSGA 7.3.8 Durability Index Tests

To ensure that the concrete has been placed, compacted and cured correctly, a number of tests will be carried out by a nominated laboratory on the concrete after curing has been completed ie 26 to 30 days after placing of the concrete.

1 . A set of four 68mm diameter cores, 75mm in length will be drilled at each test location through the cover crete (being the concrete layer between the outermost layer of steel reinforcement and the exposed outer surface of the concrete element) from the constructed concrete element when the concrete has reached 28 days of age. A slice (30mm thick) will then be cut from the outer surface of this core such that the slice is representative of the middle layer of the covercrete (ie the middle layer being a 30mm thick slice of concrete, 15mm from the exposed outer surface extending in towards the reinforcement) and tested for: -

- 1.1 water sorbtivity,
- 1.2 oxygen permeability (tested in the Ballim apparatus), and
- 1.3 chloride conductivity

The positions at which the cores will be extracted will be indicated by the Engineer.

The oxygen permeability and water sorptivity, and chloride conductivity test procedures shall be carried out in accordance with the following references:

- (1) Guide to the use of durability indexes for achieving durability in concrete structures. (Research Monograph No. 2)
- (2) Concrete durability index testing manual (Research Monograph No.

2. The depth of concrete cover achieved will be measured to ensure that the specified values have been achieved.

The cost of these tests will be borne by the Employer if the results are equal to or exceed the specified value. The Contractor will pay for the tests if the results fall below the conditional acceptance range.

### Table 7 - Acceptance criteria for durability testing structural element



Acceptance Category	Oxygen permeability index (log scale)	Water sorptivity (mm h)	Chloride Conductivity
Full acceptance	$Op \geq 9.15$	$Ws \leq 8$	$Cc \leq 0.75$
Conditional acceptance	$9.15 \geq Op > 9.0$	$8 < Ws \leq 12$	$0.75 < Cc \leq 1.50$
Acceptance with remedial measures	$9.0 \geq Op > 8.75$	$12 < Ws \leq 15$	$1.50 < Cc \leq 2.50$
Rejection	$Op < 8.75$	$Ws > 15$	$Cc > 2.50$

The descriptions given in the "Acceptance Categories" column above shall have the following meanings.

Full acceptance	Concrete shall be accepted unconditionally, subject to the concrete meeting the strength and cover criteria.
Conditional acceptance	Concrete will be accepted with a warning that construction methods should be examined to improve the durability. A financial penalty of up to R75/m <sup>3</sup> will be applied on a pro rata sliding scale for each structural element where the average test results fall within the conditional acceptable range.
Acceptance with remedial	Concrete will be accepted if the Contractor measures undertakes remedial work at his expense, as approved by the Engineer to improve the durability of the concrete to the criterion described as "full acceptance"
Rejection	At the discretion of the Engineer, the concrete shall be removed and replaced at the expense of the Contractor

## PSGA 5 CONSTRUCTION

### PSGA 5.1 REINFORCEMENT

#### PSGA 5.1.2 Fixing

Delete from the eighth line the following:

"or, if permitted by the Employer's Agent, by welding".

#### PSGA 5.1.3 Cover

Add between the words "30 mm" and "unless" in the second line of the Sub-Clause, the following "(with a tolerance of +10 mm -0)".

In second line read "4 mm" for "30mm"

Add to the Sub-Clause:

Binding wire used for fixing reinforcement must be tightly bound around the nodes at bar intersection with cut ends bent inwards. A nominal reduction of the minimum specified cover by 3mm will be allowed for binding wire.

The Contractor shall use only high quality cement mortar cover blocks to maintain the specified cover to reinforcement. Mortar must be made using the same quality cement as specified for strength concrete and mixed in the same cement/sand proportions as employed in the concrete elements in which they are placed.

Cover blocks shall not be less than 7 days old at time of installation and shall have been cured by full immersion in water for a period of not less than 3 days.

## **PSGA 5.2 FORMWORK**

### **PSGA 5.2.1 Classification of Finishes**

*Delete the eighth and ninth lines of the Sub-Clause.*

#### **1. Rough**

*Add to the Sub-Clause:*

The finish of the concrete is to be within the tolerances of Degree of Accuracy III as set out in Sub-Clause 6.4.

#### **2. Smooth**

*Add to the Sub-Clause:*

The finish of the concrete is to be within the tolerances of Degree of Accuracy II as set out in Sub-Clause 6.4.

### **PSGA 5.2.2 Preparation of**

**Formwork** *Add to the Sub-Clause:*

All formwork must be treated with a release agent which is compatible with the concrete surface finish specified. Details of the proposed release agent shall be submitted to the Employer's Agent for his approval, prior to its use on site.

All exposed external corners shall have 20mm x 20mm chamfers.

### **PSGA 5.2.3 Removal of Formwork**

#### **PSGA 5.2.3.1 Permissible Time for Removal of Formwork**

*Delete the second sentence and substitute the following:*

For this purpose and except as allowed below, the formwork shall remain in place, after all the concrete has been placed in the relevant lift, for the appropriate minimum period of time given in Table 1.

If the Contractor can prove to the satisfaction of the Employer's Agent that a period shorter than the appropriate minimum given in Table 1 is sufficient to enable the concrete to comply with the requirements of this clause, the formwork may be removed after such shorter period.

Ammend Table 1 as following:-

In columns 2,3 and 4 after the word "Portland" add "and Type Cem I, Type Cem II/A-S and Type Cem II/B-S"

### **PSGA 5.3 HOLES, CHASES, PIPES, CONDUITS AND FIXING BLOCKS**

*Add to the Sub-Clause:*

Fixing blocks for the attachment of fixtures may be embedded in concrete provided that the strength and other desirable features (such as appearance of the member) are not, in the opinion of the Employer's Agent, thereby impaired.

#### **PSGA 5.4.1.4 Prescribed Mix Concrete**

*Delete the Sub-Clause and substitute the following:*

Unless the Design mix is detailed on the drawings or in the Specification, all concrete shall be Strength concrete.

#### **PSGA 5.4.1.5 Strength Concrete**

*Add to the Sub-Clause:*

Unless otherwise agreed to by the Employer's Agent, the concrete mix is to be designed by an approved laboratory. At least four weeks before placing any concrete on the Works, the Contractor shall supply and deliver to the approved laboratory, at his own cost, samples of the aggregates he proposes to use in the concrete mix. While the proportion of cement to the combined quantity of sand and stone will remain constant for each grade of concrete, as set out above, the relative proportions of sand and stone may be adjusted to achieve the required strength. The laboratory will be bound by the requirements of this Specification which are to guide the Contractor in pricing the grade of strength concrete. The Contractor is to allow in his rate for strength concrete an amount to cover the fees and charges levied by the approved laboratory in designing the strength concrete mix.

#### **PSGA 5.4.1.6 Ready-mixed concrete**

*Delete the Sub-Clause and substitute the following:*

Concrete produced at a central concrete production facility other than at the site of the Works shall only be accepted for use in the Works with the prior and express approval of the Employer's Agent. When such approval has been given the Employer's Agent shall then decide whether or not to accept the test results obtained by the facility concerned.

### **PSGA 5.4.5 Placing**

#### **PSGA 5.4.5.3 Dropping of Concrete (New heading)**

*Add to the Sub-Clause:*

Dropping concrete freely will only be permitted if the Employer's Agent is satisfied that this is the only practical method of placing.

---

**PSGA 5.4.5.5 Adverse weather conditions (See PSGA 2.3.d) Add New**

*Sub-Clause:*

Under adverse cold weather conditions, effective measures shall be taken to ensure that the temperature of the concrete, from the time of placing until it has hardened (i.e. about 24 h), is maintained at not less than 5°C. If the atmospheric temperature in the vicinity of the concrete is below 2°C or is expected to fall below 2°C during the curing period (see Sub-Clause 5.4.7), water shall not be used for curing. All surfaces shall be protected from ice or frost damage.

When the ambient temperature is above 32°C, the temperature of the concrete when deposited shall not be allowed to exceed 32°C. Under adverse hot weather conditions, the Contractor shall take all reasonable steps to reduce to a minimum the placing temperature of the concrete. Stockpiles of aggregates and all metal surfaces in contact with aggregates and concrete shall be shielded from the direct rays of the sun or cooled by being sprayed with water, and windbreaks shall be erected, if necessary, to prevent the initial rapid drying-out of concrete which would otherwise occur before normal curing procedures can be undertaken.

Concrete shall not be placed during periods of heavy or prolonged rainfall.

**PSGA 5.4.5.6 Pumping of concrete (New heading)**

*Add New Sub-Clause:*

The placing of concrete by pumping will not be permitted without the written approval of the Employer's Agent.

**PSGA 5.4.5.7 Blinding Layer (New Sub-Clause)**

*Add new Sub-Clause:*

Beneath all structural grades of concrete, or where shown on drawings or elsewhere if so ordered by the Employer's Agent, the bottom of the excavation is to be covered by a blinding layer (screed) in Grade 15/19 mPa concrete to a minimum depth of 75mm to prevent disturbance of the ground and to serve as an even, clean and accurately positioned working floor for setting steel and placing foundation concrete. This blinding layer shall be laid within a day after excavations have been taken out, trimmed to the required depths and have been inspected and approved by the Employer's Agent.

**PSGA 5.4.10 Defects**

**PSGA 5.4.10.3**

*Add New Sub-Clause:*

Localised minor imperfections (e.g. blow holes, small recesses etc.) shall be made good by rubbing in a stiff 1:2 cement mortar immediately after stripping of formwork. Curing compound shall not be applied to these areas. Once the repair work has set, curing compound and curing membrane shall be applied to the area within 24 hours of stripping formwork.

All other remedial work shall be carried out in dry conditions after the concrete is fully cured. Defective material shall be cut out and contact surfaces to which new concrete shall be bonded shall be cleaned by sandblasting. Repairs shall be made with an epoxy mortar with an appropriate 2 part epoxy primer on concrete or a wet to dry epoxy adhesive, depending on the extent of the defect.

All epoxy resin compounds used in repair work must be approved by the Employer's Agent and applied strictly in accordance with the manufacturer's specification. The Contractor shall match the colour of repair work with existing concrete where repair work is permanently exposed.

#### **PSGA 5.4.11 Concrete in Wet Ground**

*Add New Sub-Clause:*

Where concrete has to be laid in wet ground (eg. River crossings) steps must be taken to lower the water level to at least 150mm below the bottom level of the concrete, and such level must be maintained for a period of at least two days after the concrete has been poured.

The cost of any necessary drains, sumps and pumping etc. necessary to achieve this shall be included in the tendered rates for the construction work and no separate payment shall be made for such dewatering throughout the construction period.

The Contractor shall be fully responsible for keeping the excavations free from water whilst the construction work is being carried out. The methods by which he proposes to achieve this shall be approved by the Employer's Agent before being implemented.

#### **PSGA 5.4.12 Manhole Covers and Frames**

*Add new Sub-Clause:*

Manhole frames are to be set into the concrete with the upper edge 10mm above the concrete level to prevent the entry of rainwater.

### **PSGA 6 TOLERANCES**

#### **PSGA 6.1.1 General**

Change the words "Degree of Accuracy III" to "Degree of Accuracy II" in the third line.

*Add to the Sub-Clause:*

The Permissible Deviations for the following elements of the Works shall be to Degree of Accuracy III:

Concrete work which is not exposed after completion of the Works.

### **PSGA 7 TESTS**

#### **PSGA 7.2 TESTING**

##### **PSGA 7.2.2 Laboratory**

**Testing** *Add to the Sub-Clause:*

All test cubes shall be made, cured and tested in accordance with the requirements of SANS Standard Method 863 and 864.

Test cubes shall be cured in an approved curing tank.

Delivery of cubes for testing shall take place not less than 24 hours in advance of the specified time for testing.

The Contractor shall keep accurate records of the exact position in the structure of the concrete batch represented by the cube test. All costs connected with sampling and testing of concrete, as described in this section of the project specification, shall be included in the relevant strength concrete rates.

**PSGA 8 MEASUREMENT AND PAYMENT**

**PSGA 8.1 MEASUREMENT AND RATES**

**PSGA 8.1.1.4 Formwork**

Add to the first line between the words "concrete" and "and" the following:

"including forming fillets or splays up to and including 20 x 20mm"

**PSGA 8.1.2 Reinforcement**

*Replace Sub-Clause 8.1.2.2 with the following:*

**"PSGA 8.1.2.2**

Mild steel and high tensile steel will be measured by mass for the diameters or range of diameters as scheduled.

Welded mesh will be scheduled separately for each type and mass per square metre of mesh."

*Replace Sub-Clause 8.1.2.3 with the following:*

**"PSGA 8.1.2.3**

The unit rate for steel bars shall cover the cost of supply, cutting, bending, placing in position, and fixing of the reinforcing and supporting steel scheduled. The rate shall also include the provision of all spacer devices and binding wire, as well as the cost of tests in terms of SANS 920.

The unit rate for welded mesh shall cover the supply, cutting and placing of mesh, as well as the cost of all waste due to laps."

**PSGA 8.4.1 Prescribed Mix Concrete**

*Delete from the Sub-Clause all but the first sentence.*

*New payment item:*

**PSGA 8.4.5 Screed : 1:3 (cement : sand mix).....Unit : m<sup>2</sup>**

**PSL MEDIUM PRESSURE PIPELINES**

**(Applicable to SANS 1200 L – 1983)**

**PSL 3 MATERIALS**

### **PSL 3.4 STEEL PIPES, FITTINGS AND SPECIALS**

#### **PSL 3.4.1 General**

Add to the Sub-Clause:

All collars are to be manufactured from API 5L Grade X42 steel/Grade 300WA.

#### **PSL 3.4.2 Pipes of Nominal Bore up to 150 mm**

Delete: "medium class, shall be screwed"

and substitute: "heavy class, shall have plain ends, be galvanized,"

#### **PSL 3.4.3 Pipes of Nominal Bore over 150 mm**

Delete the wording of this Sub-Clause and replace with:

All said piping shall be In accordance With "uMngeni-uThukela Water's Particular Specification for 164mm to 2230mm Diameter Steel Pipe, Specials, Coatings and Linings"

#### **PSL 3.4.4 Fittings and Specials**

Add to the Sub-Clause:

All fittings and specials shall be fabricated to the dimensions and details shown on the drawings and/or described in the Bill of Quantities.

The Contractor will be responsible for the provision of wrappers, collars, gussets etc as may be necessary or as are shown on the drawings to prevent excessive stresses, deflection and/or deformation of fittings and specials when subjected to hydraulic tests and the rate for the work will be deemed to include for the provision of this reinforcing wherever necessary.

The bend, fitting, and special fabricator shall supply written confirmation that all hand welding was carried out by coded welders.

Individual bends, fittings and specials up to and including DN 250 shall be hot-dip galvanised (unless otherwise stated) to heavy duty grade in accordance with SANS 121:2000 after fabrication. Where a hot dipped galvanised fitting is to be welded to a coated and lined pipe, the galvanising is to be ground off prior to welding. The external coating at the welded joint is to be primed and coated with an approved anti-corrosion system.

Bends, fittings and specials shall be manufactured and tested in accordance with the specification for straight pipe and additionally with Section 18 of BS 534. The nominal dimensions of each bend, fitting and special required are itemised in the Bill of Quantities and/or on the drawings and 'exact length' tolerances shall be adhered to. All plain ends on bends, fittings and specials shall have the plain ends prepared for butt welding except those plain ends that are to be jointed with adaptor joints.

Shop drawings of bends, fittings and specials shall be submitted to the Employer's Agent for approval prior to manufacture.

All fittings and specials shall be hydraulically tested at the fabricator's premises to the same pressure that they will be subjected to during the hydraulic testing of the completed pipeline. No visible signs of leakage will be permitted.

Add new Sub-Clause:

#### **PSL 3.4.5 Puddle and Anchoring Flanges**

Puddle flanges and Anchoring flanges used as pipe anchorages shall be of the same dimensions as corresponding flanges but those cast into concrete walls shall not be drilled. The anchoring flanges shall be capable of transmitting a longitudinal force 33% greater than the internal hydraulic pressure to be applied when testing, multiplied by the area of the bore and, under that condition, the stress in the material shall not exceed its yield stress.

'Thin' Puddle flanges are not required to transmit thrust and shall have a thickness of 20mm, their purpose being to assist with the waterproofing of the concrete chambers by increasing the path that ground water might have to take to enter the chambers.

### **PSL 3.7 OTHER TYPES OF PIPES**

Delete this clause and replace with clauses 4.1.7, 4.1.8 and 4.1.9 of SANS 2001-DP2:2010

### **PSL 3.8 JOINTING MATERIALS**

#### **PSL 3.8.2 Flexible Couplings**

*Delete the Sub-Clause and substitute the following:*

Where ordered, steel flexible couplings are to be of the "Viking Johnson"/"Klamflex"/"Aqualok" or similar approved type without central registers, each comprising one centre collar, two special flanges, two rubber rings and hot dipped galvanised mild steel bolts.

Steel couplings shall be assembled strictly in accordance with the manufacturer's instructions and all bolts shall be torqued to the value recommended by the manufacturer. On completion of hydraulic pressure testing of the installation, the entire joint shall be protected as described in Clause PSL 3.9.3.6.

The tendered prices for laying and jointing are to include for the supply of all necessary materials, plant and labour to complete the joint.

Flexible couplings shall conform generally to Clause 15 of BS 534 for slip-on type couplings and shall be of approved manufacture. They shall be capable of being tightened and released without damaging or improperly distorting the rubber seating rings and shall be designed to prevent the rubber rings being blown out under pressure or sucked in under vacuum.

The steel used shall conform to the appropriate British Standard Specification and each coupling is to be capable of withstanding the test pressure applicable to the pipes with which they are to be used without exceeding a stress in the steel of 67% of the yield point.

Mild steel couplings shall be protected by an approved epoxy coating system such as "Cupon KSIR88" (or similar approved) within 4 hours of abrasive blast cleaning the metal surfaces of the coupling in accordance with Swedish Standard SIS 05 5900 Grade SA 2,5. Nuts, bolts and washers shall be hot dipped galvanised. The plain end of the pipe shall be properly prepared, and in the case of steel pipes before corrosion protection, so as to accept the flexible coupling.

Adaptor couplings and anchoring adaptor joints shall comply with the above specification for flexible couplings and be of a similar design, but one end shall be flanged to enable connection of plain ended pipes to flanged joints. The adaptor joints are to be complete with bolts and nuts for connecting the flanged joint to the anchoring flange situated generally 300 mm to 400 mm from the plain end of pipe. All bolts, nuts and washers are to be hot dipped galvanised.

In order to anchor the plain ended pipe to the flanged joint all of the bolts for the flanged joint are to pass through the anchoring flange and are to be fitted with nuts and washers at the flanged joint and on either side of the anchoring flange.

#### **PSL 3.8.3 Flanges and Accessories**



*Add new Sub-Clause:*

**PSL 3.8.3.1 Bolted Connections**

All flanges, gaskets, bolts, nuts washers and other appurtenances required for the execution of the work shall be supplied and installed by the Contractor.

Flanges shall comply with the details shown on the drawings. For all pipes larger than 150mm diameter, connected to equipment or fittings, or where specifically indicated, shall be flanged to SANS 1123:2007 as amended.

1. All flanges shall have a raised face.
  1. All plate flanges for welding shall be Type 3 and blank plate flanges shall be Type 8.
  2. Matched flanges shall correspond in construction and dimensions to flanges on equipment. Matched flanges shall be provided with the correct bolts, nuts and packing rings.
  3. Temporary end covers shall be provided by the Contractor for protection of flanges, and prepared plain ends of pipes and fittings to prevent damage to internal lining during transportation and during handling on site.
  4. All piping and flanged surfaces shall be cleaned before connections are made.
  5. The mating faces of flanges that are to be in contact with gaskets shall not be painted or coated. After application of all pipe and flange coatings, there shall be no runs or drips on the mating face and, where applicable, the flange profiling shall be clearly visible. After blast cleaning the mating faces shall receive one coat of rust inhibitor (Plascon Rustrix 84 or equal approved). There shall be no coating build-up in the flange bolt holes that could snag the bolts.
  6. Unless otherwise specified, bolts shall conform to property class 4.6 of SANS1700-5-1:2003. Bolts and nuts connecting mild steel flanges to stainless steel flanges, or stainless steel flanges to stainless steel flanges shall be grade 304 stainless steel. Bolts, nuts and washers used on insulated flanges shall conform to the UMngeni-uThukela Water Particular Specification for Cathodic Protection.
  7. All bolts, tie-bolts, nuts and washers shall be galvanised to SANS 121:2000 and shall comply with the relevant requirements of SANS 135 – 1985 and SANS 136 – 1985 where applicable.
  8. The length of each bolt shall be such that after the bolt has been tightened, the end of the bolt shall project beyond the outer face of the nut, but not by more than two threads. Tie-bolts on restrained/anchoring couplings shall be fitted with “backing nuts” and washers.

9. Each flanged joint is to be fitted with an approved and suitably rated gasket and sealed watertight such that there will be no visible sign of leakage under the specified factory and field test pressures and under the in-service working conditions (pressures).
10. All bolts are to be tightened in a predetermined pattern with opposing bolts being tightened sequentially. When all bolts are tight, each bolt is to be torqued to the required/recommended torque in a predetermined pattern with opposing bolts being tightened sequentially.
11. Except in the case of insulting-flanges, all bolt threads shall be liberally coated with "Nickle Slip" or similar approved compound prior to assembly. Upon completion, bolt heads, washers and nuts shall be wrapped as described under PSL 3.9.3.8 below.

### **PSL 3.9 CORROSION PROTECTION**

#### **PSL 3.9.2 Steel Pipes**

##### **PSL 3.9.2.1 Steel Pipes of Nominal Bore up to 150mm**

In this sub-clause and its title replace "150mm" with "200mm"

Delete all words in the sub-clause after "SANS 763" and replace "SANS 763" with "SANS 32"

##### **PSL 3.9.2.2 Steel Pipes of Nominal Bore over 150mm**

In this sub-clause and its title replace "150mm" with "200mm"

a)(2) Delete this sub-clause and substitute:

in the case of bitumen coatings, all steel pipes, fittings and specials shall be coated in accordance with the requirement of SANS 1178:2002 Edition 1.02 – Type CB6A.

c) Add to the Sub-Clause:

Unless otherwise specified, all steel pipes, fittings and specials with a cement mortar lining shall be in accordance with the requirements of the Australian Standard ASW 1281:2001 with thicknesses as stated in Clause C3.9.1. (and C3.9.2 for DN 250 pipes).

*Add new Sub-Clause:*

##### **PSL 3.9.2.4 Holiday Testing**

All Holiday Testing shall be carried out with an instrument approved by the Employer's Agent. The sparking detection test shall conform to the standards as set out in SANS 1217:2001 and BS 3003 Part 1. The Contractor shall familiarise himself with the dielectric strength (breakdown strength) of all the coatings and linings he works with for the different pipe sizes. The Contractor shall also have an in depth knowledge of the Holiday Testing equipment he works with, in order to calculate the Corona discharge effect for the typical brush being utilised, with reference to the specific ambient conditions for any specific test.

