



ETHEKWINI WATER AND SANITATION UNIT
CONSTRUCTION OF THE SOUTHERN WASTEWATER TREATMENT WORKS MULTIDISCIPLINARY UPGRADES

CONTRACT NO. 30661-5W

1 JULY 2025

ADDENDUM 2

Tenderers for the above-mentioned contract are hereby notified as follows:

- **Purpose of the Addendum**

The purpose of this addendum is to formally notify all prospective bidders of the following items attached and queries answered:

1. **The Site Tender