All Holiday Testing shall be executed at a voltage which is set at 50% of the value of the dielectric strength of the lining or coating being tested. The Contractor shall carefully analyse the loss in test voltage as a result of the Corona Effect, specific to the ambient conditions surrounding the test. The test voltage of the Holiday Testing equipment shall be adjusted such that the voltage drop as a result of the Corona Effect will be taken into account when the actual 50% threshold of the dielectric strength is calculated.

The Holiday Test equipment shall be calibrated by an approved supplier and checked every 30 minutes or every time a test at a different location is started. Each piece of equipment shall have a unique identification number with calibration certificates and detail of equipment utilized shall be submitted to the Employer's Agent for approval. Method statements for the process of holiday testing shall be submitted to the Employer's Agent for approval.

The correct equipment for the type of application will be utilized. For example, where pin holes have been repaired and re testing for effectiveness of repair work being done, the Contractor shall utilize the correct equipment to effect same and this shall include the use of a pencil brush which concentrates the efforts of holiday testing at the repair. Where spark tests are performed on Tape Wrap systems, the minimum brush width shall be 300 mm. The brushes utilized shall be brass bristle cone brushes. The typical brush speed shall be 200 to 300 mm/sec when doing spark tests

The Contractor shall, at his expense, test each and every surface area, that is internal lining as well as external coating, during construction as per this specification. Testing for holidays shall be done after inclusion of materials, manufactured specials and equipment, as well as pipes, into the permanent

works. Any defects found shall be repaired and the costs for remedial work shall be deemed to be included in the tendered rates for the construction of the pipeline. These tests and results shall be recorded on the quality control plan as approved by the Employer's Agent.

*Add new Sub-Clause:*

**PSL 3.9.3.1 Preparation of Steel Surfaces for Repairs and/or Reinstatement of Internal Lining and/or External Coating**

The following method is applicable for the preparation of all exposed steel surfaces prior to the carrying out of any repair procedure to internal linings and/or to external coatings. This specification is applicable to all pipe steel surfaces which have been stripped of its corrosion protection layer, internally or externally, as a result of the manufacturing of specials, construction activities or pipe laying, welding and/or damages caused by handling or latent defects in application.

Degreasing:

All bare metal surfaces shall be degreased in order to remove grease and oil from the pipe surface as a first step in the preparation process ie before grit blasting and/or power brushing starts. Degreasing shall be carried out using a non volatile solvent (e.g. "Aquasolve", "Chesterton Nr. 261 Safety Solvent Cleaner" or similar approved substance). The surface shall then be cleaned with potable water and left to dry completely before the next step is taken.

Grit Blasting – Internal Lining Repair:

Grit blasting of bare metal surfaces shall take place after degreasing of the area. The finished grit blasted surface shall be 75 micron with an angular profile.

Transition areas from EPOXY internal lining, to bare metal which has been grit blasted, shall be smooth without rough edges or flaking appearances.

All grit blasting within the pipe line that is under construction, shall be performed by way of a “vacuum blast” process in order to limit the generation of dust.

Grit blasting shall, under all circumstances, be carried out using equipment suitable for the size of the work to be undertaken.

The Contractor shall provide the Employer’s Agent with a method statement for approval for each type/location of grit blasting, before work commences.

Power Brush – External Coating Repair:

Power brushing of bare metal surface shall take place after degreasing of the area as specified. The area that has been power brushed shall be free from rust, laitance, dust, oil or other deleterious matter before the application of primer. Any areas in the region where power brushing took place shall be free from signs of disbonding of lining and/or coating, once power brushed. The surface finish, once power brushing has been completed, shall conform to minimum St2 standard.

*Add new Sub-Clause:*

#### **PSL 3.9.3.2 Preparation Mixing and Application of Epoxy Compounds**

When mixing two part epoxies, the base and activator shall be mixed in accordance with the manufacturer’s specifications. Mixing in the original container will only be permitted by means of methods that ensure full integration of different parts of the compound into a homogeneous compound with the characteristics as intended by the manufacturer. The different parts of the compound shall not be diluted. Mixing shall only be allowed with full batches and reduction of volumes from mixing packs by means of weight or volume measurement, which will result in smaller portions to be mixed, will not be allowed. In the application of the epoxy the following shall be strictly in compliance with the manufacturer’s instructions:

1. Method of application (Type of Brush or roller.)
2. Over coating time.
3. Temperature range for application.
4. Method of mixing base and activator.
5. Number of coats to achieve the specified thickness.
6. Safety aspects e.g. Eye and hand protection, ventilation, fire precautions, etc.
7. Note that roller and brush applicators shall be replaced once the product application expiry time has been reached on any specific applicator tool.

Uncured epoxy must be regarded as being toxic and shall be handled in accordance with the manufacturer’s instructions. Adequate lighting and ventilation shall be provided whilst working within the pipeline.

Only solvent free epoxy repair kits shall be utilized to repair the internal linings of the pipe line. This specification refers to “two part epoxy” as an epoxy repair kit which consists of a base and an activator

approved by the Employer's Agent and could be products similar to "Denso ST100", "Sigma SF 523", "Nordbak", etc.

Attention is drawn to the fact that "Nordbak 1" (or similar approved) is to be used on this Contract. For the repair of cement mortar linings, "Epidermix 338" or similar approved will be required.

The Contractor's tendered rates for the laying of the pipe shall be deemed to include for all the repairs and make-goods that have to be effected in order to deliver a serviceable and acceptable pipe line. (This excludes such repairs as instructed by the Employer's Agent as a result of manufacturing defects, if any).

Two part epoxy may only be applied on steel surfaces prepared as specified in PSL3.9.3.1.

*Add new Sub-Clause:*

#### **PSL 3.9.3.3 Making Good of Cement Mortar Lining at Welded Joints**

All pipes that are to be supplied by the Contractor are to have their cement mortar lining stopped between 50 mm and 75 mm from each plain end and from each belled end and it is to be "chamfered" by 15 degrees to provide a positive dove-tail joint for the mortar repair plug after field fillet-welding to another pipe.

When straight steel pipes are cut, the cement mortar lining is to be cut back between 50 mm and 75 mm from the cut end of the pipe and "chamfered" by approximately 15 degrees to provide a positive dove-tail joint for the mortar repair plug after butt welding.

The surfaces are to be prepared as specified in PSL3.9.3.1.

A 50 mm wide by 20 mm thick band of "Epidermix 338" or similar approved epoxy, shall be applied internally on the uncoated steel adjacent to the cement mortar lining. The plain end of the adjoining pipe shall be pushed into the bellmouth (or into the external sleeve when there is no bellmouth) in such a way that the epoxy band is compressed and makes contact with the transverse face of the cement mortar lining of both pipes. The excess material that is squeezed into the bore of the pipes is to be removed by drawing a suitable plug (pig) that is 5 mm smaller than the bore of the cement mortar lining across the joint. The plug that is used shall be such as to render an even and smooth finish to the epoxy at the joint. The timing of when the plug is pulled through is critical and shall be carefully controlled.

*Add new Sub-Clause:*

#### **PSL 3.9.3.4 Repair and Making Good of Solvent Free Epoxy Linings**

Pipes with linings damaged prior to acceptance by the Contractor shall be marked and recorded by both the Contractor and the Employer's Agent's Representative and then repaired by the Contractor. The payment rate for repair shall be made at the scheduled rate.

Once the Contractor has accepted pipes with undamaged linings from the Employer, any subsequent damage to the lining in the pipes shall be repaired by the Contractor at his expense.

All making good of internal solvent free epoxy linings at welded and flanged joints that is required to ensure continuous internal corrosion protection to steel surfaces shall be carried out strictly in accordance with the manufacturer's specifications. The Contractor shall ensure that making good of

linings is carried out progressively as the pipe is being laid and shall not be permitted to lag behind for more than three pipe lengths at each working front.

*Add new Sub-Clause:*

#### **PSL 3.9.3.5 External Corrosion Protection of Factory Welded Joints and Coating Repairs**

All DN 610 to DN1300 steel pipes will be supplied with the external coating cut back 100 mm from each pipe end. Where pipes are to be cut, either on site, or for the purpose of fabricating bends, fittings and specials, or in the event of the pipe coating being damaged, the pipe coating shall be cut back 100 mm from the intended cut area before the pipe is cut. Damp hessian sacking or other suitable material is to be temporarily fixed around the pipe to prevent damage to the pipe coating during welding operations. Once welding is complete, and all weld splatter and burnt coating has been removed, the welded pipe joints shall be wrapped in the following manner.

The following specification is based on “Denso” products and systems. Alternative products and procedures may be proposed by the Contractor and, if approved by the Employer’s Agent, they may be used.

Irrespective of which products are approved by the Employer’s Agent and used by the Contractor, all procedures shall be carried out strictly in accordance with the Contractor’s method statements which must conform to the manufacturer’s recommendations.

A fundamental outcome is a sound and continuous coating that is free from wrinkles and that does not have any entrapped air pockets or any air bubbles.

### Surface Preparation

The bare metal shall be cleaned and wire brushed to minimum St.2 standard and, degreased with white spirit. The adjacent pipe coating shall be cleaned to a minimum of 300 mm either side of the joint and the edges “feathered” to achieve a tapered transition over a distance of 100 mm. The sound, parent coating surface shall be roughened with sandpaper over an area 250 mm either side of the joint.

### Priming

The entire pipe and coating surface over a length of 250 mm on either side of the joint shall be primed using “Denso Primer D” (or equivalent approved). Care shall be taken to obtain a thin even film with no runs or sags. The primer shall be allowed to cure until “tack dry” before the application of the tape commences. Priming may only be carried out on those areas that are to be wrapped that same day. If primed areas are to be left overnight, those areas shall be re-primed before wrapping.

### Profiling Tape

A 1.5 mm thick x 50 mm wide “Denso Mastic Sealing Tape” (or equivalent approved) shall be applied to the full circumference of the weld bead in accordance with the manufacturer’s specifications. Care shall be taken to ensure a smooth profile and to avoid air bubbles being trapped beneath the tape. (Note: The profiling tape may be omitted at the discretion of the Employer’s Agent. Tenderers shall nonetheless allow for the profiling tape in their tendered rates).

### Tape Wrapping

The joint shall then be wrapped (minimum 55 % overlap) with “Denso CPT 1250/300 Polyethylene/Bitumen” tape starting at the roughened section (250 mm from the welded joint) in accordance with the manufacturer’s requirements to create a 500 mm wide wrapping, centred over the welded joint. A 100% overlap is required on the first and last revolutions of the tape wrapping operation. It is important that tension in the tape be released when the wrapping of the last half circumference of the pipe. The Contractor shall ensure that the wrapping overlaps or covers a minimum of 150 mm of the pipe coating. A secondary or outer tape wrap layer is then to be applied over the first layer with a 10% tape overlap.

An alternative tape wrapping system that may be used is the “Densotherm 35 Hot Applied Bitumen Tape” system. The procedures are similar to those for the “Denso” system described above except

that the underside of the tape shall be heated as it is applied and the overlaps and seams of the tape are to be sealed by means of a heated tool.

*Add new Sub-Clause:*

**PSL 3.9.3.6 External Corrosion Protection of Shop-Fabricated Pipe Bends and Fittings**

The external coating of shop fabricated bends and fittings shall be carried out as follows:

1. Where a substantial part of the external coating on the parent pipe is intact, the coating repairs/make good shall be carried out in accordance with PSL 3.9.3.5 or
2. Where black (uncoated pipe has been used), the coating shall be carried out in accordance UMngeni-uThukela Water's specification for "Pipe Lining System 2: Solvent-Free Epoxy Lining" or
3. Where only a relatively small proportion of the external coating on the parent pipe remains, all of the remaining coating shall be removed and the entire bend/fitting shall be coated in accordance UMngeni-uThukela Water's specification for "Pipe Lining System 2: Solvent-Free Epoxy Lining".

All crotch plates and wrappers/collars shall be coated in accordance UMngeni-uThukela Water's specification for "Pipe Lining System 2: Solvent-Free Epoxy Lining".

After application of the SFE coatings to the crotch plates and collars/wrappers, approved mastic (refer PSL3.9.3.8) shall be placed in all crevices that may become moisture traps.

No additional payment will be made for any of this work as the costs are deemed to be included in the scheduled rates for pipe laying.

*Add new Sub-Clause:*

**PSL 3.9.3.7 External Corrosion Protection of Site-Fabricated Pipe Bends**

The coating repairs/make good shall be carried out in accordance with PSL 3.9.3.5.

*Add new Sub-Clause:*

**PSL 3.9.3.8 Corrosion Protection of Flanges and Flexible Adaptor/Anchoring Joints**

All flanges and flexible joints and adaptor/anchoring joints and their associated bolts, nuts and washers, shall, notwithstanding that the flexible and adaptor/anchoring joints will be epoxy coated as specified elsewhere, be protected as described below.

(Note: This specification is based on a "Denso" system. Alternative products may be used, subject to approval by the Employer's Agent).

Surface Preparation:

The entire surface area of the flange/adaptor/anchoring joint, and its bolts, nuts and washers, up to no less than 250 mm either side of the joint, shall be cleaned of all dirt and other deleterious matter. The cleaned area, up to 200 mm either side of the flange/adaptor/anchoring joint, shall then be wire brushed.

Priming:

The cleaned flange/adaptor/anchoring joint, bolts, nuts, washers and the adjoining 200 mm length either side shall be primed with "Denso Priming Solution", or if moisture is present, with "Denso S105 Paste".

Application of Mastic Blankets:

Narrow strips cut from "Denso Mastic Blanket" shall be applied to the flange/ adaptor/anchoring joint to achieve a smooth profile with a 50 mm splayed fillet being formed at the joint/pipe interface. Care shall be taken, particularly at bolts, to avoid the formation of air pockets. Complete "Denso Mastic Blankets" shall then be applied (mastic side down) to the flange/adaptor/anchoring joint until the flange/adaptor/anchoring joint is completely enveloped.

The blanket shall be overlapped at least 50 mm and shall extend at least 150 mm along the pipe barrel on each side of the flange/adaptor/anchoring joint. The ends of the blanket shall be bound to the barrel of the pipe on each end with 100 mm wide "Denso Tape". The "Denso Tape" overlaps shall be 50 mm and shall extend 100 mm onto the blanket and 150 mm onto the pipe barrel.

Application of Protective Sheeting:

The entire flange/adaptor/anchoring joint shall then be wrapped with 350 micron polyethylene sheeting which shall end 400 mm beyond the joint. The protective sheeting shall be secured to the pipe barrel and along the seam with 48 mm wide "Denso Adhesive Tape".

*Add new Sub-Clause:*

#### **PSL 3.9.3.9 Coating of Permanently Exposed Pipes/Fittings**

All pipes which are to be permanently exposed shall, in addition to the specified corrosion protection at flange/adaptor/anchoring joints, be protected with the "Denso Acrylic Pipeline Tape (Steelcoat 500)" system or similar approved UV resistant coating. The pipe surface shall be prepared and the coating applied in strict accordance with the manufacturer's instructions.

Surface Preparation:

The pipe surface to be wrapped shall be cleaned of dirt, grime, grease and other deleterious matter, using white spirit if necessary and then allowed to dry thoroughly.

Priming:

"Denso Primer D" shall be applied to the prepared surfaces at a nominal coverage rate of 8 m<sup>2</sup> per litre. Care shall be taken to obtain an even film with no runs or sags. Only those areas that are to be wrapped the same day shall be primed. If primed areas are to be left overnight, these areas shall be re-primed before wrapping.

Tape Wrapping:

The joint shall be spirally wrapped (minimum 55% overlap) with "Denso Acrylic Tape" (or approved equivalent) in accordance with the manufacturer's requirements such that the start and end points are located at buried sections of the pipe, before it daylights. A 100% overlap is required on the first and last revolutions of the tape wrapping operation. It is important that tension in the tape be released when the wrapping of the last half circumference of the pipe.

Final Coating:

One coat of "Densoflex Fire Retardant" shall be applied to the exposed pipe at a nominal application rate of 3 m<sup>2</sup> per litre.

*Add new Sub-Clause:*



### **PSL 3.9.3.10 Puddle Pipes**

All puddle pipes shall be primed and wrapped in accordance with the above procedure. The wrapping shall extend from (but shall not include) the puddle flange to 150mm beyond the concrete surface. Final coating with Densoflex Fire Retardant is not necessary unless the pipe is exposed outside a chamber.

*Add new Sub-Clause:*

### **PSL 3.9.3.11 Cathodic Protection**

The assessment and testing of Cathodic Protection will be arranged by the Employer. If provided for in the project specification, the Contractor will be required, to appoint a selected-Sub-Contractor to execute this work, in which case a provisional sum is provided for in the Bill of Quantities.

### **PSL 3.10 VALVES**

From this sub-clause delete "SANS 1200 LK" and substitute "the relevant UMngeni-uThukela Water Particular Specification included in the Contract Document"

### **PSL 4 PLANT**

*Add new Sub-Clause:*

#### **PSL 4.4 Packing**

Goods should be suitably packed in such manner as will ensure safe and efficient transport by road or rail, and the Contractor shall include in his prices for whatever packing may be necessary in this respect. Small items particularly liable to damage or loss in transit should be crated. All crates and packing material shall, after use, become the property of the Employer, unless distinctly specified otherwise, or if returnable, shall be so at the Contractor's expense.

### **PSL 5 CONSTRUCTION**

#### **PSL 5.1 LAYING**

##### **PSL 5.1.1 General**

*Add to the Sub-Clause:*

The coating of each pipe shall be inspected and holiday detected by the Contractor, immediately prior to being laid and these inspections will be witnessed and signed off by the Employer's Agent or an appointed third party inspection authority. Two thirds of the circumference of each pipe and fitting will be inspected outside the trench, after the pipe/fitting has been transported to the construction site where it is to be laid. This inspection is to be carried out shortly before each pipe is hoisted for laying in the trench. The balance of the circumference of each pipe/fitting will be inspected once the pipe/fitting has been laid in the trench. This will require the pie/fitting to be rotated to facilitate inspections.

All remedial work that is required shall be effected immediately upon detection of any holidays. The cost of holiday testing and effecting remedial work to the coating of the pipe at the installation location, as a result of construction or transportation or storage damage, shall be deemed to be included in the tendered rates for the laying of the pipe/fitting.

Each and every external coating make good at welded joints, shall be holiday tested around the full circumference and be subject to approval of in terms of the relevant Quality Control Plan. All costs associated with holiday detection and any costs of effecting remedial work, shall be deemed to be included in the tendered rates ie. no special or "extra over" payments will be made for external repairs or make goods at joints.

All pipe specials being corrosion protected with an external epoxy coating, shall be holiday tested before being incorporated into the works as well as holiday tested after inclusion into the works. All the costs of holiday detection and any costs for effecting remedial work shall be deemed to be included in the rates for the laying of the pipe/fitting.

The corrosion protection systems on all fittings and manufactured specials shall be holiday tested once included into the permanent works. All the costs of holiday detection and any costs of effecting remedial work shall be deemed to be included in the tendered rates for the laying of the pipeline.

The appropriate wet sponge tests shall be conducted on the internal surfaces of all epoxy linings, and particularly on reinstated areas and make good at joints, and on manufactured specials and repairs to linings. This will be carried out from time to time and again before final cleaning of sections of the pipeline that are completed. All the costs associated with wet sponge holiday detection and any costs for effecting remedial work shall be deemed to be included in the rates for the laying of the pipeline.

Should the Contractor feel that some of the holidays detected in an epoxy lining, are as a result of the original manufacturing process, this should be brought to the Employer's Agent's attention for evaluation. The Employer's Agent's decision in this regard will be final and, should it be decided that the holidays are in fact as a result of the manufacturing process, the Contractor will be required to repair same at the cost of the Contractor.

*Add new Sub-Clause:*

#### **PSL 5.1.3.1 Cleaning Pipe Internals**

The Contractor shall ensure that all pipe work is installed internally free of any contaminants. All traces of dirty water, slag, splatter, swarf, cuttings, coupons, welding rod ends, grinding dust, dirt and other debris are to be removed from the inside of the pipe as it is installed.

The Contractor shall ensure that all dust, grit and powder that accumulates in the pipe as a result of grit blasting for the repair of internal linings, be removed from the pipe in an acceptable manner before the internal lining repairs are carried out.

Once the lining repair has been completed, cleaned off and inspected, that specific section of the pipe shall be blocked off to prevent any further access by workers.

The Contractor shall take note that flushing of the completed pipeline may not be allowed after construction has been completed and therefore clean house keeping practices will be required under all circumstances during construction. The tendered rates for pipe laying shall include for the clean house keeping practices required.

Each section of the pipeline is to be internally inspected and passed by the Employer's Agent once construction has been completed. If the pipework is not satisfactory, the Contractor shall re clean the pipe at his own expense until the pipe is passed clean. The Employer's Agent reserves the right to utilize cameras or any other means to inspect inaccessible areas.

*Add new Sub-Clause:*

#### **PSL 5.1.3.2 Cleaning of Valves and Fittings**

All flanges, valves, fittings and equipment are to be installed in pipe work only after they have been thoroughly cleaned. Flange faces shall be checked for damage before being incorporated into the permanent works and any damage shall be reported to the Employer's Agent.

*Add new Sub-Clause*

### **PSL 5.1.5 Pipe Supports**

Temporary pipe supports may be used to assist setting up and assembly. However, it is preferred that permanent pipe supports are installed as soon as possible to minimize double handling and/or omission during construction.

Permanent pipe supports shall be constructed as indicated on the drawings or as directed on site.

Before testing, all permanent supports shall be complete and all temporary supports removed, unless otherwise agreed by the Employer's Agent.

*Add new Sub-Clause:*

### **PSL 5.1.6 End Caps**

The Contractor shall, at the end of each day's work, fit end caps to the open ends of the pipeline under construction. The end caps shall be manufactured in such a manner that it can be fitted to seal off the pipeline to the extent that it is totally dust and water proof. The end cap must be able to withstand a pressure of 5 m head of water externally when fitted.

End caps shall be maintained during non-working periods.

The tendered rates for the laying of pipe shall be deemed to include for the supply, fitment, and maintenance of the end caps.

## **PSL 5.2 JOINTING METHODS**

### **PSL 5.2.2 Flanges (Steel Pipelines)**

*Add to the Sub-Clause:*

Before being brought together, the ends of the pipes, fittings, couplings and flanges are to be inspected and cleaned to ensure that all parts forming the joint are undamaged and clean.

When jointing flanges, the faces shall be cleaned thoroughly and approved jointing material (compressed asbestos cement fibre or other approved gaskets on flanged joints), cut properly to size, is to be inserted immediately before bringing the two flanges together. Before closing the joints, the flanges must be parallel to each other, with all bolts inserted in the bolt holes. After the fittings have thus been aligned and well supported, the joint shall be bolted up to a uniform tightness using torque

wrenches to achieve the required compression force on the gasket. Diagonally opposing bolts shall be tightened sequentially.

If and where full face gaskets are used, the jointing material shall be flush with, or protrude beyond, the outer circumference of the flange (this is not applicable to raised face flanges). On completion of the joint, the flanges and bolts shall be protected as described in Clause PSL 3.9.3.8.

*Change heading:*

### **PSL 5.2.3 Welding (Steel Pipelines)**

Delete the 1<sup>st</sup> sentence and replace with:

Field welding of steel pipelines shall be carried out in accordance with the relevant requirements of the latest version of API 1104. The Contractor, prior to commencement of welding, shall produce a qualified welding procedure in accordance with the latest version of API 1104, for the intended sizes, processes, positions and consumables to be used on this project.

Welding shall be carried out by welders who are competent in terms of the procedure approval test given in API 1104. Prior to commencement of welding, the current qualification of each welder must be produced in accordance with the welding procedure. Should constant repairs be required on welds

carried out by one particular welder, the Employer's Agent may request that the welder be retested or removed from the project.

Add to the Sub-clause:

### **Examination of Welds**

The Contractor shall include in his prices for the manufacture of pipes, bends, fittings and specials for the cost of carrying out, under the supervision of the inspector appointed by the Employer, examination of shop welds on the following basis:

(a) Manufacture of Pipes

- i) FIVE percent random radiographic examination of all welds deposited by an approved automatic process.
- ii) TEN percent random radiographic examination of all welds deposited manually or semi-automatically, and repairs to welds done by an automatic process (should repairs exceed 25% of the tests the percentage of examination shall be increased to 20%).

(b) Field Welds

Radiographic testing will be performed on butt welds and dye penetrant testing on fillet welds. Welds will be tested and adjudicated in accordance with API 1104 and will be tested with the following frequencies:

The first 10 welds executed by each Welder will be tested. Thereafter, if no discontinuities are discovered, 10% of his/her further welds, chosen at random by the Employer's Agent, will be tested. If during the 10% testing, discontinuities are discovered both welds immediately adjacent to the defective weld will be tested. If these joints are found acceptable testing will remain at 10%. If, however, defective welds continue to be evident, testing will be increased to 100%. Only once the welding has returned to an acceptable standard and at the discretion of the Employer's Agent, will the percentage be reduced again.

Repairs of welds will be permitted in accordance with approved repair procedures. Repairs shall be re-examined using the relevant non-destructive testing method. All costs associated with the repair of defective welds will be borne by the Contractor.

1. Welds in Fabricated Bends, Fittings and Specials:

- i) ONE HUNDRED percent radiographic examination of all weld deposited manually or semi-automatically in bends, fittings and specials which cannot be hydraulically tested because they have a plain end.
- ii) TEN percent radiographic examination of all welds deposited manually or semi-automatically in all flanged bends, fittings, and specials which are to be tested hydraulically.

The Employer's Agent shall in all cases determine which welds are to be radiographed on the quantity basis specified above. All radiographs and records thereof made by the Contractor shall be made available to the Employer's Agent to enable him to determine whether the welds are acceptable or not and no lining or wrapping of pipes shall be permitted until the welds have been accepted by the Employer's Agent. To avoid any unnecessary delays, at the option of

the fabricator, radiographs may be approved by the manufacturer's inspectors subject to them being subsequently submitted to, and approved by the Employer's Agent.

When a section of the weld is shown by radiography to be unacceptable and if the limits of the deficient weld are not defined by the radiograph, additional radiography shall be carried out at the Contractor's expense until the limits of the deficiency are determined.

Repairs shall be made to defective welds at the Contractor's expense. All repair welds shall be identified with a stamp marking, indicating which welder conducted the repair. Repaired welds shall be radiographed at the Contractor's expense but, after any repair welder has had ten consecutive repairs approved, the extent of the radiography of the repairs conducted by the welder may be decreased by agreement between the Employer's Agent and the Contractor.

#### **Production Testing of Welds** (Not applicable to pipes supplied by the Employer)

The Contractor shall also include in his prices for the supply of pipes the cost of carrying out at the factory, non-destructive tests of shop production welds (additional to the qualification tests for welding procedure) on the following basis:-

One pipe from each one hundred pipes produced shall be selected at random and specimens for two guided cold bend tests and one transverse tensile test shall be cut therefrom and tested in accordance with SANS 719:1971, Section 7.

In the case of the guided cold bend tests, where welding is carried from one side only, bend - specimens shall be tested with the rest of the bend in tension; where welded from both sides the specimens shall be tested with the inner and outer welds in tension alternately.

Tensile tests shall be carried out as for the qualification tests.

The pipes from which successfully tested specimens have been taken shall be trimmed to the maximum possible length and shall be accepted by the Employer for payment purposes as full standard pipe lengths.

In the event of the welds of any pipe failing to reach the standard of acceptance, such pipe shall be rejected. Two further plate coupons shall be prepared from different pipes, selected at random by the Employer's Agent, for each specimen that has failed to reach the required standard. In the event of such additional tests proving to be satisfactory repairs to the pipe originally failing any test will be permitted by the Employer's Agent and such repairs and subsequent re-test shall be at the Contractor's expense. In the event of the additional tests also failing to reach the required standard the Employer's Agent shall have the right to reject the entire batch of pipes from which the coupon plates were cut.

*Add new Sub-Clause:*

#### **PSL 5.2.3.1 Welding Procedure**

Welding shall, unless otherwise prescribed in the approved welding procedure, commence at the top of the joint and proceed downwards. In addition to the root weld, at least two further passes shall be made, none of which is to exceed 3 mm in depth but this is subject to the approved welding procedure.

*Add new Sub-Clause:*

#### **PSL 5.2.3.2 Aligning**

The alignment of abutting ends will be such that the offset does not exceed 1.5 mm. Line-up clamps ("dogs") may be used for the "fit-ups". The use of "bridges and wedges" or any other method that may

reduce the pipe wall thickness when removed or in any way introduce unnecessary stresses into the pipe is forbidden.

*Add new Sub-Clause:*

**PSL 5.2.3.3 Weather Conditions**

Welding shall not be performed under conditions that could affect the quality of the welded joint (e.g. high moisture or windy conditions). Windshields may be used where practical.

*Add new Sub-Clause:*

**PSL 5.2.3.4 Clearance**

The minimum clearance around the pipe during welding shall be 500mm or such other minimum distance that may be required to facilitate compliance with the approved welding procedure. When welding in the trench, adequately sized "fox holes" shall be excavated/formed so as to provide adequate access for the welders.

*Add new Sub-Clause:*

**PSL 5.2.3.5 Visual Inspection**

100% of each joint will be examined and the following criteria shall be met:

All welds shall be substantially uniform in appearance with the inner and outer weld beads not exceeding 1 mm and 3 mm in height respectively unless otherwise required in terms of the approved welding procedure.

Undercut shall not exceed 12.5% or 1mm in depth whichever is less, nor shall it's length exceed 50mm in any 300mm length of weld.

The weld, heat affected zone, and surrounding parent metal shall be free from cracks, porosity and trapped slag.

All weld splatter must be removed prior to corrosion protection application.

*Add new Sub-Clause:*

**PSL 5.2.5 Cut Pipes**

Cut pipes shall be used where required as closure lengths. The cut ends shall be prepared in accordance with clause 5.1.5 of SANS 719:2008. The finished dimensions of ends cut on site must be within the tolerances applicable to the ends of the particular types of pipe to be laid. The cost of cutting and trimming of pipes shall be included in the rates tendered for laying and jointing pipes.

**PSL 5.10 DISINFECTION OF POTABLE WATER PIPELINES**

*Delete the clause and replace with:*

The entire pipeline disinfection will be monitored by the Employer's personnel. The disinfection criteria are stringent and the Contractor shall keep the pipeline clean throughout the Contract.

The Contractor will be required to submit a detailed method statement for approval by the Employer's Agent. A minimum requirement will be that the method statement deals with the method of dosing and how the dosing rate will be controlled to ensure a uniform distribution throughout the pipeline to be disinfected, the chemicals to be used, the anticipated range of dosing rates and equipment to be used, the name and qualification of the Contractor's personnel supervising the disinfection.

Once a successful hydraulic test of the entire pipeline has been achieved and the connections have been completed, the pipeline shall be drained. The pipeline shall then be re-charged in accordance

with PSL 7.3.4 – “Initial Filling of the Pipeline”. Whilst being charged, a sodium hypochlorite solution shall be introduced into the pipeline in such a manner as to ensure that a theoretical total chlorine concentration of at least 25 ppm (mg/l) is achieved throughout the pipeline.

Once the entire pipeline has been filled in this manner, it shall be left for a 24-hour period.

Thereafter, total chlorine concentrations shall be measured at each scour point. A concentration of 20ppm total chlorine will be considered acceptable. Should this concentration not be achieved at all scours, the Contractor shall take all steps considered necessary by the Employer’s Agent to achieve satisfactory disinfection, at his/her own cost.

Once satisfactory disinfection has been achieved, the pipeline shall be drained via the scour valves (or by other means approved by the Employer’s Agent) and sufficient sodium thiosulphate (typically 1 part of total chlorine) shall be dosed into the scour-wet wells to fully neutralise the chlorine before discharging to watercourse.

The pipeline shall then be re-charged in accordance with the stated procedure and, after 24 hours, samples will be taken by UMngeni-uThukela Water for analysis (at no cost to the Contractor). Should the following limits not be achieved, the Contractor shall carry out at his/her own cost, all steps deemed necessary by the Employer’s Agent to achieve satisfactory disinfection.

**Water Quality Limits**

PARAMETER	COUNT
<i>e. coli</i>	0
Coliforms	0
Faecal Streptococci	0

**PSL 6 TOLERANCES**

**PSL 6.2 CONTROL POINTS**

In the third line delete “± 100 mm” and substitute “± 50 mm”

**PSL 7 TESTING**

**PSL 7.3 STANDARD HYDRAULIC PIPE TEST**

**PSL 7.3.1 Test Pressure and Time of Test**

**PSL 7.3.1.1**

From the 4th line of sub-clause 7.3.1.1 delete the words “isolating valves and/or”. Pressure testing shall not take place against closed isolating valves. Where necessary a blank flange or “spade” shall be inserted if isolation for pressure testing purposes is required at the location of an isolating valve.

Also delete the wording from “.....at the pressure given in 7.3.1.2” to the end of the same sentence.

*Add to the Sub-clause:*

### **Test Pressures**

All pipework, fittings, valves and specials shall be pressure tested as follows

1. At Clarendon Reservoir to 1600kPa

The pipe shall not be tested until the associated structural concrete for anchorage has cured for 28 days or until such concrete has attained the specified design strength.

The section to be tested shall be pressurised to the specified pressure and left for 24 hours, during which period, the pressure drop (if any) and the quantity of water required to be pumped in to restore the test pressure shall be measured and recorded. In addition, all flexible and flanged joints shall be visually inspected and there shall be no sign of leakage.

The permissible leakage for welded and flanged steel pipelines is zero (0) At all times when there is water in the pipeline, and particularly during filling, testing and draining of the pipeline, all air valves shall be in operation and their individually isolating valves shall be open.

*Add new Sub-clause:*

#### **PSL 7.3.1.6 Water for Testing**

The Contractor shall supply potable quality water for hydraulic testing and disinfection of the pipeline.

Water used for one filling of the pipeline for hydraulic testing, one filling for disinfection and one filling after draining the disinfection water will be provided by the Employer to the Contractor, free of charge, at the connection points. Items have been provided in the Bill of Quantities to cover the cost of receiving and, where necessary conveying water, other than through the newly constructed pipeline, from the supply point to the test section of pipeline. Additional water supplied by the Employer owing to unsuccessful disinfection and/or hydraulic testing will be charged to the Contractor.

Filling of the pipeline for hydraulic testing shall be carried out slowly to enable air to escape and under the direction of the Employer's Agent.

*Change the heading:*

#### **PSL 7.3.3 Permissible Make-up Water**

Add additional paragraph to the Sub-Clause as follows:

- c) Welded steel pipelines - Nil

*Add new Sub-Clause:*

#### **PSL 7.3.4 Initial Filling of Pipeline**

The entire process for filling the pipeline at any time during testing or disinfection shall be carried out under the supervision of the Employer's Agent and will also be monitored by UMngeni-uThukela Water personnel. Under no circumstances will the Contractor be allowed to carry out filling of the pipeline without the supervision of the Employer's Agent, neither shall he/she permit any other persons to carry out such filling without the written permission of the Employer's Agent.

Any damage to the pipeline caused by non-compliance with this clause shall be rectified at the Contractor's expense.

*Add new Sub-Clause:*



**PSL 7.3.5 Connections after Testing**

The connections of the new pipework to the existing pipework shall only be carried out after the pipeline testing has been completed and accepted by the Employer’s Agent. For this reason, testing must be carried out against a blank flange or bullnose end cap at these locations.

*Add new Sub-Clause:*

**PSL 7.3.6 Remedial Measures**

In the event that a pipe section fails a test, the Contractor shall carry out all remedial measures necessary to obtain a successful test of each individual section and the entire pipeline, at his/her own expense. Such remedial measures shall in no way compromise the original pipeline specifications.

*Add new Sub-Clause:*

**PSL 7.3.7 Draining of the Pipeline**

The pipeline may have to be drained to carry out remedial measures and it must be drained before the disinfection process commences. The pipeline shall be drained via the scour valves in a manner that does not cause erosion of the streambeds or negatively impact on the environment in any way. All such drainage of the pipeline shall be carried out under the supervision of the Employer’s Agent.

*Add new Sub-Clause:*

**PSL 7.5 Commissioning**

The pipeline will be considered to have been commissioned and practically complete once all the associated structures are sufficiently complete to carry out their structural and hydraulic function and the hydraulic test and disinfection of the entire pipeline has been successfully completed.

**PSL 8 MEASUREMENT AND PAYMENT**

*Change heading:*

**PSL 8.2.1 Supply, transport, lay, and bed pipes complete, fabricate, install pipes, bends, specials, valves, etc .....Unit: m**

*Delete the wording and substitute with:*

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 diameter, type and class of pipe laid.

The rates shall cover the cost of supplying pipes and for fabricating and radiographic and/or hydraulic testing of bends, fittings specials, and supplying and installing flanges, couplings, valves and other

appurtenances as scheduled, making good the coatings and linings, handling, inspecting, marking bends, fittings and specials with item numbers, transporting, holiday detection testing for coatings of steel pipes, forming joint (“fox”) holes in all materials, bedding, laying, welding, jointing, cutting, all testing and disinfecting and where relevant all welding and the completion of the internal and external corrosion protection (make good) and jointing materials (e.g. nuts, bolts, washers, gaskets, welding rods etc)."

A maximum payment of 85 % of the tendered rate may be made for the completed section of pipeline which has not yet been hydraulically pressure tested and disinfected. A further payment of 10% of the tendered rate will be made upon successful completion of the pressure testing for the relevant section of pipeline. The final 5% of the tendered rate will be made upon completion of disinfection of the pipeline.

Notwithstanding the above, the rate for “supply, lay and bed pipes” excludes the cost associated with the field pressure testing and disinfection of the pipeline. Separate items have been included in the Bill of Quantities for the cost associated with pressure testing and disinfection of the pipeline.

**PSL 8.2.3 Extra-over 8.2.1 for the Supplying, Fixing, and Bedding of Valves.....Unit: No.**

*Add to the end of the sub-clause:*

The prices tendered for supplying the pressure sustaining/pressure reducing valve and level control/flow control/pressure reducing valve assemblies shall cover all expenditure and everything necessary to be done by the manufacturer and supplier in order to comply with the requirements of PSL3.10.1, including attendance on site by a representative of the supplier for checking, testing and demonstrating all in accordance with the specification and upholding insofar as supply of replacements for defective parts is concerned, all in accordance with the terms of the Contract.

*Change heading:*

**PSL 8.2.15 Corrosion Protection**

*Delete the Sub-Clause and substitute the following:*

The costs of making good the internal linings and external coatings on all butt welded and fillet welded joints on the pipeline are to be included in the tendered rates.

Add new items:

External corrosion protection to flanges, adaptor joints, valves..... Unit : No

Separate items will be scheduled for each item by pipe nominal diameter.

In the case of valves, the rate shall include for protection of the whole of the valve body, all flanges integral to the valve, the connecting flanges to the valve (i.e. including the two flanges of the pipework

connected to either side of the valve) and the packing of mastic (without tape or sheathing) over the gland adjusting bolts and nuts.

*New Sub-Clause :*

**PSL 8.2.16 Shut-Down Operations.....Unit: No**

The Rate shall cover the complete cost of each 'Shut-Down' Operation, in compliance with the approved Method Statement for each Shut-Down (referencing PS 15; Three Shut-Down Operations namely PS 15.3.1 to PS 15.3.3). The cost of any further shut-down operations to be added to the Three Shut-Down Operation in the Bill of Quantities.

The cost of dis-mantling and removing the existing sections of the pipeline/fittings at the areas of the different 'tie-in' locations shall be measured, separately, under item PSC 8.2.7.

Each Shut-Down Operation, including but not necessarily limited to:

1. The Company cost of all permanent and/or temporary staff involved
2. The acquiring and/or use of all equipment and vehicles
3. Liasing with all the relevant Stakeholders in order to complete the Method Statement for each of the Shut-Down Operations
4. Preparing and complying with approved Method Statement for each Shut-Down Operation
5. Complying with all Health and Safety requirements
6. Making arrangements with the Employer's staff to temporarily shut off the existing pipeline whilst effecting the connection, .
7. Re-commissioning the systems after each Shut-down Operation.

**PRS: PROJECT SPECIFIC SPECIFICATION AND STANDARDS.**

**In addition to the Standardized and Project Specifications the following Project Specific Specifications will apply.**

PSR 1 Access for Reservoir Rehabilitation

PSR 2 Demolition and Removal of Structural Concrete and Steelwork

PSR 3 Surface and Structural Repair of Concrete Members

PSR 4 Anchoring of Reinforcement, Grouting and Crack Injection

PSR 5 Repair and Replacement of Ancillary Structural Elements

PSR 6 Repair of Steel Elements

PSR 7 External Bonding of Steel and Carbon Fibre

PSR 8 Protective Coatings and Treatments for Concrete

PSR 9 Miscellaneous Work and Reinstatement

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## **PSR 1. ACCESS FOR RESERVOIR REHABILITATION**

### **PSR 1.1 SCOPE**

This Section covers the requirements for the provision of suitable and safe access to all area requiring concrete demolition, repair work or rehabilitation of structures in accordance with the contract, and for inspections by the Engineer. It shall also include for the protection of passing persons, animals and vehicles against injury or damage and prevention of damage and contamination of the environment.

### **PSR 1.2 DEFINITIONS**

**Temporary Works:** The temporary works shall be all necessary for access to the work area and include all foundations, scaffolding and support structures, working platforms, cradles, fixtures to existing structural members, etc. required for the safe access to and execution of the work.

**Location:** Location means a specific structure as a whole where rehabilitation work has to be carried out.

**Structural Element:** Structural elements shall be that particular part or parts of a reservoir including but not limited to the following:

- Perimeter walls;
- Internal walls (dividing walls);
- Reinforced concrete columns including column heads and bases;
- Reinforced concrete floor slab; and
- Reinforced concrete roof slab.

Setting up at each structural element shall include all movement required from point to point on a particular element.

**Screening the Work:** Suitable metallic or non metallic grids, boarding or fabric membranes shall be used to screen the work area and to prevent falling debris from endangering the persons in the work area.

### **PSR 1.3 GENERAL**

The Contractor shall provide and will be responsible for safe access structures and work platforms to all areas or structural elements requiring remedial work. The access and temporary works shall be designed, constructed and maintained in accordance with the current relevant safety regulations, all in compliance with the Occupational Health and Safety Act and its applicable Regulations, and shall remain in place until removal is authorised by the Engineer. Appropriate allowances shall be made for screening of the work and other protective measures required by the various work activities. Access and work platforms may be provided from overhead mobile access gantries or vehicles, or from temporary works supported from the ground or fixed to structural elements.

Notwithstanding approval given by the Engineer for the design and drawings prepared by the Contractor and the acceptance of temporary works including the working platform(s) and access structure(s) as constructed, the Contractor shall be solely responsible for the safety and adequacy of the temporary works in terms of the occupation health and safety Act and shall indemnify and keep indemnified the Employer and Engineer against any losses, damage to persons or property, all claims, demands, proceedings, damages, costs, charges and expenses whatsoever, which may arise out of or in consequence of the design, construction, use and maintenance of the temporary works.

Roped access techniques shall not be permitted unless specified in the Contract Documentation. Where roped access is used, only persons who are specialists in roped access may be used in accordance with (Section18) of the applicable construction regulations.

Complete method statements including Occupation Health and Safety, Environmental and risk assessments, shall be submitted to the Engineer of techniques to be adopted for execution of the work before any work commences.

The Contractor shall comply with any additional imposed or physical restraints upon the means of access to and from the structure as stated in the project specification and the drawings.

The Contractor shall provide access facilities for inspection and testing by the Engineer, including the inspection at the end of the defects liability period. Any specific access facility required for the inspection at the end of the defects liability period shall be as indicated in the pricing schedule.

## **PSR 1.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS**

### **PSR 1.4.1 General**

The Contractor's design and drawings of the falsework for access shall comply with all requirements of the Construction Regulations.

The Contractor's design of all falsework for access shall be carried out by an ECSA Registered Professional Engineer or Technologist with relevant experience. The drawings and calculations shall be submitted to the Engineer for approval at least 14 days prior to the commencement of the work. The design, erection and construction of such temporary works shall be certified by an ECSA Registered Professional Engineer or Technologist on behalf of the Contractor shall comply with the relevant safety regulations regarding strength and stability for all imposed loads that can be anticipated to arise from the specified work activities.

The Contractor shall submit to the Engineer at least 14 days before work on the existing structure is scheduled for construction a detailed analysis showing the effect of the stresses that will be induced on the permanent works by the Contractor's chosen method of construction. The cost of any additional work or material required as a result of the Contractor's chosen method of construction shall be to the Contractor's account. No construction shall commence until the Engineer has given his written approval.

The Contractor's registered professional shall monitor at regular intervals and also sign off on the erection of the falsework and formwork after the erection thereof before the Engineer permits the work to proceed.

### **PSR 1.4.2 Falsework**

The Contractor shall make his own assessment of the allowable bearing pressure on the foundation material and shall design the footings and falsework to prevent overloading, differential settlement and unacceptable overall settlement. In assessing the allowable bearing pressure, due account shall be taken of the effect of wetting on the foundation material.

Particular attention shall be given to providing transverse and diagonal bracing as well as rib stiffeners on cross bearers.

## **PSR 1.5 MATERIALS**

All timber, structural steel and scaffolding used shall be free from defects that may prejudice the stability of the working platform(s) and access structures. All materials used for temporary access shall be certified and approved by the designer and copied to the Engineer. The jacks, devices, clamps and fittings shall all be in good working order and of adequate design and strength.

The type, grade and condition of the material shall be subject to the designer's approval and submitted to the Engineer for the record.

## **PSR 1.6 CONSTRUCTION EQUIPMENT**

### **PSR 1.6.1 Scaffolds, Platforms and Cradles**

Temporary works entailing scaffolds, platforms and cradles providing access to the work area shall be assembled and constructed from materials and structural sections complying with the relevant material specifications. The temporary works shall be designed, erected, operated, maintained and dismantled so as to ensure safe working conditions for all site personnel, and where necessary the safety of the general public having access to the site. Traffic safety measures shall be in place before the work commences.

## **PSR 1.7 EXECUTION OF THE WORKS**

All temporary access structures and work platforms and associated works shall be erected, modified, maintained and dismantled under the direction of an experienced and competent supervisor and safety officer. Prior to using any temporary access structure or facility, and at regular intervals thereafter, or following unforeseen circumstances, the temporary works shall be inspected and certified by a suitably experienced and qualified person on behalf of the Contractor.

To ensure the safety of, and to prevent injury or damage to passing persons, vehicles, animals, etc. the temporary works shall be enclosed with a suitable screening membrane or boarding where necessary to contain material or work equipment within the limits of the restricted work area. Suitable debris containers and chutes shall be provided to assist in the removal of debris and unusable or rejected materials.

Where temporary works are to be fixed to, or supported from an existing permanent structure, the location shall be subject to the approval by the Engineer. Such temporary works shall be removed when the work is completed and any holes, surface damage or blemishes arising from the fixture thereof to the inspected structure shall be repaired to the surface finish of the adjacent surface to the satisfaction of the Engineer. The Contractor shall submit a Method Statement including Risk Assessments required in terms of the Occupation Health and Safety Act and also provide for all requirements required in terms of the Environmental Management Plan.

## **PSR 1.8 WORKMANSHIP**

The Contractor shall, prior to dispatching the mobile access unit to the site, provide certification from the manufacturer or the operating authority that the unit has been thoroughly inspected and serviced, that the unit is functioning properly and that it complies with the relevant safety regulations and that the operator has been certified to operate the unit. After the erection for access purposes and before usage by the workmen the works shall be certified by the designer in terms with compliance with the specifications and is suitable for its intended use. A copy of the certification shall be delivered to the Engineer.

## **PSR 1.9 GUARANTEES AND COMPLIANCE CERTIFICATES**

### **PSR 1.9.1 SCOPE**

The scope of this Section covers the following:

- Product conformance specifications
- Warranties for product or element design and installation of proprietary systems
- Performance specifications

Note that the requirements for performance specifications are not limited to that given in part A only but includes all of the requirements in the Contract Documentation.

### **PSR 1.9.2 GENERAL**

#### **PSR 1.9.3 Product Conformance Specifications**

The Contractor shall, within 28 days of entering into the contract with the Employer, submit to the Engineer conformance documentation related to the specifications.

Conformance documentation shall be provided for:

- a. Scaffolding members.
- b. Timber scaffolding members.
- c. Jacks, devices, clamps and fitting.

#### **PSR 1.9.3 PERFORMANCE GUARANTEE REQUIREMENTS**

##### **PSR 1.9.3.1 Warranties for Product or Element Design and Installation of Proprietary Systems**

Certification for all false work for access by a suitable experience ESCA Registered Professional Engineer or Technologist shall be required.

##### **PSR 1.9.3.3 Performance Specifications**

Performance based specifications shall be contained in the Contract Documentation for the project if applicable. Method Statements shall be drawn up by the Contractor's designer and submitted to the Engineer for approval.

The Contractor shall accept full responsibility for the design, erection, usage and removal of the plant and equipment from site after completion.

## **PSR 1.10: MEASUREMENT AND PAYMENT**

### **Preamble**

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the Contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.



The following payment items shall include full compensation for all the works items associated with the provision of suitable safe access to all areas on site.

Item	Description	Unit
<b>PSR 1.1</b>	<b>Temporary access structures and work platforms (by element)</b>	
PSR 1.1.1	Access and platforms to locations as described as well as dismantling and removal at completion (heights assessed by Contractor)	
	(a) (Description of structures) (i)(Element of work requiring access described) (ii)(Etc. for other elements of work)	L/Sum L/Sum
	(b) (Etc. for other structures) (i)(Element of work requiring access described) (ii)(Etc. for other elements of work)	L/Sum L/Sum

The unit of measurement for each sub item shall be the lump sum.

The height of the required access platforms can be estimated from the BOQ and confirmed on site. The heights must be assessed by the Contractor at the time of tender. The tendered amount shall include full compensation for design, supply, fabrication, erection, dismantling, movement and for all labour, materials, and equipment required for the above works including the inspections, supervision by the safety officer and the maintenance of the temporary access structure and work platform. Payment shall be made on the following basis:

- 70% of the lump sum on erection of access structures;
- 30% of the lump sum on removal of access structures;
- Payment shall not be made for re-erection of access structure.

## **PSR 2. DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK**

### **PSR 2.1 SCOPE**

This Section covers the work in connection with the demolition of entire members of a concrete structure as well as cutting back concrete to expose reinforcement and the initial preparation of the exposed surface. Surface and structural repair of concrete members is covered in Section PSR 3. This Section also covers the demolition and removal of steel structures and members.

### **PSR 2.2 DEFINITIONS**

#### **Concrete and Steel Members or Elements:**

- (a) All references to concrete members shall include mass concrete, un-reinforced, reinforced and pre-stressed concrete members.
- (b) References to steel members shall include all structural steel members in structures.

#### **Demolition of Concrete and Steel Members or Elements:**

Demolition means the breaking up and removal of an entire concrete member or portion of a member or demolition and removal of an entire structural steel member or element.

#### **Removal of Concrete and Steel Members or Elements:**

- (a) Removal of concrete means cutting back into the surface or end of a concrete element and the removal of unsound, damaged or contaminated concrete, or the partial removal of concrete sections, to expose a sound surface for bonding new material for the repair or extension of the concrete element.
- (b) Removal of steel members or elements means the cutting out of a steel member or element out of a steel structure.

### **PSR 2.3 GENERAL**

#### **PSR 2.3.1 Concrete Members and Elements**

The work in this chapter includes the demolition of concrete members or elements either completely or partially. Complete demolition is usually carried out for the replacement of a member or element of a structure in its entirety and partial demolition of member or element is carried out for alterations or extensions to a structure.

Removal of small areas of concrete in partial demolitions is carried out for repairs of concrete members or elements.

#### **PSR 2.3.2 Structural Steel**

The demolition of structural steel members or elements can also be full demolition of a structure, member or element and is also carried out for alterations, extensions or repairs on structural steel structures.

### **PSR 2.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS**

Where concrete members or elements are demolished or where concrete is removed from concrete sections, or where steel members or elements are removed, the Contractor shall submit complete method statements for the method of execution of the works. These method statements shall be submitted for approval by the Engineer at least 14 days prior to works being carried out.

## **PSR 2.5 MATERIALS**

All materials used in the demolition and removal of concrete elements, shall be handled, stored and used strictly in accordance with the manufacturer's instructions and the current Occupation Health and Safety Act and its regulations.

## **PSR 2.6 CONSTRUCTION EQUIPMENT**

### **PSR 2.6.1 General**

All plant, equipment and tools used for the demolition of concrete elements or the removal of portions of existing concrete or the removal of steel members or elements shall be based on proven and accepted technology within the industry. The plant, equipment, tools and accessories shall be inspected and maintained on a regular basis to ensure that they remain in good working order, function efficiently, and that safety is not compromised. All cutting and breaking tools shall be kept sharp to reduce the force required to break out concrete to a minimum.

The plant, equipment and tools used for the demolition or removal process shall be of the accepted type and capacity for the relevant application. The suitability of the chosen method shall be demonstrated on a representative test section identified by the Engineer prior to the execution of any programmed work.

### **PSR 2.6.2 Access Structures and Working Platforms**

Where necessary, the Contractor shall provide suitable and safe temporary access structures, working platforms, debris collection and removal chutes and bins, including protection screens where required, at each location where concrete has to be demolished or removed.

The temporary structures, platforms, chutes, etc. must be stable and of sufficient strength and rigidity to safely carry the imposed temporary loads arising from the work activity, all as described in Section PSR 1.

## **PSR 2.7 EXECUTION OF THE WORKS**

### **PSR 2.7.1 Sequence of Execution**

The method and sequence of demolition or removal of concrete and structural steel shall be in accordance with the drawings or the approved method statement submitted by the Contractor to the Engineer for approval.

Any temporary propping specified in the approved method statement and the drawings shall be securely positioned in accordance with each stage of the demolition or removal sequence prior to commencement of the following stage. Areas to be demolished shall be indicated by the Engineer or shown on the drawings.

### **PSR 2.7.2 Site Preparation and Access**

The necessary access and temporary support structures shall be in place prior to the commencement of demolition or removal of concrete or structural steel. Screening and protective measures shall be established around the work area as necessary to ensure acceptable Environmental, Occupation, Health and Safety conditions.

### **PSR 2.7.3 Demolition of Entire Structural Members**

#### **(a) Steel Structures or Members**

The removal of entire structural steel structures or members shall be carried out using techniques which do not damage adjacent structures or members. The structural members to be demolished or removed completely shall be cut up into suitably sized sections and removed to suitable scrap metal yards for recycling.

### **PSR 2.7.4 Removal of Concrete from Structural Elements**

#### **(a) Cutting back concrete to a new finished surface**

The concrete and reinforcement shall be cut back adequately to provide the prescribed concrete cover to the new finished surface as indicated on the drawings or as directed by the Engineer. The technique used shall be suited to its intended purpose and shall not cause damage to the remaining concrete member.

Only techniques that do not damage the inherent structure, bond or strength of the remaining sound concrete shall be used. Heavy duty demolition equipment or thermal cutting techniques shall not be used closer than 100 mm from the final surface of the cut back as indicated on the drawings. The remaining concrete shall be removed using approved mechanical equipment or preferably hydro demolition. The fixed exposed contact surface shall be bounded by straight line edges cut at least 10 mm deep by a diamond cutting saw, angle grinder or other approved equipment.

#### **(b) Cutting back concrete to expose reinforcement**

Where a concrete member has to be joined or extended or replaced by new concrete, the concrete shall be carefully cut or broken from the reinforcement bars to expose the bars to the dimensions and outline as shown on the drawings or as directed by the Engineer. Care shall be taken not to damage or reduce the strength of the exposed bars or concrete member thereby making them unfit for use. The remaining concrete contact surface shall be cut to a plane and even surface with exposed faces perpendicular to the horizontal face or side faces as applicable.

The bounding lines of the cut concrete shall be straight and neatly cut to at least a depth of 10 mm using a diamond cutting saw, angle grinder or other approved concrete cutting equipment.

### **PSR 2.7.5 Removal of Structural Steel Elements from Existing Structures**

Where structural steel elements or members are removed from structures special cutting techniques shall be used to ensure the integrity of the remaining steel structure. Temporary bracing and or members shall be welded or bolted into place as indicated on the drawings before such a structural member or element is removed from the structure.

No work shall be carried out unless a complete method statement is submitted to the Engineer for approval and which shall include all Occupational Health and Safety requirements and a Risk Assessment.

### **PSR 2.7.6 Removal of Metal Sections Embedded in Concrete**

Metal sections including steel reinforcement that are embedded in concrete members by means of grout pockets shall be removed by carefully chipping out the embedment grout filling the pocket. Care shall be taken not to damage the structural concrete surrounding the pocket. Suitable tools such as hand-held power tools with chisel bits or hand tools shall be used to carry out this work.

Following the removal of the metal section or steel reinforcement, all remaining grout shall be removed and the pocket cleaned out to expose only solid concrete surfaces. The pocket shall be finally cleaned using high-pressure water jetting or oil-free compressed air to remove all loose fragments of grout, or concrete aggregate before further work is carried out.

### **PSR 2.7.7 Preparation of Exposed Contact Surfaces (for extension of existing concrete elements or construction of new concrete members)**

All loose and shattered concrete, as well as foreign material such as oil, paint, grease, etc. shall be removed from the contact surface of old concrete before new concrete is placed. The aggregate must be exposed to provide a good bonding surface.

The mechanically prepared concrete surface shall be cleaned by means of grit blasting or water jetting.

The breaking out and preparation of damaged, spalled and/or cracked concrete surfaces is described and measured under Sections PSR 2 and PSR 3.

### **PSR 2.7.8 Disposal of Waste Material**

All waste materials, rubble, scrap and rubbish arising from the Contractor's presence on site and/or The execution of the works shall be disposed of weekly to a disposal site or scrap metal yard Identified by the Contractor and approved by the Engineer.

## **PSR 2.8 WORKMANSHIP**

### **PSR 2.8.1 Tolerances**

The Contractor shall remove concrete to a planar, uniform surface with 25 mm maximum deviation from the level or dimension indicated on the drawings unless otherwise approved by the Engineer. The outer edge of the contact surface shall consist of straight lines with maximum deviation of 5 mm from straight, measured with a 1 m long straight edge, and shall be within 5 mm of the position indicated on the drawings, or as instructed by the Engineer. Steel members to be removed shall be cut out and replaced to a tolerance of 1 mm and then be welded or bolted into position.

### **PSR 2.8.2 Trials**

The Contractor shall carry out pre-construction trials with the proposed equipment to determine the suitability of the technique for the envisaged application. The results shall be reported to the Engineer and shall be subject to the Engineer's approval before the inclusion of such equipment into the method statement for the execution of the works.

## PSR 3. SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS

### PSR 3.1 SCOPE

This Section covers the requirements for the surface and structural repair of structural concrete members. It covers the preparation of the exposed concrete surface and reinforcement for the rehabilitation of the member, and the repair or replacement of concrete with cementitious mortars, epoxy systems and proprietary concrete repair compounds.

The method for removal of defective or contaminated concrete, partial removal of concrete sections and the initial preparation of contact surfaces are covered in Section PSR 2.

### PSR 3.2 DEFINITIONS

**Bonding Agent:** The component of a repair system used to promote adhesion of a repair mortar or concrete to a concrete substrate for the purpose of achieving a permanent bond, which is not affected by moisture and strong alkalis in service.

**Cementitious Repair Products and Systems:** Hydraulic or polymer mortars, concretes and grouts.

**High Flow Mortar or Concrete:** A repair product formulated to exhibit extremely high flow characteristics, outside the limits of normal methods of test, and which flows through narrow gaps and around areas of congested reinforcement, without bleeding or segregation.

**Smoothering Coat:** A fine mortar coating applied to a surface to fill voids, cracks, and cavities or to level an uneven surface. The purpose is to prepare the surface for the application of protection systems.

### PSR 3.3 GENERAL

This Section includes all the work and materials required to carry out the surface and structural repair of concrete members. The proprietary repair materials which are specified are based on the EN 1504-3 specification which shall be used in conjunction with this specification.

### PSR 3.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

Where the repair system comprises, in part, of a cementitious mortar or concrete, the material design and pre-construction laboratory results shall be recorded and submitted to the Engineer for approval prior to the commencement of the repair activities. The surface and structural repair activities shall only commence after the approval of the material design. The Contractor shall allow sufficient time in his programme for the material design, EN 1504 compliance verification and approval of the repair system.

### PSR 3.5 MATERIALS

#### PSR 3.5.1 General

Both cementitious-based and epoxy-based repair systems are described in this specification. In particular, cementitious repair systems may comprise either of a proprietary system conforming to the specification or a site-based formulation and performance tested with the relevant requirements of this section.

#### PSR 3.5.2 Cementitious Mortar or Concrete

The cementitious repair mortar shall comply with the strength requirements of the concrete in the structural member to be repaired. The water/cement (w/c) ratio shall not exceed 0,5 and guidelines for the composition of mortars and concretes consisting of different aggregate sizes shall be in accordance with the requirement of Section PSR 3.

The Contractor shall be responsible for the final design of the repair mix and shall submit a test report by an approved testing laboratory to the Engineer for approval prior to its use in the permanent works. All the test results shall be incorporated in the standard concrete mix design approval form.

Materials used in the cementitious mortar or concrete shall comply with the following requirements:

(a) Cement

Cement shall comply with SANS 50197-1 (EN 197-1) with a strength class of 32,5 or greater, and a rate of strength gain N or greater. Cement shall hold valid certification in the form of a Letter of

Authority issued as certified approval pursuant to the Compulsory Specification for cement published by Government Notice R.544. Masonry cement shall not be used.

(b) **Aggregates**

Aggregates shall comply with the requirements of SANS 1083, subject to all amendments and additional project requirements described in A13.4.5.2 aggregates.

(c) **Admixtures**

Admixtures shall comply with the requirements of SANS 50934 and shall be of an approved brand and type.

(d) **Performance requirements for cementitious mortar or concrete**

Unless otherwise specified, the cementitious mortar or concrete shall conform to the performance requirements stipulated in Table PSR 3.5-1 for class R3 for structural repairs or class R2 for non-structural repairs.

**PSR 3.5.3 Water**

The Contractor shall prove by way of laboratory test that all water used for mixing and curing repair materials complies with SANS 51008.

**PSR 3.5.4 Epoxy Systems**

Epoxy systems shall consist of a solvent-free, two-part adhesive consisting of a resin and hardener curing at ambient temperatures. The hardener shall be amine based with a high resistance to moisture. The epoxy shall be supplied and used in accordance with the manufacturer's instructions and recommendations regarding the intended use thereof. Aggregate for epoxy mortars shall be kiln-dry when mixed with the epoxy system. The proprietary epoxy system used shall be approved by the Engineer and shall have a minimum compressive strength after 7 days of 50 Mpa.

The suitability of the epoxy mortar for a particular application shall be proved by testing or submission of an approved industry track record of usage under similar circumstances.

The epoxy mortar shall have a compressive strength equal to or greater than the adjacent concrete and it shall exhibit similar temperature expansion characteristics. The elastic modulus,  $E_e$ , shall not exceed that of the parent concrete. Aggregate (fine and coarse) shall be clean and dry and the size shall not exceed one third of the minimum patch thickness.

The Contractor shall be responsible for the final mix design and shall submit details to the Engineer for approval prior to its use in the permanent works.

**PSR 3.5.5 Proprietary Cementitious Repair Systems**

The suitability of the repair compound for a particular application shall be proved by testing or submission of an approved industry track record of usage under similar circumstances.

The Contractor shall submit details of the proprietary cementitious compounds to the Engineer for approval prior to its use in the permanent works.

The repair systems shall consist of the following to be approved by the Engineer:

**(a) Primer for Steel Surfaces**

The primer shall consist of a single component zinc rich primer as per Clause PSR 3.5.7 or cementitious epoxy resin compensated three component coating material with active corrosion inhibitor

**(b) Adhesion promoter for concrete surfaces**

The products and measures deemed suitable for use as adhesion promoters in accordance with the proprietary repair compound and site conditions shall conform to the requirements stipulated in Clause PSR 3.5.6.

### (c) Concrete Repair products

For structural repairs, only Class R3 and R4 repair products conforming to EN 1504 as specified shall be used. For non-structural repairs, Class R1, R2, or R3 repair products conforming to EN 1504 as specified shall be used.

Typical generic descriptions of suitable repair products may include:

- (i) High strength, expansive cementitious grout;
- (ii) Free flowing structural repair concrete;
- (iii) Fibre reinforced, polymer modified repair mortar;
- (iv) High build, polymer modified repair mortar;
- (v) Polymer modified pore sealer;
- (vi) Very rapid setting repair mortar; and
- (vii) Non-sag patching and repair mortar.

### (d) Curing of repaired surface

The type and application of the curing compound shall be to the Engineer's approval.

Proprietary cementitious repair systems shall include all components and materials necessary to complete both non-structural and structural repair of concrete structures. The proprietary repair systems shall comply with EN 1504-3. The repair system shall be suitable for the following protective and remedial principles in accordance with EN 1504-9 as set out in Table PSR 3.5-1.

- (i) Applying mortar by hand (Principle 3 – Method 3.1)
- (ii) Recasting concrete (Principle 3 – Method 3.2)
- (iii) Adding Mortar or concrete (Principle 4 – Method 4.4)
- (iv) Increasing cover to reinforcement with mortar or concrete (Principle 7 - Method 7.1)
- (v) Replacing contaminated concrete (Principle 7 – Method 7.2)

The materials for proprietary cementitious repair products shall be supplied as a factory pre-packed dry premix of cements, aggregate and other proprietary products requiring only the addition of prepacked liquid or a prescribed volume of water of an approved quality to produce the satisfactory repair product. The proprietary repair products shall compensate for shrinkage in both the plastic and hardened states and shall be suitable for use in the proposed mix and placing techniques. These products are suitable for both structural and non-structural applications.

Proprietary concrete shall be highly workable and self-compacting without the use of vibrators. The aggregate grading shall be designed to prevent segregation during transportation and placing. The concrete system shall have a low alkali content to ensure minimal risk of alkali-silica reaction and shall contain no chlorides. The proprietary concrete shall comply with the material properties as indicated on the detail drawings, alternatively the performance requirements defined in Table PSR 3.5-1 shall apply:



Table PSR 3.5-1: Performance requirements for structural and non-structural repair products (Extract from Table 3, EN 1504-3)

Item No.	Performance Requirements	Reference substrate (EN 1766)	Test Method	Requirement			
				Structural		Non-structural	
				Class R4	Class R3	Class R2	Class R1
1	Compressive strength	None	EN 12190	≥ 45 MPa	≥ 25 MPa	≥ 15 MPa	≥ 10 MPa
2	Chloride ion content	None	EN 1015-17	≤ 0.05 %		≤ 0.05 %	
3	Adhesive Bond	MC (0.40)	EN 1542	≥ 2.0 MPa	≥ 1.5 MPa	≥ 0.80 MPa	
4	Restrained shrinkage / expansion	MC (0.40)	EN 12617-4	Bond strength after test			No Requirement
				≥ 2.0 MPa	≥ 1.5 MPa	≥ 0.80 MPa	
5	Carbonation resistance	None	EN 13295	Dk ≤ control concrete (MC(0.45))		No requirement	
6	Elastic modulus	None	EN 13412	≥ 20 GPa	≥ 15 GPa	No Requirement	
7	Thermal compatibility Part 1: Freeze-thaw	MC (0.40)	EN 13687-1	Bond strength after 50 cycles			Visual inspection after 50 cycles
				≥ 2.0 MPa	≥ 1.5 MPa	≥ 0.80 MPa	
8	Thermal compatibility Part 2: Thunder shower	MC (0.40)	EN 13687-2	Bond strength after 30 cycles			Visual inspection after 30 cycles
				≥ 2.0 MPa	≥ 1.5 MPa	≥ 0.80 MPa	
9	Thermal combat ability: Part 4: Dry cycling	MC (0.40)	EN 13687-4	Bond strength after 30 cycles			Bond strength after 30 cycles
				≥ 2.0 MPa	≥ 2.0 MPa	≥ 2.0 MPa	
10	Skid resistance	None	EN 13036-4	Class I: >40 units wet tested Class II: >40 units dry tested Class II: > 55 units wet tested		Class I: >40 units wet tested Class II: >40 units dry tested Class II: > 55 units wet tested	
11	Coefficient of thermal expansion	None	EN 1770	Not required if tests 7, 8 or 9 are carried out, otherwise 9.0E-6 mm/mm/°C		Not required if tests 7, 8 or 9 are carried out, otherwise 9.0E-6 mm/mm/°C	
12	Capillary absorption	None	EN 13057	≤ 0.5 kg.m <sup>-2</sup> .h <sup>-0.5</sup>		≤ 0.5 kg.m <sup>-2</sup> .h <sup>-0.5</sup>	No requirement

In addition to the general occupation health and safety requirements of the works all the necessary health, safety and fire precautions stated by the manufacturer shall be complied with. Only material of which the shelf life has not expired shall be used.

### **PSR 3.5.6 Adhesion Promoting Techniques**

Adhesion of the repair material to the substrate is a priority requirement for all repair systems. Adhesion can be assisted by the use of bonding agents, prewetting the substrate, or sealing of the substrate, as appropriate to the particular requirements of the repair system.

Bonding agents shall be supplied, pre-packaged and ready for on-site mixing and application. Typical cementitious materials may include either a one component cementitious, polymer modified primer; or a cementitious, epoxy resin compensated three component coating material. The Contractor shall note the limitations given by the manufacturer to pot life, workable life and open time related to the materials used.

Where appropriate to the cementitious repair system, the concrete shall be well pre-wetted but free from water on the surface at the time of application. The surface should achieve a dark matt appearance without glistening and surface pores and pits should not contain water.

Some repair systems recommend the use of a substrate sealing compounds, this technique shall comply with the adhesion requirements of EN 1504. Typical materials include single-component emulsion based on modified acrylic type resins, but the use of wet-to-dry type epoxy materials shall not be permitted.

### **PSR 3.5.7 Anti-corrosion Primer for Reinforcement**

The anti-corrosion primer shall be a single component zinc rich primer with a minimum volume solids of 30% complying to a 700 hour salt spray resistance to exposure as per ASTM B-117 or a cementitious, epoxy resin compensated three component coating material with an active corrosion inhibitor meeting the requirement of EN 1504-7.

The primer shall be supplied and used in accordance with the manufacturer's instructions and recommendations regarding the intended application. All necessary health, safety and fire precautions stated by the manufacturer shall be complied with.

### **PSR 3.6 CONSTRUCTION EQUIPMENT**

All plant and equipment used for the preparation of concrete surfaces, batching of material and mixing operations shall be in good working order and suited for the intended use. The plant shall be inspected, serviced and calibrated at regular intervals and tested to ensure proper functioning, all to the satisfaction of the Engineer.

### **PRS 3.7 EXECUTION OF WORKS**

#### **PRS 3.7.1 Preparation of Repair Surface**

##### **a) Preparation of concrete contact surface**

All surface laitance and damaged, loose and soft concrete, concrete containing aggressive ions e.g. chloride, as well as all foreign materials such as oil, paint, grease, etc. shall be removed from the contact surface using pneumatic chisels or other approved mechanical equipment or thermal/hydraulic techniques. The contact surface shall be treated to expose the aggregate by means of grit blasting or high-pressure water-jetting or where it can be shown to produce the required aggregate exposure, a hard brush may be used subject to the Engineer's approval.

The mechanically prepared concrete surface shall be cleaned of dust by means of oil-free compressed air or water-jetting.

The area to be repaired shall be bounded by straight line edges cut to the required depth using a diamond cutting saw, angle grinder or other approved equipment. The edges shall be recessed such that the patch has a thickness at the edge of at least twice the maximum aggregate size of the patching material, but in no case less than 10mm.

### **b) Preparation and protection of embedded reinforcement**

All visible or embedded reinforcement bars showing signs of corrosion shall be exposed by cutting back the concrete around the bar with pneumatic chisels or other approved method. The corrosion shall be removed by grit blasting, or where this is not warranted, by wire-brushing with power tools to an acceptable surface. The treated steel surface shall be clean of all corrosion and foreign material likely to impair the bond of the anti-corrosion primer to the reinforcement. No chemical solvents shall be used without the approval of the Engineer.

Reinforcement that has experienced significant pitting or reduction in diameter shall be referred to the Engineer for acceptance. All rejected reinforcement shall be cut out and replaced with new bars of the same type and size, allowing for a minimum overlap of 45 diameters with the in situ bars.

All exposed and cleaned reinforcement shall receive one coat of a single-component anticorrosion primer based on zinc and epoxy resins, which shall be evenly applied to achieve a minimum 40 µm dry film thickness. The primer shall contain at least 30% zinc solids by volume. The primed surface shall not be exposed to the atmosphere longer than specified by the manufacturer primer before the application of the repair mortar, but at least until the coating is fully dry.

Alternative proprietary anti-corrosion coatings shall be subject to the approval of the Engineer, based on submitted test documentation and proven performance within the industry.

In cases where the final concrete cover is deemed by the Engineer to be inadequate the following protection shall be applied at the Engineer's instruction:

- Cover 0 - 5mm

The reinforcement shall receive two coats of anti-corrosion zinc-based epoxy primer as described previously. In order to improve the bond to the covering epoxy mortar, kiln-dry quartzitic sand shall be applied onto the final wet coat.

- Cover >5mm

The outer surface mortar patch shall receive a surface coating based on an approved hydrophobic impregnants, sealers and pore blockers. Where an epoxy mortar is used as repair material, the reinforcement shall be coated as for the 0 - 5mm case.

### **PSR 3.7.2 Bonding layer**

#### **a) Cementitious mortar or concrete repair**

Concrete surfaces that exhibit a high moisture absorption shall be wetted prior to patching, the mortar being applied only when the surface has dried sufficiently to have a matt moist appearance, preferably saturated surface dry.

Generally, the cement paste shall consist of one part cement (same type as for patching mortar) and one part sand (<2mm) mixed with water to a thick, but fluid consistency.

The use of polymer dispersive additives to improve workability and bond characteristics shall be subject to the approval of the Engineer. Alternatively, an approved adhesive or bonding agent may be applied to the prepared surface so as to enhance the bond of the fresh mortar to the dry concrete in accordance with the manufacturer's instructions. Only compatible materials shall be used.

#### **b) Epoxy mortar repair**

The repair surfaces shall be covered with a thin compatible bonding layer of epoxy resin. Should the time interval between resin and mortar application exceed 24 hours, the wet bonding layer shall be sprayed with a kiln-dry quartzitic sand to achieve a sandpaper-like covering. All loose sand shall be brushed off before applying the epoxy mortar to the bonding layer.

#### **c) Proprietary cementitious repair compounds**

The contact surfaces shall be prepared and treated with a compatible bonding layer in accordance with the manufacturer's specification.

### PSR 3.7.3 Batching and mixing

#### a) Cementitious mortar or concrete

The constituent parts of the mortar or concrete, i.e. the cement, aggregate and water, shall be weigh batched. Mixing of mortar shall be done with plant or equipment suited to the amount of mortar to be mixed.

The batched materials shall be mixed continuously for at least five minutes in a mechanical drum or table type mixer, or, for small amounts, with an electric drill with a mixing paddle.

#### b) Epoxy mortar

The epoxy base and activator shall be mixed strictly in accordance with the manufacturer's instructions.

The epoxy and aggregate shall be weigh-batched. The base and activator shall first be mixed thoroughly for at least 3 minutes and until a consistent uniform colour is maintained, whereafter the aggregate shall be added and mixed to a uniform consistency. The manufacturer's instructions shall be strictly adhered to.

#### c) Proprietary cementitious repair compounds

The repair compound shall be mixed strictly in accordance with the manufacturer's specifications. Unless otherwise specified the product shall be thoroughly mixed in a forced-action mixer of adequate capacity. Alternatively a suitably sized drum may be used with a slow speed (400/500 rpm) high-torque rotary drill fitted with an approved mixing paddle. The contents shall be properly mixed to ensure a smooth, uniform mix.

The mixing capacity and placing capacity of equipment and labour shall be adequate and matched to enable placing operations to be carried out continuously within the recommended placement time of the product, or within 20 minutes of mixing ensuring a smooth, uniform mix.

Tools and equipment shall be cleaned after each batch and all previously mixed material shall be removed from tools and equipment prior to charging and mixing a new batch of repair compound.

### PSR 3.7.4 Formwork for structural concrete repair

All formwork shall conform to the Specifications contained in SANS 1200G and shall be used when the area to be patched will not allow for a trowelled finish.

Formwork shall be fixed in place as soon as possible after the substrate has been prepared as specified. Openings in the formwork shall be protected to prevent entry of debris or contaminants.

When casting high flow concrete or mortar, the formwork shall be water-tight and shall be free from obstructions to the free flow of cementitious repair product. Where required, a suitable provision for the drainage of pre-soaking water or access for the application of a surface bonding layer immediately prior to placing the repair concrete shall be provided.

All formwork surfaces which will be in contact with proprietary concrete repair compounds shall be treated with a suitable mould release agent. The formwork surfaces shall match the existing surface textures.

### PSR 3.7.5 Application of the repair material

#### a) Cementitious mortar

After the defective concrete surface and the embedded reinforcement have been prepared, the bonding layer shall be worked onto the concrete contact surface followed directly by the freshly mixed repair mortar. The mortar application shall follow the technique of plastering.

The mortar surface shall be trowelled when the mortar exhibits initial set to obtain a uniform plain surface true to line, matching the boundaries of the repair area, and shall then be finished to match the adjacent existing surface finish.

Local areas, where deep recesses have been cut out, or where concrete has been removed around reinforcement bars, shall be built up in layers as required.

**b) Concrete**

After the defective concrete surface or member has been prepared, an approved bonding layer shall be worked onto the concrete contact surface followed directly by the freshly mixed concrete. The concrete shall be properly compacted and where possible, vibrators shall be used.

**c) Epoxy mortar**

The epoxy mortar shall be applied in accordance with the manufacturer's recommendations and specifications.

Each layer of epoxy mortar shall be trowelled onto the prepared and primed surface in one work session. The rate at which the epoxy mortar can be applied shall determine the batch quantity such that the pot life of the epoxy is not exceeded. Unused mortar for which the pot life has been exceeded shall be discarded.

**d) Proprietary cementitious repair compound**

The proprietary compound shall be applied in accordance with the manufacturer's recommendations and specifications.

The minimum and maximum layer thickness shall be as specified by the manufacturer, depending on the orientation of the application. Each layer of repair compound shall be thoroughly worked and compacted into the repair zone ensuring that full contact with the primed contact surface is achieved and no air entrapment occurs. All sagging or slumping material shall be removed and the contact surface cleaned prior to re-application using a reduced layer thickness.

**PSR 3.7.6 Protection and curing**

**a) Cementitious mortar or concrete**

The finished mortar surface shall be protected from drying out due to wind, direct sunlight or frost. The Contractor shall arrange such protection to the Engineer's approval who will assess each case on its merits.

The surfaces shall be cured over a period of at least 7 days by spraying a uniform, full coat of an approved resin-based curing membrane not later than 2 hours after placement of the mortar, but within 20 minutes after stripping the formwork, or by any other approved procedure.

**b) Epoxy mortar**

The mortar shall be protected from rain and frost for at least 24 hours and shall be cured in accordance with the epoxy supplier's recommendations, or as directed by the Engineer.

**c) Proprietary cementitious repair compounds**

Immediately after the proprietary compound has been applied or after formwork has been removed cure the compound as per the manufacturer's detailed instructions.

**PSR 3.7.7 Reinstatement of concrete cover**

**a) Cementitious mortar**

The mortar shall consist of one part cement and two parts sand (0-2mm) by mass with a water/cement ratio not exceeding 0,42. Additives approved by the Engineer may be used to improve workability and durability of the mortar.

The mortar shall be applied to minimum thickness of 10mm and the finished surface shall be treated with an approved curing compound in accordance with Clause PSG 5.5.6.

**b) Epoxy Mortar**

Epoxy mortars shall not be applied to structural concrete surfaces with temperatures below +10°C. The concrete and reinforcement shall be prepared as described in SANS 1200G and primed with the bonding layer before applying the approved epoxy mortar based on the size and depth of repair.

### **PSR 3.7.8 Partial Removal of Concrete to Expose Reinforcement**

Where a structural element contains embedded reinforcement which will be re-used in the rehabilitation process, the concrete shall be carefully chipped away without damaging the reinforcing bars. Damaged bars shall be replaced with new reinforcement of similar type and size, subject to the Engineer's approval.

### **PSR 3.7.9 Sounding Survey**

On instruction from the Engineer a sounding survey shall be carried out by striking the concrete with a hammer of approximately 500g mass and recording the location of hollow sounding areas. On plane areas of concrete the surface shall be sounded at approximately 300mm centres in each direction. On columns, beams or other similar members with faces less than 300mm wide, each face shall be sounded near each edge or corner at approximately 300mm centres along the member. Where a hollow sounding area is detected its extent shall be determined by local sounding and its periphery marked on the surface of the member for repair.

## **PSR 3.8 WORKMANSHIP**

### **PSR 3.8.1 Tolerances**

The Contractor shall apply the patching mortar or concrete and finish the surface to the line and level of the existing concrete and within the tolerances specified on the drawings, or if none is specified, to the tolerances specified in SANS 1200G.

### **PSR 3.8.2 Testing**

The Contractor shall ensure that only compatible materials are used for surface and structural repair of concrete members. All test results shall be reported to the Engineer and will be subject to the Engineer's approval.

The site weather conditions during the application of surface and structural repair of concrete members shall be monitored and recorded as follows:

- a) Ambient temperature shall be recorded using thermometers with accuracy of 1°C, in the direct vicinity of the Works, but not subject to direct solar radiation.
- b) Precipitation shall be recorded daily during product application. The following tests for the substrate and repair material are required:
  - The cleanliness of the substrate shall be visually inspected, after preparation and immediately before the application of repair materials.
  - The temperature of the substrate shall be recorded using thermometers with accuracy of 1°C, but not subject to direct solar radiation.
  - The consistency of repair materials shall be recorded for each batch: for concrete slump measured according to SANS 3001- CO1-3, or flow according to SANS 3001-CO1-6 and consistency for mortar determined in accordance with EN 13395 – parts 1, 2 or 4.
  - Colour, uniformity and texture of finished surfaces shall be assessed visually to ensure consistent aesthetic appearance.
- c) Material  
The Contractor shall ensure that only compatible materials are used as ingredients for the repair mixes.

The Contractor shall carry out pre-construction compatibility tests on the proposed repair system in accordance with EN 1504 to ensure that the strength and serviceability requirements of the structural rehabilitation are met. The test results shall be reported to the Engineer and shall be subject to the Engineer's approval.

Any patch material exhibiting signs of cracking at its perimeter shall be deemed to have failed and shall be removed and replaced.

- d) Acceptance testing

The Engineer will assess cast repair concrete or proprietary cementitious compounds according to SANS 3001-C02-03 and the relevant sub-clauses and any applicable Contract Documentation.

Repair material for surface repair will be assessed for compliance based on the 28-day mean strength test result compared to the specified 28-day compressive strength for each class of repair material.

The criteria for compliance with the strength requirements shall be the mean strength result of three test cubes made from the repair material mix used, which are then prepared and tested in accordance with SANS 3001-C02-03.

Test cubes shall be stored and cured in a manner appropriate to the materials to be tested in accordance with the manufacturer's specifications and shall be properly identified.

The strength results shall represent the section of work executed in the period as agreed to by the Contractor and the Engineer in advance of sampling.

The work at risk due to non-compliance shall be that executed during the agreed period represented by the strength results that failed to achieve the specified strength.

As a consequence of non-compliance in terms of the acceptance criteria, the Contractor shall take such remedial action as the Engineer may consider necessary. Such action may include removal and replacement of material in repairs at risk and further testing. All such costs shall be borne by the Contractor.

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## PSR 4. ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION

### PSR 4.1 SCOPE

This specification covers the requirements for the filling of gaps, holes and pockets with grout systems and the injection of cracks and cavities with adhesive systems.

### PSR 4.2 DEFINITIONS

**Grouting:** Grouting means the filling of gaps between structural elements by using gravity techniques to fill holes or pockets in concrete members including the embedment of steel sections or other components. Grouting is generally done with a proprietary high-strength, non-shrink, cementitious compound or epoxy system.

**Crack injection:** Crack injection means the filling of cracks and internal cavities in concrete members with low-viscosity liquid epoxy adhesive by a low-pressure injection procedure.

**Epoxy adhesive:** Epoxy adhesive means the compound that serves to bond together two separate materials or contact faces resisting the interfacial stresses to ensure structural composite action of the joined materials.

### PSR 4.3 MATERIALS

#### PSR 4.3.1 Anchoring adhesive

The materials selected shall be suitable for anchoring reinforcement into concrete surfaces in accordance with EN 1504-9 Principle 4- Method 4.2. All anchoring adhesives shall have certified fire resistance and hold European Technical Approval for use in non-cracked concrete, or if specified on the drawings, certified approval for cracked concrete or seismic zones. All anchoring products shall be styrene-free and shall be compatible with European Technical Approval ETAG 001-5.

#### PSR 4.3.2 Grout

The materials selected shall be suitable as structural repair products for concrete in accordance with EN 1504-9 Principle 3-Method 3.2, Principle 4-Method 4.4 and Principle 7-Method 7.2.

##### a) Cementitious grout

Cementitious grout shall comply with the requirements of ASTM C1107 or EN 1504. The materials for the grout shall be supplied as a factory pre-packed dry premix of Portland cement powder, graded fillers and other proprietary products requiring only the addition of water to produce the required consistency ranging from a plastic to flowable. The proprietary grout shall compensate for shrinkage in both the plastic and hardened states whilst hardening free of bleeding, segregation and settlement, without gas-generating and air-releasing agents.

Flowable grouts shall be suitable for use by pumping and mix-and-pour placing techniques, and shall be highly workable, self-compacting and self-levelling without the use of vibrators. The cementitious grout shall have no deleterious effects on the reinforcement or embedment's, and shall not contain harmful quantities of chloride, nitrate, nitrite, sulphide or sulphate.

##### b) Epoxy resin grout

The materials for the grout shall consist of a factory pre-packed, solvent-free, two-part epoxy adhesive consisting of resin and hardener components and specially prepared and graded aggregate. The epoxy shall be low viscosity modified aliphatic or amid amines with a high resistance to moisture and low creep values under sustained loads. Polyester-based products shall not be permitted for grouting purposes.

The mixed adhesive shall have a smooth, free-flowing liquid consistency which, when mixed with the aggregate, will not separate or settle out prior to curing.

The epoxy resin grout shall be suited to the intended application and the toxicity of the chemicals in the components shall be low enough to enable safe usage in confined areas of the construction site and in a normal workshop environment.



### c) Working characteristics of grout

- I. Application  
The grout system shall be suitable for application by pouring into gaps, holes, pockets or formwork depending on the particular circumstances.
- II. Strength development, cure time and environmental conditions  
The grout shall be capable of curing to the required strength at ambient temperatures between 10°C and 40°C in relative humidity up to 95 percent.

The grout must cure sufficiently within 24 hours, to the compressive strength specified on the drawings, with negligible shrinkage on curing.

#### PSR 4.3.3 Crack injection and crack filling

The materials selected shall be suitable for crack injection filling and sealing in accordance with EN 1504-9 Principle 1-Method 1.5 and Principle 4-Methods 4.5 and 4.6.

#### a) Adhesive

- I. Surface sealing for vertical and overhead surfaces  
The surface sealant shall be suitable for bonding the injection ports to the concrete substrate and for sealing the surface of the crack. The surface sealing adhesive shall be grey in colour, shall be compatible with the injectable adhesive and shall have sufficient strength and adhesion to contain the injectable adhesive at the maximum injection pressure within the crack during the injection and curing processes. The hardened surface sealant adhesive shall be capable of being easily removed without damage to the concrete surface and shall not leave a residue.

Acrylic compounds or car body repair-type compounds shall not be permitted.

- II. Surface sealing for horizontal, top surfaces

The surface sealant shall be suitable for use in creating a ponding area along the crack for the filling by pouring method. The sealant shall be applied as a bead or dam onto the concrete surface, be capable of retaining the epoxy adhesive and maintain the sealant properties until the epoxy adhesive has hardened. The surface sealant shall be easily removed after hardening of the epoxy adhesive. Surface applied beads of thixotropic acrylic- or polyurethane-sealants are commonly used, but compliance with the epoxy adhesive manufacturer's instructions shall be enforced.

#### b) Injection ports

Injection ports shall consist of short lengths 75 mm to 130 mm of small diameter 3 mm to 5 mm ID, flexible, high-pressure tubing each fitted with a locating pin at the base for bonding in the crack sealant. The locating pin shall be supplied with a length of wire flattened at the end for accurate positioning of the tube over a crack.

Grease nipples or similar self-closing injection nipples shall not be used unless authorized by the Engineer. Sufficient field testing to demonstrate the satisfactory operation of such injection port shall precede any approval application.

#### c) Injectable and pourable epoxy adhesive products

The adhesive used for epoxy injection into cracks in concrete shall consist of an unfilled, solvent-free, two-part epoxy consisting of resin and hardener components. The epoxy shall be low viscosity modified aliphatics or amidoamines with a high resistance to moisture and low creep values under sustained loads. The injectable adhesive shall meet the requirements for force transmitting structural filling of cracks in accordance with EN 1504-5.

The adhesive components shall be supplied in liquid form and in separate sealed containers. Each component shall have a different identifiable colour which results in a distinctive homogeneous colour when thoroughly mixed. The adhesive shall mix readily to a smooth liquid consistency of low to medium viscosity and shall be suitable for injection into cracks on surfaces

ranging from horizontal top to vertical, as well as inverted overhead, surfaces.

The mixed adhesive shall be free of lumps and the components shall not separate or settle out during the pot life of the adhesive.

**d) Working characteristics of adhesive**

- I. Surface sealing application  
The surface sealing adhesive shall be suitable for trowelling application, shall be non-slump and shall have excellent gap filling properties.
- II. Injectable and pourable application  
The adhesive shall be suitable for injection into cracks and voids under low pressure and shall meet the requirements for Inject ability Class P3 (as defined in EN 1504-5) when determined in accordance with EN 1771. The viscosity of the epoxy shall be matched to the crack width and material macro porosity surrounding the crack, generally between 200 cP and 400 cP at 25°C. The adhesive shall be capable of bonding to dry and moist surfaces where the injected adhesive displaces moisture present in cracks and cavities.
- III. Pot life  
The workable time or pot life of the mixed adhesive shall be determined according to EN ISO 9514. The mixed adhesive shall exceed 60 minutes at 25°C and a relatively high humidity, unless special circumstances dictate a fast-setting adhesive.
- IV. Storage life  
The storage life, or shelf life, in the original sealed containers of both the resin and hardener shall not be less than six months stored at temperatures between 5°C and 25°C. Only batches of material of which the shelf life has not expired shall be used.
- V. Cure time and temperature  
The adhesive shall be capable of curing to the required strength at temperatures between 10°C and 40°C in relative humidity of up to 95 percent.

The adhesive must cure sufficiently to develop the specified mechanical properties within 7 days, with negligible shrinkage on curing.

**e) Mechanical properties of cured injectable adhesive**

- I. Moisture resistance  
The adhesive shall comply with “Adhesion by tensile bond strength” Class F2 (as defined in EN 1504-5) when tested in accordance with EN 12618-2 for “Adhesion by tensile bond strength after thermal and wet-drying cycles”. If specified on the drawings, the adhesive shall comply with “Adhesion by tensile bond strength after thermal and wet-drying cycles” Class F1 (as defined in EN 1504-5).
- II. Temperature resistance  
The glass transition temperature of the adhesive, measured in accordance with EN 12614, shall exceed 40°C and the adhesive shall have a heat distortion temperature (HDT) of at least 50°C measured in accordance with ISO 75.
- III. Flexural modulus  
The modulus of elasticity in flexure of the adhesive, determined in accordance with EN ISO 178, shall be between 2,0 GPa and 10,0 GPa at 20°C. The adhesive must have a consistent static behaviour for temperatures ranging between -20°C to 40°C under cyclic loading.
- IV. Modulus of elasticity in compression  
The modulus of elasticity in compression of the adhesive, determined in accordance with EN 13412, shall be minimum 2,0 GPa.

- V. Shear strength  
The bulk shear strength of the adhesive, determined in accordance with EN 12188, shall exceed 12 MPa at 20°C.
- VI. Tensile strength  
The adhesion capacity shall be determined in accordance with EN 12188. The tensile stress carried by the bonded joint in a pull-off test shall not be less than 14 MPa. The slant shear strength of scarf-jointed prisms tested in compression at various interface angles:
1. for an interface angle of 50°, the minimum adhesion stress shall be 50 MPa
  2. for an interface angle of 60°, the minimum adhesion stress shall be 60 MPa
  3. for an interface angle of 70°, the minimum adhesion stress shall be 70 MPa.
- VII. Double lap shear strength  
The average lap shear strength of a double overlap joint at failure using steel plates shall exceed 8 MPa at 20°C.

#### PSR 4.3.4 Packaging and handling

All adhesive components shall be supplied in separate sealed containers of suitable sizes to obtain a mixed quantity that can be fully utilized within the pot life of the adhesive. The components shall be packaged in the correct portions so that the entire contents of each container mixed together shall produce a mix of the correct proportions. The adhesive properties shall not vary significantly with minor variations in the mix proportions resulting from the container emptying process.

Each container shall be durably and legibly marked and complete records of stock acquired and issued for use, shall be kept. The containers shall be clearly marked with the following information:

- a) name of manufacturer;
- b) manufacturer's product identification;
- c) batch number and date of manufacture;
- d) date of expiry or shelf life;
- e) manufacturer's instructions for mixing; and
- f) Detailed health and safety information, including precautionary physical, toxicological and environmental requirements.

#### PSR 4.3.5 Storage

The Contractor shall provide a lockable store with ventilation and observe all storage requirements and safety precautions recommended by the manufacturer's instructions and applicable Regulations.

#### PSR 4.3.6 Manufacturer's instructions and documentary proof of compliance

The material manufacturer's quality control conformance certificates and test results relevant for each batch of material supplied to site shall be made available to the Engineer upon request. The manufacturer shall provide a dated, coded and titled instruction sheet with each delivery of adhesive. The following information shall be contained on the sheet in a clear and unambiguous manner:

- a) the general chemical type of each component used in the adhesive;
- b) recommended storage conditions and shelf life when stored under these conditions;
- c) preparation instructions for steel and concrete surfaces;
- d) instructions for use of primers, including optimum dry film thickness and permissible ranges;
- e) mixing instructions, including allowable variations in mix ratio and any temperature control requirements during the mixing process;
- f) application instructions, including limits on pressure, temperature, open time and relative humidity before injection;
- g) safety precautions for all components of the adhesive; and
- h) curing conditions and temperature-related precautions.

## **PSR 4.4 CONSTRUCTION EQUIPMENT**

### **PSR 4.4.1 General**

All plant and equipment used for anchoring of reinforcing bar, grouting operations and pressure- and gravity- injection of epoxy resins shall be based on proven and accepted technology and practice within the industry. The plant, equipment, tools and accessories shall be inspected and maintained on a regular basis to ensure that they remain in good working order, are clean, function efficiently, and that safety is not compromised - all to the approval of the Engineer.

### **PSR 4.4.2 Temporary access structures and working platforms**

Where necessary the Contractor shall provide temporary access structures and working platforms in accordance with Section PSR 1 at each location for anchoring, grouting or crack preparation and injection procedures.

### **PSR 4.4.3 Forming holes for anchoring**

The Contractor shall form holes for anchoring utilizing equipment based on rotary drilling or wet coring techniques, appropriate to the size of the hole and the anchoring material utilized.

### **PSR 4.4.4 Pressure injection equipment**

The type and capacity of the pressure injection equipment, delivery hoses and nozzles shall be such as to ensure the uniform supply of separate components to the mixing nozzle, thereby obtaining the correct consistency and a uniform discharge rate from the nozzle.

The pressure injection equipment shall be capable of continuously supplying the freshly mixed epoxy resin on demand. The equipment shall be fitted with properly calibrated positive displacement pumps and a pressure gauge capable of recording correct pressures applied up to 2,0 MPa with 0,1 MPa divisions.

The two components of the epoxy injection compound shall be fed separately to the extrusion gun and shall only be mixed together within the pressure chamber of the gun at the time of injection. On no account shall ready-mixed epoxy be fed to the extrusion gun.

## **PSR 4.5 EXECUTION OF THE WORKS**

### **PSR 4.5.1 Grouting**

#### **a) Preparation of contact surfaces**

Concrete contact surfaces shall be prepared by removing all surface laitance and damaged, loose and soft concrete, concrete containing aggressive ions, e.g. chloride, as well as cleaning the surfaces of all foreign adherents and impregnants such as oil, paint, grease, curing compounds, dirt, etc. The contact surface shall be treated to expose the sound substrate by means of chiselling, grit blasting or high- pressure water-jetting. Where concrete removal is achieved by mechanical means (for example. Chiselling), the surface shall receive treatment using high-pressure water-jetting to remove concrete layer potentially containing micro-cracking. The prepared contact surfaces shall be finally cleaned of loose dirt and dust by means of oil-free compressed air, water-jetting or vacuum cleaning, as appropriate for the grouting material.

#### **b) Holes, recesses, and pockets for grouting.**

Holes, recesses, and pockets that are formed in concrete must be cleaned of all foreign material and prepared as for the contact surfaces in Clause PSR 4.5.1(a).

#### **c) Pre-soaking**

Cementitious grout usually requires the pre-soaking of the concrete substrate with water several hours prior to grouting. All surface pores and local depressions formed due to roughening should not contain standing water when the grouting takes place. All free water shall however be removed from the surface and holes or pockets immediately prior to grouting. The contact surface should present as dark matt, without glistening or shiny water films. A site test may be performed by introducing drops of water applied to the contact surface that must

be soaked up, leaving the surface matt again after a short time. The surface should not be allowed to dry before the application of the grouting products.

The use of an epoxy resin grout usually requires a clean and substantially dry contact surface. No pre-soaking is required unless specified by the grout manufacturer.

**d) Formwork**

Temporary formwork may be required to place and contain the fluid grout. Reference shall be made to the manufacturer's instructions regarding flow distance based on the gap width and the fluid head at the pouring side. The formwork shall be constructed to be leakproof to prevent wastage and loss of material. For grouting applied proud of existing concrete surfaces, 45 degree chamfers may be used around the grout perimeter, if instructed by the Engineer. The Contractor shall apply suitable care in the selection of formwork release agents appropriate to the grouting product used.

**e) Batching and mixing**

The proprietary grout shall be batched and mixed strictly in accordance with the manufacturer's instructions.

Unless otherwise specified, the product shall be mixed thoroughly in a forced action mixer of adequate capacity. Alternatively a suitably sized container equipped with a slow-speed (typically 400-500 rpm), high-torque rotary drill fitted with an approved paddle may be used. The liquid components shall be properly mixed to ensure a smooth uniform mix prior to adding the aggregate. The premixed aggregate shall be added slowly to the liquid binder and mixed until an evenly coated and wet mix is obtained.

The mixing and placing capacity of equipment and labour shall be adequate and matched to enable placing operations to be carried out continuously within the recommended workable time, or pot life, of the product, generally within 15 minutes of mixing for cementitious grouts. The mixed product shall be passed through a suitable coarse metal screen prior to placing or pumping to remove any lumps of unmixed product.

The mixed product shall not be used after expiry of the pot life and all material unused after the workable time limit, shall be discarded at the Contractor's expense. All previously mixed material shall be removed from tools and equipment prior to charging and mixing a new batch of grout.

**f) Placement of grout for bedding or gap filling**

The mixed grout shall be placed within the workable life or pot life of the material in accordance with the manufacturer's instructions.

In general, continuous grout flow is essential, hence sufficient mixed grout shall be available prior to commencing placement, and the rate of placing a batch shall be matched to the time taken to batch and mix a new batch.

Placement shall take place at one end of a gap to ensure continuous flow through the gap expelling all air from the exit opening. A sufficient grout head shall be maintained at the inlet end to ensure a continuous grout front through the gap.

For an epoxy grout a single batch shall not exceed 30 litres of mixed material. For large batches of cementitious grout, placing by pump may be considered.

**g) Protection and curing**

The exposed cementitious grout surfaces shall be protected from wind, rain and low or high ambient temperatures that may lead to cracks caused by plastic or drying shrinkage. While the

cementitious grout hardens and cures, the temperature gradient throughout the structure shall be managed to ensure it remains as uniform as possible to avoid thermal cracking.

Cementitious grouts shall be thoroughly cured by supplying excess water over the grout surface, the application of water using continuous mist sprays, or using saturated absorbent material covered with transparent plastic sheeting. In cold weather, grout may be cured by means of an approved curing compound.

#### **PSR 4.5.2 Crack injection**

All work related to the injection of cracks with epoxy shall be executed in accordance with the approved method statement as confirmed by site tests according to Clause PSR 4.5.2 (a).

##### **a) Extent and sequence of work**

The extent of work will be indicated by the Engineer and no work may commence unless instructed by the Engineer. The extent of the actual work may vary very significantly from that indicated in the pricing schedule and the Contractor is advised to discuss the extent of the work with the Engineer at the outset of the contract before establishing the necessary personnel, equipment or plant on site.

Following the erection of the necessary temporary access and working platforms at the work location and, if required, cleaning of the surface, the Engineer, assisted by the Contractor, shall undertake a detailed inspection of the existing concrete surfaces to identify cracks requiring epoxy injection. The Engineer shall then issue an instruction to the Contractor detailing the extent and nature of the work. In general, only cracks exhibiting a surface crack width of 0,4 mm or greater shall be injected unless instructed to the contrary by the Engineer.

##### **b) Crack preparation**

All surfaces within 50 mm of a crack line shall be thoroughly cleaned of all foreign material likely to impair the bond of the surface sealant to the concrete by high-pressure water-jetting, wet grit blasting or other approved chemical and mechanical means. All loose spalls and foreign materials within the crack shall be similarly removed followed by final cleaning with clean, oil-free compressed air. The concrete surface and crack shall be allowed to dry out completely and finally cleaned before commencing with crack sealing and injection.

##### **c) Surface sealing and injection port installation**

The whole surface of the crack shall be temporarily sealed with a sag resistant fast setting epoxy surface sealant cured with a modified aliphatic amine. The type of temporary sealant used shall be such that it can be removed without causing damage to, or defacement of, the concrete surface.

All minor cracks branching out from the identified cracks by more than 50 mm shall be cut perpendicularly across the crack using an angle grinder to a depth of at least 25 mm and filled with epoxy surface sealant.

Approved injection ports shall be properly spaced along cracks, but shall not be drilled and fixed directly into the crack. The first and last injection ports must be established at either end of a crack in a member. The injection ports shall be located over the cracks using the locating wire and the locating end shall be firmly sealed and bonded to the concrete surface with a generous amount of epoxy sealant. Thereafter the crack surface between injection ports shall be sealed with an approved epoxy surface sealant band at least 3 mm thick and 30 mm wide.

While guidelines can be given for proper spacing, good judgement must be the final criterion.

- I. Guidelines for injection port spacing in partial depth cracks are as follows:

1. Spacing between injection ports should be equal to the desired depth of penetration since the resin generally travels as far into the crack as along the face of the crack. If port-to-port travel at this spacing is not obtained, intermediate injection ports must be established.
  2. If the cracks are less than 0,4 mm wide, injection ports should not be spaced more than 150 mm apart. If the cracks are more than 600 mm in depth, full penetration may be difficult to achieve because of equipment limitations. Intermediate ports should be established to monitor the flow of epoxy.
- II. Guidelines for injection port spacing in cracks extending the full depth of the member are as follows:
1. Members up to 300 mm thick  
For members 300 mm or less in thickness, injection ports should be placed in the crack on one side only and spaced at the thickness of the member.
  2. Members 300 mm to 600 mm thick  
For members 300 mm to 600 mm in thickness, injection ports should be placed in the crack on all available sides and spaced no more than the thickness of the member.
  3. Members over 600 mm thick  
For members greater than 600 mm in thickness, injection ports should be placed in the crack on all available sides and spaced according to the guidelines set forth for the partial depth cracks in Clause PSR 4.5.2 (c)(i).

#### d) Epoxy resin injection

Either the pressure injection or vacuum impregnation technique of crack injection shall be used. The epoxy surface sealant shall have cured fully before commencing with any crack injection.

All traces of cleaning solvent and air shall be expelled from the injection gun prior to commencing with crack injection.

Using an automatic epoxy mixing gun, the epoxy resin shall be injected in such a way that there is a steady displacement of air and moisture from within the crack. Starting from the lowest injection port at one end, the epoxy resin shall be injected until resin flows out of the next injection port. The upper injection port is closed and the process of injecting the epoxy resin is continued briefly. A steady injection pressure shall be maintained, however at no stage shall the pressure exceed 1,0 MPa.

The gun shall then be moved to the injection port where the resin has flowed out and the procedure is repeated for the length of the crack. After the crack is filled, and not longer than 30 minutes after the work has begun, another attempt shall be made to inject more resin, starting at the first port.

Before injection work starts, a rough calculation shall have been made as to the amount of resin required to fill the crack. If consumption exceeds the estimated quantity by more than three times, the matter shall be referred back to the Engineer for investigation.

At all cracks, contact surface or repaired cavities, epoxy injection shall commence at the lowest injection point and at one end, and shall in all cases be executed such that there is a steady displacement of air, residual moisture and fine material from the void being injected.

During the entire injection operation, the sealing lines (on both sides in the case of full depth cracks) and adjacent concrete surfaces shall be inspected for any signs of leakage of epoxy and, if observed, the injection shall be stopped and the leaking region sealed or resealed.

Further injection shall recommence only once the epoxy sealant repair has cured sufficiently. Accurate and complete records shall be kept of the amount of epoxy injected into each crack, contact surface or repaired cavity together with any leakage that may have occurred during the injection operation.

After satisfactory completion of the pressure injection at any particular location and the full curing period of the epoxy injection material, the injection points and all epoxy sealant shall be removed and the concrete surfaces and crack lines, as applicable, made good. Where the aesthetic appearance of the concrete surface is important, the surface sealant epoxy may be removed by careful heating using a propane torch, allowing the epoxy to soften, i.e. above 130°C in combination with gentle scraping. Alternatively for non-aesthetic surfaces and those that may receive protective coatings, grinding down the areas as necessary and finishing to a smooth and clean surface will be required. Where the crack is chased out, the chase should be filled with an approved repair material and finished flush with the concrete surface.

#### e) Crack filling

##### III. Extent and sequence of work

The extent of the work will be indicated by the Engineer and no work may commence unless instructed by the Engineer. The extent of the actual work may vary very significantly from that indicated in the pricing schedule and the Contractor is advised to discuss the extent of the work with the Engineer at the outset of the contract before establishing the necessary personnel, equipment or plant on site.

Following the erection of the necessary temporary access and working platforms at the work location, the Engineer, assisted by the Contractor shall undertake a detailed inspection of the existing concrete surfaces to identify cracks requiring filling. The Engineer shall then issue an instruction to the Contractor detailing the extent and nature of the work. In general, only cracks exhibiting a surface crack width exceeding 0,2 mm shall be filled unless instructed to the contrary.

##### IV. Surface preparation

All surfaces within 50 mm of a crack line shall be thoroughly cleaned of all foreign material likely to impair the bond of the surface sealant to the concrete by high pressure water jetting, wet grit blasting or other approved mechanical means. All loose spalls and foreign materials within the crack shall be similarly removed followed by final cleaning with clean, oil free compressed air. The concrete surface and crack shall be allowed to dry out completely and finally cleaned before commencing with crack filling.

##### V. Crack preparation

Create a vee notch in the concrete approximately 20 mm wide over the crack using a hammer and chisel or small power tools. Clear all debris, loose concrete and dust and prime the surface with the specialised materials.

##### VI. Crack filling

Fill the vee notch with specified material and grind smooth with the surrounding surface when cured.



#### **PSR 4.5.3 Manufacturer's guidelines, and health and safety requirements**

Compliance with all health, safety, storage and fire precautions shall be in accordance with the manufacturer's instructions. The toxicity of the chemicals in the components shall be low enough to enable safe usage in confined areas on the construction site and in a normal workshop environment, including special ventilation if required. Wherever toxicity of the chemicals in the components is declared by the manufacturer, suitable personal protective equipment shall be utilized by all persons working with, transporting or storing that product.

#### **PSR 4.6 WORKMANSHIP**

##### **PSR 4.6.1 Grouting**

The Contractor shall through the application of careful methodology, ensure that the grouting has minimal entrapped air. Wherever possible, tapping or sounding on a grouted surface can be carried out with a light hammer or other impact echo equipment. The purpose of the sounding shall be to detect delaminated areas of the grout.

The compressive strength of grouting products shall be verified in accordance with EN 12190. The consistency of concrete mortar and grouts shall be determined in accordance with EN 13395-Parts 1 to 4.

##### **PSR 4.6.2 Crack injection**

###### **a) Site tests**

The Contractor shall ensure that only approved materials for the proposed crack injection process are used. Pre-construction site tests to confirm proposed work procedures shall be undertaken in accordance with this specification and the approved preliminary method statement. Any variation to procedures or material usage arising from site test results shall be incorporated into the approved final method statement. Further site tests to confirm revised procedures or material use, and test coring to confirm crack penetration and sealing quality shall be at the discretion of the Engineer.

###### **b) Core tests**

Test coring from the actual crack injection areas shall be done at positions and at intervals as instructed by the Engineer to confirm satisfactory crack penetration and sealing quality. The core size shall be 30 mm to 60 mm nominal diameter and shall extend at least to the full depth of the crack or other dimension as instructed by the Engineer. Where conformance in accordance with EN1504-10 is verified, the degree of crack filling shall be minimum 80 %. Acceptance of the core results will be at the discretion of the Engineer.

## **PSR 5. REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS**

### **PSR 5.1 SCOPE**

This section covers the requirements for the removal of debris from repair of expansion joints, removal and rebuilding of brickwork.

### **PSR 5.2 DEFINITIONS**

Elements are defined elsewhere in these specifications.

### **PSR 5.3 MATERIALS**

All materials referred to in this section shall be in accordance with relevant sections in the Contract Documentation.

### **PSR 5.4 CONSTRUCTION EQUIPMENT**

The Contractor shall before the construction commence, provide comprehensive details of all plant and equipment, which shall be appropriate for the intended use and in good working order.

### **PSR 5.5 EXECUTION OF THE WORKS**

#### **PSR 5.5.1 Removal of debris from expansion gaps**

All debris in the expansion gaps and expansion joints between deck ends, walls and girder beds shall be removed and the gaps shall be cleaned out with high-pressure water or air jets or other suitable means. Solvents or fire shall not be used.

Protective measures such as screening shall be provided to contain flying debris, dust and water spray to ensure that passing traffic is not endangered and that the environment is not contaminated.

#### **PSR 5.5.2 Repair of expansion joints**

Remedial work on expansion joints and repairs to joint nosings shall be in accordance with the drawings. Refurbishment of proprietary joint systems shall entail the servicing of the joint in situ, or the removal and replacement of joint components.

Existing joint sealant shall be removed using mechanical methods. The joints then cleaned of all loose material. The joint system approved by the Engineer will then be installed according to the manufacturer's guidelines.

#### **PSR 5.5.3 Removal and rebuilding of brickwork**

Brickwork that needs to be rebuilt, shall be broken down and removed as instructed by the Engineer. Care shall be taken not to damage brickwork or concrete adjacent to the section to be removed. New brickwork shall be joined to existing brickwork using a stepped-back or keyed joint. Joints shall only be provided where shown on the drawings or as instructed by the Engineer. Rebuilt walls shall be plastered if instructed and the surfaces shall be treated as specified to provide a uniform texture and colour to match the existing work.

#### **PSR 5.5.4 Replacement and refurbishment of ancillary elements**

The replacement or refurbishment of ancillary elements such as access ladders, etc. shall be carried out as specified on the drawings or directed by the Engineer.

#### **PSR 5.5.5 Disposal of waste material**

All waste materials, rubble, scrap and rubbish arising from the Contractors work on site and the execution of the works shall be disposed of to a disposal site identified by the Contractor and approved by the Engineer.

## **PSR 6. REPAIR OF STEEL ELEMENTS**

### **PSR 6.1 SCOPE**

This Section covers the requirements for removal, refurbishment and re-attachment of corroded or damaged steel items on the reservoirs.

### **PSR 6.2 DEFINITIONS**

**Ancillary items:** Non-structural items such as access ladders, access hatches and pipework.

**Structural items:** Load bearing structural items contributing to the strength of the structure.

### **PSR 6.3 GENERAL**

Steel items shall be refurbished such that they fulfil their original design intent in terms of strength, safety and durability.

### **PSR 6.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS**

Where a damaged or corroded steel item, or where the removal of a steel item may compromise the safety or stability of part of a structure, the Contractor shall design and install appropriate temporary works certified by an ECSA registered professional Engineer or Technologist. Details shall be submitted to the Engineer for approval.

### **PSR 6.5 CONSTRUCTION EQUIPMENT**

Corroded or badly fitting steel ancillary items shall be refurbished when instructed by the Engineer. The items to be refurbished shall be carefully removed from their installed positions without damaging the surrounding concrete or other steel items, removed from site and refurbished. Where a section of steel is cut out and replaced, the new steel shall be connected using full strength welds. The welds shall be ground flush with the steel surface.

Where steel members require straightening, this shall be done using jacking equipment. Items will then be prepared for painting or hot dip galvanising in accordance with the particular specifications. Steel ancillary items will be returned to site and re-installed in their original positions, utilizing new galvanized mild steel bolts to suit their application if necessary.

For structural items being refurbished, bolts and rivets removed shall not be reused but replaced with Class 10.9 HSBG bolts torqued using the method of turn. Where items cannot be removed from site for refurbishment such as refurbishment of local damage to a major welded steel item, the work shall be carried out on site in near-factory conditions.

All items shall be painted as specified on the drawings or instructed by the Engineer. Painting shall be done immediately after refurbishment in near-factory conditions. All paint damaged during installation shall be repaired after installation. Site welds, bolts and nuts shall be painted to the full paint specification after installation. All works, including fabrication and painting shall be done in accordance with the particular specifications.

### **PSR 6.6 EXECUTION OF THE WORKS**

All hot dip galvanizing shall be done in accordance with SANS 121, and the minimum coating thickness for all elements shall be 85 microns. All items shall be sand blasted to ST2½ to remove all existing corrosion protection and corrosion.

The correct shape and size of ill-fitting items shall be requested from the Engineer who shall either issue drawings from which the dimensions shall be derived or provide such general dimensions in writing as are appropriate to the structure concerned. The Contractor shall then be fully responsible for ensuring that the item removed for refurbishment will fit to generally accepted tolerances onto the structure once it is reinstalled.

The Contractor shall ensure that the structure from which the steel element was removed, remains in a safe condition, specifically where the removal of the item may have a negative impact on the safety of the public. In this regard, any and all necessary supports, signage, danger tape etc. shall be utilized by the Contractor.

### PSR 6.7 REPAIRS TO COATINGS AND LININGS

#### a) External Repairs of pipeline coatings

##### 1. Surface Preparation of coatings

- I. All damaged and blistered coatings shall be removed back to sound epoxy coating or bare metal by mechanical power grinding or other approved means.
- II. The exposed steel surface shall be power, or hand wire brushed to remove dirt, scale, rust and other foreign matter to a surface equivalent to a Class 2 finish.
- III. The surrounding sound FBMDPE or epoxy surface shall be abraded to a distance of 50 mm beyond the defective area. The abrasion shall be carried out with clean emery paper of profile without causing the removal of excessive amounts of protective material.

##### 2. Cleaning of Area to be Repaired

- I. Grease and oil shall be removed with a non-volatile solvent (e.g. "Aquasolve", "Arc Nr.261 Safety Solvent Cleaner" or similar approved). The surface shall then be cleaned with potable water and allowed to dry completely.

##### 3. Methods of Repair to be Carried Out

#### a) Defects in coating

- I. The roughened area of coating and the defect shall be repaired by the application of a two-part solvent free epoxy repair kit ("Cupon Hycote 151", "Arc 982" or similar approved) to a minimum dry film thickness of 300 microns. The epoxy repair material shall be applied in accordance with the manufacturer's instructions and allowed to dry for 24 hours. Surface preparation and application shall be strictly in accordance with the manufacturer's instructions.
- II. When coating valves, care shall be taken to prevent the epoxy coating covering the descriptive name plates and flow direction indicators on the valves by masking off these plates.

### C3.3 UMNGENI-UTHUKELA WATER PARTICULAR SPECIFICATIONS

In addition to the SABS Standard Specifications, the following uMngeni-uThukela Water Particular Specifications shall apply to this contract. They are not bound in with this Volume but are issued separately in Volume 3 as “Annexure to C3.3: UMngeni–uThukela Water Particular Specifications”.

UMngeni-uThukela Water Insurance Summary and Claims Procedure

UMngeni-uThukela Water Particular Specification for OHASA 1993 Health and Safety

UMngeni-uThukela Water Particular Specification for Wedge Gate and Resilient Seal Valves

UMngeni-uThukela Water Particular Specification for Valves

Guideline for local content calculation.

UMngeni-uThukela Water Particular Specification for coating repair of galvanised steel members

UMngeni-uThukela Water Particular Specification for the Protection of Field Joints of Steel Pipe and Repairs of Damaged Coatings.

UMngeni-uThukela Water Particular Specification for Environmental Management of Construction Projects

UMngeni-uThukela Water’s Quality Assurance Procedure

|

### **C3.4 AMENDMENTS TO THE UMNGENI – UTHUKELA WATER PARTICULAR SPECIFICATIONS**

In certain clauses the standard, standardized and particular specifications allow a choice to be specified in the project specifications between alternative materials and / or methods of construction and / or for additional requirements to be specified to suit a particular contract. Details of such alternative or additional requirements applicable to this contract are contained in this part of the project specifications. It also contains additional specifications required for this particular contract.

#### **C3.4.1 UMNGENI-UTHUKELA WATER PARTICULAR SPECIFICATION FOR 164mm to 2230mm DIAMETER STEEL PIPE, SPECIALS, COATINGS AND LININGS (copy is bound into this document)**

##### **2.3 FABRICATION OF SPECIALS**

When a belled or plain ended pipe is cut, one piece of that pipe will become a plain ended pipe. To enable two plain ended pipes of diameter less than DN 600 to be joined by fillet welding, steel sleeves shall be supplied. The sleeves shall have a width of 100mm, an internal diameter of 3mm greater than the outside diameter of the pipe, and a plate thickness and grade of steel identical to that of the pipes.

##### **4.3 PIPE COATING SYSTEM 2: FUSION-BONDED MEDIUM DENSITY POLYETHYLENE COATING**

###### **4.3.1.2 Repairs**

*In the third line after “per 9m” insert “or 12m length of pipe and 4 repairs per 18m”*

##### **5 PIPE LININGS**

###### **5.2 Pipe Lining System 1: Cement Mortar Lining**

*Add to the end of this clause: “Pipes shall not be despatched until at least 10 days have elapsed since the lining was applied”.*

#### **C3.4.2 UMNGENI-UTHUKELA WATER PARTICULAR SPECIFICATION FOR WEDGE GATE AND RESILIENT SEAL VALVES**

Clause 1.1.1 add “Wedge gate valves shall be used for all scour valves.—Delete the first paragraph and substitute “Wedge Gate Valves shall be used on this Project”

Clause 3.1 The medium is potable water.

Clause 3.4 Size: Nominal Bore

The pressure rating shall be as shown on the drawings and scheduled in the Bill of Quantities.

Closing direction: clockwise

Ends: double flanged.

Flange drilling Tables: SANS 1123 to 4000/3 (4000 kPa) or 1600/3 (1600 kPa). Refer to Clause PSL 3.8.3

Pressure rating as shown on drawings and Bill of Quantities

Spindle: Non-rising

Hand-wheels: to be supplied

Valve Trim: 316 Stainless Steel

Corrosion Protection: Option 1 or 2

Extension Spindles: not applicable

New Clause Notwithstanding any requirements of the Particular Specification, valves shall be factory tested as follows:

16 bar rated valves:	Body	3200 kPa
	Open end	2400 kPa
	Drop tight in both directions at	1800 kPa
25 bar rated valves:	Body	5000 kPa
	Open end	3500 kPa
	Drop tight in both directions at	2750 kPa
40 bar rated valves:	Body	8000 kPa
	Open end	6000 kPa
	Drop tight in both directions at	4400 kPa

When under test, there shall be no visible sign of leakage. However, the gates shall not necessarily be drop tight under 'open end' test condition and minor weeping will be acceptable provided that the gates are drop tight at the valve rated pressure (16 or 25 bar respectively).

The operating pressures for the determination of the gearing required to ensure that the effort required to operate the valves shall not exceed the specified values shall be:

16 bar rated valves	1600 kPa
25 bar rated valves	2500 kPa
40 bar rated valves	4000 kPa

**C3.4.3 AMENDMENTS TO THE PARTICULAR SPECIFICATION FOR VALVES**

Clause 2.1 *Delete this clause*

Clause 2.2 Medium : Potable water.

Size: Nominal Bore

Pressure Class : As shown on drawings and Bill of Quantities

Ends : double flanged.

Counterweight Arm Required: No

External Spring permitted : No

Stainless Steel Perforated Cone permitted:

Resilient Conical Diaphragm permitted:

Corrosion Protection : Option 1 or 2

Clause 2.3 *Delete this clause*

Clause 2.4 Extension Spindles are not required.

Clause 3.3 *Delete this clause* - it is superseded by the UMngeni-uThukela Water Particular Specification for Wedge Gate and Resilient Seal Valves.

#### **C3.4.4 AMENDMENTS TO PARTICULAR SPECIFICATION FOR ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION PROJECTS**

Amend Clause PSZB 5.3 CONSERVATION OF TOPSOIL

*Delete the sentence....*

“The depth to which topsoil will be stripped shall be 200mm unless otherwise instructed by the Employer’s Agent on Site”

*...and replace with*

“All Topsoil shall be stripped regardless of depth”.

Amend PSZB 13.2 FENCING

Delete the wording and replace with “Temporary fencing shall be in accordance with PSC 5.3.1”

Amend Clause PSZC 2.2 TOPSOILING

*Delete the sentence....*

“Topsoil is to be replaced to a minimum depth of 100mm, unless otherwise specified in the project specification (eg in the case of agricultural lands)”

*....and replace with*

“Topsoil is to be replaced to at least its original depth, and left-over topsoil shall be spread over the adjacent lands to the instruction of the Employer’s Agent (as guided by the Environmental Officer).”

PSZC 8 MEASUREMENT AND PAYMENT

Amend Sub-Clause PSZC 8 a) ii) Topsoiling

*Delete the sentence....*

“Replacement of topsoil to minimum depth of 100mm or such other depth as specified in the project specification”

*....and replace with*

“Excavating Topsoil from stockpiling, hauling, and spreading in final position, placed to at least its original depth, and placing left-over topsoil over the adjacent lands, during site re-establishment, to the instruction of the Employer’s Agent”

*Change units of measurement to cubic metres*

Amend PSZB 13.2 FENCING

*Re-word the Clause:*

Fencing shall be in accordance with PSC 5.3.1

Amend PSZB 18 MEASUREMENT AND PAYMENT



*Omit Payment Clause PSZB 18 f) Temporary Fencing*

This item shall be measured and paid for under payment item PSC 8.2.11 Temporary Fencing

PSZC 8 MEASUREMENT AND PAYMENT

a) Finishing

*PSZC 8 ii) Topsoiling*

*Omit the sentence:*

“Replacement of topsoil to minimum depth of 100mm or such other depth as specified in the project specification “

*and add:*

The payment for replacement of topsoiling shall be by means of item PSC 8.3.10

FOR INFORMATION USE ONLY

## **C3.5 PROJECT SPECIFICATIONS**

### **STATUS**

The Project Specifications (PS) forms an integral part of the contract and supplements the Standard Specifications and uMngeni-uThukela Water Particular Specifications. They contain a general description of the works, the site and the requirements to be met.

In the event of any discrepancy between a part or parts of the Standardized or Particular Specifications and the Project Specifications, the Project Specifications shall take precedence. In the event of a discrepancy between the Specifications and the drawings and / or the Bill of Quantities, the drawings take precedence, thereafter the Bill of Quantities. In all events, the discrepancy shall be brought to the attention of the Employer's Agent before the execution of the work under the relevant item.

### **3.5.1 QUALITY ASSURANCE**

The successful Tenderer shall, within 14 days of award, first confirm the acceptance of all critical suppliers to uMngeni-uThukela Water, prior to development of detailed Quality Control Plans and Procedures. Upon approval of the supplier by uMngeni-uThukela Water, the successful Tenderer shall submit to the Employer (for approval within 14 days) a detailed Quality Control Plan (QCP) and Procedure for the manufacture and installation/construction of all materials to suit the manufacturing and delivery programme, including inter alia:

**PS 1 PROJECT DESCRIPTION**

**PS 2 OVERVIEW AND DETAILS OF CONTRACT**

**PS 2.1 OVERVIEW**

**2.1.1 DESIGN WORK**

The design element of the works shall comprise the ECSA stages 1 to 6 as per Guideline Professional Fees (Scope of Services and Tariff of Fees for Persons Registered in terms of the Engineering Profession Act, 46 of 2000) as revised below:

STAGE	REVISION
1	Inception
2	Concept and viability
3	Design Development
4	Documentation
5	Contract administration and Inspection
6	Close-out

- The Contractor's Designer shall be familiar with UJW standards and particular specifications.
- The appointed Contractor's Designer shall provide Level 3 Construction Monitoring in accordance with the aforementioned Act.
- Drawings or other documentation furnished as part of this tender shall be regarded as the Reference Design and the Contractor shall review and accept responsibility for the design to perform its intended purpose or shall amend the design for authorisation by the Employer prior to the procurement of materials or commencement of any construction works.
- The new pre-thickener to resemble the existing in terms of process requirements
- Where drawings or other documentation is not issued, the Contractor shall prepare the design for authorisation by the Employer prior to the procurement of materials or commencement of any construction works.

**2.1.2 SCOPE OF WORKS AND CONSTRUCTION**

The work comprises of the rehabilitation / construction of the following key elements of infrastructure in urgent need of implementation. In all instances the Contractor shall take all necessary steps to safely isolate the element being rehabilitated / constructed from the operational plant. Where there is a risk of flooding in the event of an isolation failure, double isolation shall be practiced.

**2.1.2.1 PRE-THICKENER NO.1 DARVILL WASTE WATER WORKS**

Description:

The pre-thickener is a process unit in the waste water purification process, which receives the raw primary sludge or prefermented digested sludge from the big digesters through a splitter box. The two duty – standby Pre-thickener No. 1 & 2 receive an uneven split according to their size. Pre-thickener No. 1 receives one third of the primary sludge while No. 2 receives remainder of the volume.

The main purpose of the gravity thickening is to further concentrate the primary sludge and to elutriate volatile fatty acids into the liquid for the biological removal process. The supernatant

or overflow from the thickeners gravitates to storage tank (old digester). The thickener has a scraper mechanism which extends across the whole diameter of the tank and each has a picket fence so that the scraper ploughs through the thick sludge. The picket fence is for the thickening process improvement.

The system works on a duty/standby arrangement, and the Operator must select which tank is on duty by opening the correct feed-side isolating valve. The operator must then also start the relevant scraper motor and place the outlet (sludge) valve in Auto – this valve is then timer controlled based on the “Thickener Desludge Timer” settings. The interval for de-sludging and the period for the valve to be open is defined on the SCADA. The “overflow” from the tanks go back to the splitter box feeding PSTs 1 and 2.

The pre-thickener No.2 has 20m diameter at a speed of 2.5m/min.

**The scope includes but is not limited to:**

- Design, construct, commission and handover a new prethickener for the Darvill WWW.
- Design
  - ✓ Civil and structural work
  - ✓ Mechanical work
  - ✓ Electrical and instrumentation( control)

A design report and construction drawings to be submitted and presented to the Engineer/UJW prior to commencement of construction work

- Construction
  - ✓ Earth Works
  - ✓ Concrete/ structural work
  - ✓ Mechanical work
  - ✓ Electrical and instrumentation work

All relevant Quality assurance requirements to be complied to. All relevant FAT shall be conducted as and when required.
- Commissioning
  - ✓ Cold commissioning
  - ✓ Hot Commissioning

The Darvill WWW is a brown field environment, therefore access requirement must be adhered to. A formal commissioning plan and all documentation required to be submitted prior to any construction work
- Handing over of the Pre-thickener
  - ✓ Operation and Maintenance manual
  - ✓ As-Built Drawings (including P&ID)
  - ✓ All relevant Certification

All submitted documentation to adhere to the UJW O&M Manual Standard

### 2.1.2.2 DIGESTER 5&6 STAIRCASE DARVILL WATER WORKS

There are four 20m high digesters adjacent to each other in the Darvill WWW sludge removal process. Namely digester 5, 6, 7 & 8, while digester 7 & 8 are newly built, 5 & 6 are over a number of years old and have had to be rehabilitated to be put back in use. The current access staircase for digester 5&6 has reached the end of useful life and has been rendered unsafe. It has been restricted for use, leaving only access to the top through the adjacent newly built digester 7&8 staircase. This access takes longer and poses a challenge for maintenance and process day to day duties, hence the need to rehabilitate the other access through digester 5&6.

- Construction material : Steel
- Height :±20 m
- Conduct a thorough structural assessment of the existing staircase for digester no. 5&6
- Redesign the access staircase to mirror staircase digester No.7&8
  - ✓ Onsite measurement and verification;
  - ✓ Design new staircase for digester 5 & 6 using non corrosive steel(treated) and alternative products;
  - ✓ Design new concrete footing for the staircase;
  - ✓ Presentation and submission of the design report which the engineer must approve prior to commencement of construction;
  - ✓ Construction drawings.
- Demolition works
  - ✓ Dismantling of structural steel element (access staircases)
  - ✓ Demolition of existing concrete footings
- Structural Steel Fabrication, installation and construction
  - ✓ Fabrication of all steel sections as per approved design;
  - ✓ Galvanising and coating of all steel element for high corrosion resistance and prevention;
  - ✓ Construct concrete footing in accordance with approved design;
  - ✓ Supply and erect scaffolding for installation of the access staircase;
  - ✓ Apply coating to repair corroded sections of the existing walkway bridge;
  - ✓ Provide structural engineer certificate of safety and compliance;
  - ✓ Provide as built drawing for the new staircase.

### 2.1.2.3 CLARENDON RESERVOIR REHABILITATION WORK

Clarendon reservoir is a 25 MI capacity reservoir that supplies Umsunduzi Municipality. It is a circular pre stressed concrete reservoir.

Construction material – Pre stressed concrete

Shape - Circular

Height to roof slab from NGL – 5 m

Size – 25MI

- Structural Inspection, Design and Repair Methodology:
  - ✓ Conduct a thorough structural inspection and assessment of the (Reservoir);
  - ✓ Design rehabilitation methodology for the leaking joints;
  - ✓ Redesign of new stainless steel overflow pipe;
  - ✓ Redesign of new stainless steel outlet pipe;
  - ✓ Rehabilitation methodology for the inlet pipes and control valves.
- Demolition and dismantling works:
  - ✓ Removal of existing overflow pipe;
  - ✓ Breaking of concrete and removal of outlet pipe.
- Rehabilitate concrete work and expansion joints:
  - ✓ Erecting scaffolding inside the reservoir;
  - ✓ Providing lighting inside the reservoir;
  - ✓ Removing sealants/bandages used on previous repairs;
  - ✓ Repairing spalling, cracking and screed delamination on the floors, walls and roof slab;
  - ✓ Removing the existing joints and installing a new joint sealant system on the internal joints and the external roof slab joints where necessary;
  - ✓ Replacement of existing overflow pipe;
  - ✓ Rehabilitation of the corrosion on the existing outlet pipes and applying a new protective coating;
  - ✓ Rehabilitation of the corroded inlet pipe;
  - ✓ Removal and replacement of corroded reinforcement where necessary;
  - ✓ Sealing or finishing off of all improvised access hatches, refurbishment of

- catladders and access cages;
- ✓ Hydrostetical testing of reservoir;
- ✓ Commissioning;
- ✓ Provide new detailed drawing of the reservoir.

**2.1.3 OPERATIONAL CONSTRAINTS**

- All work carried out under this contract will take place at the Darvil Waste Water treatment works under full operational conditions.
- The contractor shall ensure that his workmen adhere to the strictest levels of hygiene on the site at all times and under no circumstances shall the Contractor or his staff interfere with or compromise the operation of the plant.
- Only the element of the works being rehabilitated will be offline during the rehabilitation / construction process and the tying in of rehabilitated or new infrastructure will be carried out during short, well-planned shutdowns. The following rules shall be adhered to for shutdowns: The Contractor shall submit in writing his intention to carry a shutdown at least 28 days in advance of the proposed shutdown. Within 7 days of his written notice to carry out a shutdown, the Contractor shall submit his methodology for the proposed shutdown. The methodology shall include inter alia:
  - Duration of the shutdown.
  - Resources present during the shutdowns.
  - Materials required.
  - Plant required including standby plant (Standby plant for the critical plant shall be provided).
  - Particular safety measures for shutdown activities.

All plant and materials for the shutdown shall be on site at least 24 hours prior to the commencement of the shutdowns. The Contractor shall endeavour to minimize the number and the duration of the shutdowns.

The Employer reserves the right to cancel the shutdown in the event that any of the shutdown requirements have not been adhered to and the Contractor shall not be entitled to any compensation in the event of such a cancellation.

**Refer to Clarendon reservoir supply constraints**

**PS 3 DESCRIPTION OF SITE AND ACCESS**

The Contractor shall have no exclusive access on site. The limitations are listed on page C1.17, Clause 5.4. Refer to PSP 1

**PS 4 NATURE OF GROUND AND SUBSOIL CONDITIONS**

Refer to C4.4

**PS 5 DRAWINGS**

**PS 5.1 Drawings Prepared by Employer**

The drawings listed in the table below were prepared and issued by the Employer for tendering purposes only. They are issued separately to this document and must be regarded as provisional and preliminary for Tenderers to generally assess the scope of work. The characters in the “Rev. No.” column below indicate the revision status of these drawings.

DWG No.	DESCRIPTION
---------	-------------

<b>Pre-thickener /Gravity Thickener</b>	
14856-R2	Gravity Thickener Central core reinforcement details
14856-R1	Gravity Thickener Central core reinforcement details
14897	Gravity Thickener
<b>Digester Staircase</b>	
	Access Staircase digester 5&6
	Access Staircase digester 7&8
<b>Clarendon Reservoir</b>	
1421/81	Floor and walls
1423/81	Wall Details
3340/83	Clarendon Link from 161

At commencement of the Contract, the Employer’s Agent shall deliver to the Contractor copy of the drawings for construction purposes and any instructions required for the commencement of the works. From time to time thereafter during the progress of the works, the Employer’s Agent will issue further drawings as may be necessary for adequate construction, completion and defects correction of the works.

***The work shall be carried out in accordance with the latest available revision of the drawings.***

All drawings and specifications and copies thereof remain the property of the Employer, and the Contractor shall return all drawings and copies thereof to the Employer at the completion of the Contract.

**PS 6 CONSTRUCTION AND MANAGEMENT REQUIREMENTS**

The following parts of SANS 1921 Construction and management requirements for works contracts and associated specification data are applicable:

SANS 1921-1 General engineering and construction works

The associated specification data are as follows:

Clause	Specification data associated with SANS 1921- 1
	<b>Essential Data</b>
4.1.7	The requirements for drawings, information and calculations for which the Contractor is to be responsible is detailed in the project specifications.
4.2.1	The responsibility strategy assigned to the Contractor for the works is A.
4.3	The planning, programme and method statements are to comply with the following: <ol style="list-style-type: none"> <li>1) The programme shall be prepared in bar (Gantt) chart form, preferably using a project management software tool such as <i>Microsoft Project</i> and shall be issued to the Employer’s Agent in both hard copy and electronic format. The programme shall be structured to cover all items of work conceivable including all work to be done by Sub-Contractors and shall clearly indicate the critical path</li> <li>2) The programme must clearly show the intermediate milestone dates to be achieved taking the indicative construction sequences into account.</li> <li>3) In addition to any other constraints the construction sequence and timing shall take into account items taken in T2.2.16</li> <li>4) Regular meetings must be held with the Employer’s Agent.</li> <li>5) Method statements shall be prepared in accordance with the requirements of the project specifications.</li> </ol>
4.3.3	The period of notice shall be a minimum of one working day. Etc.
4.12.1	The samples of materials, workmanship and finishes that the Contractor is to provide and deliver to the Employer/Employer’s Agent are: <ol style="list-style-type: none"> <li>1. Concrete cube;</li> <li>2. Compaction;</li> <li>3. All Quality control documentation as stipulated and/or called for by UMngeni-uThukela Water’s Quality Assurance staff;</li> </ol>
Clause	Specification data associated with SANS 1921- 1
4.12.2	The fabrication shop drawings that the Contractor is to provide and deliver to the Employer/Employer’s Agent are:
	<b>Variations</b>
All relevant	In all clauses where it appears, replace the word “Employer” with “Employer’s Agent”
4.1.10	Where reference is made to “SANS 2001”, substitute with “SABS 1200”



Clause	Specification data associated with SANS 1921- 1
	<b>Additional Clauses</b>
4.6 (e)	Managing and disposing of water will include for by-pass arrangements, of temporary earthworks, cofferdams, pumping equipment, well-pointing, de-watering equipment etc. for dealing with all possible flows whether or not the existing flow path is being interfered with during installation of pipework.
4.7.4	No blasting will be permitted within 10m of any structure, pipeline or service unless the Contractor can satisfy the Employer's Agent that his proposed blasting methods and controls are such that no damage will be caused to the adjoining structure, pipeline or service. The Contractor will be required to provide equipment for and take vibro-recordings at no additional cost to the Employer.
4.8.1	The Contractor shall be responsible for protection from damage to any structures or services that might be affected by the excavations or works. The Contractor shall, before submitting his tender, carefully study the tender drawings and inspect on site the routes of the proposed pipelines and structures to be constructed in close proximity to existing structures and services and make due allowance in his rates for protection of structures and services by use of special construction methods such as close shoring, sheet piling.

**PS 7 CONSTRUCTION PROGRAMME** (Read with SANS 1921-1:2004 Clause 4.3)

**PS 7.1 Preliminary Programme**

The preliminary programme submitted as part of the Tender Returnable Documents shall be in the form of a simplified bar chart with sufficient details to show clearly how the works will be performed within the time for completion as stated in the Contract Data.

Tenderers may submit tenders for an alternative Time for Completion in addition to a tender based on the specified Time for Completion. Each such alternative tender shall include a preliminary programme similar to the programme above for the execution of the works, and shall motivate his proposal clearly by stating all the financial implications of the alternative completion time.

The Contractor shall be deemed to have allowed fully in his tendered rates and prices as well as in his programme for all possible delays due to normal adverse weather conditions and special non-working days as specified in the Special Conditions of Contract, in the Project Specifications and in the Contract Data.

**PS 7.2 Programme in Terms of Clause 5.6 of the General Conditions of Contract**

It is essential that the construction programme, which shall conform in all respects to Clause 5.6 of the General Conditions of Contract, be furnished within the time stated in the Contract Data. The preliminary programme to be submitted with the tender shall be used as basis for this programme. The Contractor's attention is also drawn to Clause 5.7.3 of the General Conditions of Contract 2015.

The Contractor shall indicate on the programme all critical path activities. In this regard, the Contractor's attention is drawn to Clause 5.12 of the General Conditions of Contract, where consideration will only be given to claims for extension of time associated with critical path activities.

The Contractor's attention is drawn to PS 6 Clause 4.3

## **PS 8 SITE FACILITIES AVAILABLE**

### **PS 8.1 Contractor's Site Establishment** *(Read with SANS 1921 - 1 : 2004 Clause 4.14)*

The Contractor is responsible to provide a suitable site for his camp and to provide accommodation for his personnel and labourers.

No employees of the Contractor and his Sub-Contractors etc., other than security guards, will be permitted to remain on the site outside of normal working hours.

### **PS 8.2 Accommodation of Employees**

Refer to the amendments to the Standardized Specifications PSAB 4.2

### **PS 8.3 Power Water and other Services**

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

The Contractor shall provide water for construction and domestic purposes for the duration of the Contract.

Means of sourcing power remains the Contractor's responsibility. The tendered is deemed to include requisite connection and consumption charges for his own use on site for the total Contract duration. The Contractor shall apply to the relevant municipality or Eskom for power supply to the site.

uMngeni-uThukela Water shall not be responsible for electricity application.

The Contractor shall provide adequate ablution facilities at the site of works for use by his employees and shall maintain the toilets in a hygienic and disinfected condition by regular attendance and supplied with toilet paper, water and soap.

### **PS 8.4 Location of Camp and Depot**

The Contractor will be permitted to locate his offices, storage facilities, workshop, toilets, etc. in the positions directed by the Employer's Agent. All temporary buildings and fencing are to be neat and presentable and the surrounding areas must at all times be kept neat, clean and orderly condition. The Contractor will not be allowed to cut down or damage any trees or make any excavation relating to his Camp without the written permission of the Employer's Agent. The Contractor will be required to restore the site to its original condition on completion of the works.

All buildings and toilets shall be in accordance with the Local Authority and State Health Regulations, and shall be kept in a clean and sanitary condition to the satisfaction of the Employer's Agent.

### **PS 8.5 Security**

The Contractor shall be responsible for the security of his personnel and construction plant on and around the site of the Works and for the security of his camp. No claims in this regard will be considered by the Employer.

## **PS 9 SITE FACILITIES REQUIRED**

### **PS 9.1 Employer's Agent's Office**

Refer to the amendments to the Standardized Specifications PSAB 3.2 to PSAB 5.5

### **PS 9.2 Rented Accommodation**

**PS 10 OCCUPATIONAL HEALTH AND SAFETY** (Read with SANS 1921 - 1: 2004 Clause 4.18 and the Particular Specification for Construction Health and Safety)

**PS 10.1 General Statement**

It is a requirement of this Contract that the Contractor shall provide a safe and healthy working environment and to direct all his activities in such a manner that his employees and any other persons, who may be directly affected by his activities, are not exposed to hazards to their health and safety. To this end, the Contractor shall assume full responsibility to conform to all the provisions of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) (OHASA), and the Construction Regulations 2014 issued under Section 43 of the OHASA by the Minister of Labour.

For the purpose of this Contract, the Contractor is required to confirm his status as mandatory of the Employer for the execution of the Contract by entering into an agreement with the Employer in terms of the OHASA by executing the Agreement under C1.5 included in Section C1: Agreements and Contract Data.

**PS 10.2 Health and Safety Specifications and Plans to be submitted at Tender Stage**

- (a) Employer's Health and Safety Specification  
The Employer's Health and Safety Specification will be included in the tender documents as part of the Project Specifications.
- (b) Contractor's Health and Safety Plan  
The Occupational Health and Safety Plan should be submitted at tender stage so as enable the Employer to determine whether the Contractor is capable of fulfilling the requirements of Construction Regulation 5(1)(h).

The successful Tenderer shall, on receipt of notification that he has been awarded the contract, submit without delay his own documented Health and Safety Plan for the

execution of the work under the Contract. His Health and Safety Plan must at least cover the following:

- (i) a proper risk assessment of the works, risk items, work methods and procedures in terms of Construction Regulations 7 to 30 inclusive;
- (ii) pro-active identification of potential hazards and unsafe working conditions;
- (iii) provision of a safe working environment and equipment;
- (iv) statements of methods to ensure the health and safety of Sub-Contractors, employees and visitors to the site, including safety training in hazards and risk areas;
- (v) monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations;
- (vi) details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works;
- (vii) details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2014; and
- (viii) all other information and documentation that is required by the Employer, the Employer's Agent, or the agent who acts as a representative for the Employer, in order to enable the Employer to apply for a construction work permit in terms of Construction Regulation 3(1) (if required by law).

The Contractor's Health and Safety Plan will be subject to approval by the Employer, or his agent appointed as contemplated under the relevant provisions of the Construction Regulations 2014, and the Contractor's Health and Safety Plan may be required to be amended if necessary, before commencement of construction work. The Contractor will not be allowed to commence work, or his work will be suspended if he had already commenced work, before he has obtained the Employer's written approval of his Health and Safety Plan,

and before the requirements of Construction Regulation 3, or Construction Regulation 4, as applicable, have been complied with.

Time lost due to delayed commencement or suspension of the work as a result of the Contractor's failure to obtain approval for his safety plan, or any failure on the part of the Contractor to submit the required information or documentation in support of the application for a construction work permit (in terms of Construction Regulation 3), or failure to give notification of construction work (in terms of Construction Regulation 4), as applicable, shall not be used as a reason to claim for extension of time or standing time and related costs.

### **PS 10.3 Cost of Compliance with the OHASA and Construction Regulations 2014**

The rates and prices tendered by the Contractor shall be deemed to include all costs for conforming to the requirements of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) (OHASA), the Construction Regulations 2014, and the Employer's Health and Safety Specification as applicable to this Contract.

Should the Contractor fail to comply with any of the provisions of the OHASA, Construction Regulations 2014, or Employer's Health and Safety Specification, he shall be liable for penalties as provided for in any of the aforementioned documents.

Items that may qualify for remuneration will be specified in the Health and Safety Specifications, or in the Project Specifications.

### **PS 11 ENVIRONMENTAL MANAGEMENT**

A provisional sum has been included in the Bill of Quantities for the environmental rehabilitation to be carried out by a 'selected sub-contractor.

Refer to SANS 1921-1:2004 Clause 4.19 and PS 6 Clause 4.19.3 and to PS11 above

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### **PS 12 SELECTED SUB-CONTRACTORS**

Selected Sub-Contractors (refer to GCC 2015 Clause 4.4) shall be chosen and appointed as follows:

The Employer will prepare a detailed scope of work and/or specification for work to be done or goods to be supplied by a Selected Sub-Contractor.

The Employer and the Contractor will compile a list of firms or persons acceptable to both and who will be invited by the Contractor to submit tenders for the requisite work to be carried out or goods to be supplied by Selected Sub-Contractors. When the tenders are received they will be evaluated and the Employer will then indicate which tender he requires the Contractor to accept and he will advise the Contractor accordingly. The Contractor shall then accept that Tenderer and appoint him/her as a Selected Sub-Contractor.

The Contractor shall incorporate in the sub-contract, provisions that:

In respect of the work carried out or the goods that are the subject of the sub-contract, the Selected Sub-Contractor undertakes to the Contractor *mutatis mutandis* the obligations and liabilities as are imposed upon the Contractor to the Employer in terms of the Contract, and holds the Contractor harmless from and indemnifies him against the same and in respect of all claims, demands, lawsuits, damages, costs, charges and expenses whatsoever arising out of or in connection therewith, or arising out of or in connection with any failure to perform such obligations or to fulfil such liabilities, and

The Selected Sub-Contractor shall also hold the Contractor harmless from and indemnify him against:

1. Shortcomings in the sub-Contract work if and where the work was designed by the Selected Sub-Contractor;
2. Defects in the goods if and where the goods were manufactured and / or supplied by the Selected Sub-Contractor;
3. Any negligence by the Selected Sub-Contractor, his / her Agents, workmen and servants;

Any misuse by the Selected Sub-Contractor of any Constructional Plant, Temporary Works or materials provided by the Contractor for the purposes of the Contract; and

4. Any claims as aforesaid.

PS 13

**GUIDELINES FOR THE RECRUITMENT OF LOCAL LABOUR FOR THE IMPLEMENTATION OF WATER INFRASTRUCTURE PROJECTS**

**Introduction**

uMngeni-uThukela Water's approach is to balance the continued provision of reliable bulk water supply to existing customers with growth whilst ensuring rural development through reduction of backlogs, extending water access and supporting vulnerable municipalities. UMngeni-uThukela Water uses local labour as its preferred work force to facilitate skills transfer and economic support to local communities. These guidelines aim to provide Contractors with the necessary information on the procedures to be followed for the successful recruitment of labour whilst implementing UMngeni-uThukela Water's Infrastructure projects.

**Communication Requirements**

It is crucial that all communication between various stakeholders in the project be made clear, concise and understandable. All communication is to be recorded in writing and filed for records and auditing. Prior to commencement with labour recruitment, a briefing session will be held with the Contractor aimed at:

1. establishing communication channels for all site staff
2. understanding the roles and responsibilities of the following role players:
  - 2.1 Project Steering Committee (PSC)
  - 2.2 Community Liaison Officer (CLO)
3. Labour desk committee

The Contractor must at this stage communicate plans to bring skilled employees to create trust and to assist integration of employees from outside the area.

The Institutional Support and Development (ISD) Facilitator in the employ of UMngeni-uThukela Water is the major link between the project and the community. The Contractor shall not engage directly with the community without the involvement of the ISD.

### Determination of Labour Requirements

uMngeni-uThukela Water as a state owned enterprise is expected to contribute to the government's short -medium term programmes aimed at alleviating and reducing unemployment. These guidelines are applicable in conjunction with the agreed scope of work as established in the Contract and in alignment to the planned programme of works. The Contractor determines labour requirements and adheres to the following guidelines:

The Contractor shall through the Institutional Support and Development (ISD) Facilitator inform in writing the following:

1. The type of Skills required
2. The amount of work to be completed
3. The expected duration of the Contract or period for which the labour will be required
4. Targeted labour or number of labour to be employed (both semi-skilled and unskilled)

The Contractor shall not undertake own recruitment or import semi -skilled and unskilled labour without exhausting local pool of available resources as provided by the recruitment process.

### Qualification for Employment

1. Men and women between the age of 18-60 years
2. Women to be given equal employment opportunities as men
3. A person who is physically and mentally sound
4. A person who demonstrates good conduct in the community
5. Community members with required skills and competence to be considered
6. A person with a valid South African ID
7. Both genders be considered
8. Young people be considered
9. All families to benefit. Members of the same family should not be employed at the same time.
10. Children and family members of PSC members will not receive preferential treatment.
11. PSC members who want to be employed in the project must withdraw their PSC membership.

### Demographics and Eligibility for Employment

The ISD together with the recognized community structures (usually the PSC and labour desk committee) shall agree on the distribution of labour according to the Wards affected by the project. This distribution will be informed by the number of recruits required and the duration of each cycle or phase.

This process requires careful planning from the Contractor in the sense that will not cause community disruptions due to poor planning for targeted labour.

Updated reports must be provided on progress with the recruitment of labour and these must be circulated to all relevant structures.

#### **Recruitment Procedures**

1. The Contractor shall allow labour request a minimum of one full week. These requests are to be effected in writing and signed off by the Contractor.
2. Labour required by the sub-Contractors and small building Contractors is to be done through the labour desk committee in writing
3. PSC representative from each village must have a waiting list ready for labour requirements and give each prospective person standard form signed by PSC
4. The person will submit the signed form to CLO and labour desk committee.
5. The CLO will keep forms for records
6. No person is allowed at the site office without a signed form from PSC representative.

#### **Contract Termination**

The intention to issue notices of termination of the Contracts for completed tasks must be communicated to the ISD facilitator, CLO and PSC in advance. Communication in advance will prevent unforeseen disruption of the project where employees refuse to accept termination of their Contracts.

The termination clause must be clearly stated in the employee Contracts and must include a start and end date, where it cannot be specified, an estimated time of exit. Termination must be justifiable and done in line with the Contract execution programme

#### **PS 14 SPECIALISTS**

##### **Geotechnical Specialist**

Before foundations or layer-works commence the Employer's Agent is required to verify the founding material, and he/she shall, if deemed necessary, the acquire the services of a Specialist in this field to come to site and provide advice whether said material is acceptable or not, and if not, provide advice regarding the type, thickness and compaction for imported material.

A provisional sum has been included in the Bill of Quantities for three separate Geotechnical inspections by a Specialist.

### **Specialist Health & Safety Consultant**

Prior to the commencement/and for the duration of the Works the Client shall acquire the services of an approved Specialist to represent and act on behalf of the Client in terms of 'UMngeni-uThukela Water's

Project Specific Health and Safety Specification' – as per Annexure C5.2

## **PS 15 SHUT-DOWN OPERATIONS**

### **PS 15.1 General**

The Project will necessitate several 'Shut-Down's to the normal operation of the affected pipelines with in the pre-thickener

All Shutdowns shall require 'double isolation' of the pipeline both upstream and downstream of the areas of work.

The Contractor, for approval by the Employer's Agent, shall submit detailed Method Statements. This shall be done at least 2 weeks prior to any planned Shut-Down.

The Maximum permissible time for each Shut-Down shall be 8 hours. The work shall be completed before leaving site, even if this means working into the night.

UMngeni-uThukela Water's staff shall undertake the draining and re-commissioning the pipeline.

### **PS 15.2 Programme**

Firm dates for the programme will determined nearer the time by UUW's Operation's staff together with the Employer's Agent once the designs are finalised and ready for implementation .

It is proposed that Three such Shut-Downs may be required, although it reasonable to assume that the Contractor and/or UMngeni-uThukela Water operations may request some of the proposed Shut-Downs to be combined either to facilitate the logical sequence of work of the Project and/or to limit the overall number of Shut-Downs.

### **PS 15.3 Scopes**

The following scopes of the probable Shut-Downs require a thorough review by all Stakeholders before being finalized, and may be provided for tendering purposes.

The Contractor shall develop his/her own method statement and submit for approval by the Employer's Agent.

#### **PS 15.3.1 Shut-Down and isolation on Pre-thickener number 1**

### **PS 15.4 Trial Runs (Pre-thickener)**

Prior to any tie-in, the relevant new pipework shall be successfully pressure tested as far as practical.

Before shut down, trial runs are to be undertaken on site, with all equipment and personnel who will be working on the tie-ins present on site. All equipment is to carefully be checked and a spare parts of all equipment is to be available to replace any equipment in case of breakages. Stand-by lighting is to be provided in case it becomes necessary to work into



the night. Rain and wind protection should be provided for those operations that need to be undertaken in dry and non-windy conditions in case of inclement weather.

Before the first trial run, all the pipe connection points should have been fully exposed. During the first dummy run the sections of pipe to be cut out should be carefully marked and measured against the replacement pieces. Sleeves must be provided which are suitable for re-installing the original pipe cut out pieces if this decision has to be taken.

#### **PS 15.5 Method Statements**

A detailed Method Statement for each Shut-Down operation in consultation with all relevant operational staff of UMngeni-uThukela Water shall be approved by the Employer's Agent prior to any operation

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## C.4 SITE INFORMATION

Darvill:

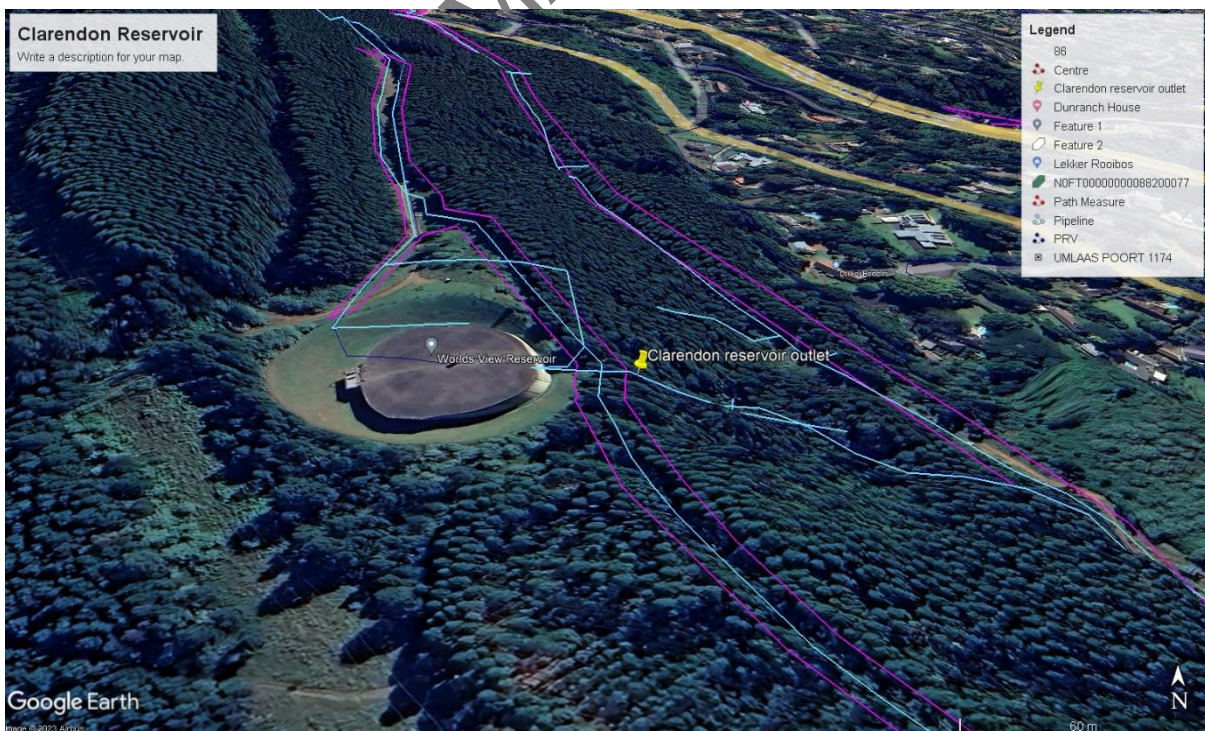
New England Road Extension

Pietermaritzburg



### C4.1 SITE LOCATION

Clarendon Reservoir



### C4.2 DESCRIPTION OF AND ACCESS TO THE SITE

The Works are located at existing Clarendon Reservoir

Clarendon Reservoir at approx 29°35'16.1"S 30°20'11.2

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**C4.3 ATMOSPHERIC / CLIMATIC**

In terms of GCC 2015, Clause 5.12.2.2, extension of time will be considered for abnormal climatic conditions in accordance with the following:

The number of days per month on which work is expected not to be possible as a result of **normal rainfall**, and for which the Contractor shall make provision in his tendered rates, prices and programme, are listed in the table below. Only the number of days lost as a result of abnormal rainfall, exceeding the number of days listed in table, will qualify for consideration of extension of time.

**TABLE: EXPECTED NUMBER OF WORKING DAYS LOST PER MONTH DUE TO NORMAL RAINFALL**

MONTH	Average number of days on which the recorded Rainfall was $\geq 10\text{mm}$	10 years Average Monthly Total Rainfall (mm)
JANUARY		
FEBRUARY	3 3	92 74
MARCH	2 2	65 46
APRIL	1 0	15 13
MAY	0 0	13 17
JUNE	1 2	29 74
JULY	2	74 77
AUGUST	3	
SEPTEMBER		
OCTOBER		
NOVEMBER		
DECEMBER		
<b>TOTAL</b>	<b>19 days</b>	<b>590</b>

*(The average monthly rainfall figures quoted are for the period 2009 to 2019 from the Darvill Waste Water Works rainfall station No U2H906P01 monitored by UMngeni-uThukela Water on daily basis; they are included for information only, and shall not be taken into consideration for calculation of extension of time. The number of days lost are based on the number of days in each month that rainfall exceeded 10mm. \* The number of working days lost for December and January allows for the builders' holidays from 16 December to 9 January)*

- During the execution of the Works, the Employer's Agent's Representative will certify a day lost due to abnormal climatic conditions only:
- if no work was possible on the relevant working day on any item which is on the critical path according to the latest approved construction programme; or
- if less than 30% of the work force and plant on site could work during that specific working day.

Extension of time as a result of abnormal climatic conditions shall be calculated monthly being equal to the number of working days certified by the Employer's Agent's Representative as lost due to rainfall to abnormal climatic conditions, less the number of days allowed for as stated in the table above, which could result in a negative figure for certain months. The total extension of time as a result of abnormal climatic conditions for which the Contractor may apply, shall be the cumulative algebraic sum of the monthly extensions. Should the sum thus obtained be negative, the extension of time shall be taken as nil.

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#### **C4.4 NATURE OF THE GROUND AND SUBSOIL CONDITIONS**

No prior Geotechnical investigations have been done.

Tenderers are advised to satisfy themselves as to the nature of the material to be excavated under this contract using attached copy of the geotechnical investigation report plus any other means they deemed it necessary.

It must be noted that no responsibility will be accepted by the Employer for and conclusions drawn by the Tenderers from the results and any information supplied. Tenderers must satisfy themselves as to the nature of the material to be excavated under this contract. Tenderers are at liberty to carry out any additional investigations to satisfy themselves as to the nature of the ground that will be encountered during construction, provided they inform the Employer of their intention to carry out such further investigations so that the necessary arrangements can be made and the safety requirements can be ensured.

The Tenderers shall be fully liable for any claims of damage, loses or injures which may arise out of, as consequences of carrying out such investigations for his tender purposes. In addition, the employer's authority for carrying out of such exploratory investigations is subject to the Tenderer indemnifying the Employer and the Employer's Agent against any claims.

#### **C4.5 ENVIRONMENTAL**

##### **Environmental Assessment**

The Environmental Assessment was not done

##### **Environmental Management Plan (EMP)**

EMP not done

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**PART C5: ANNEXURES**

**C5.1 Drawings**

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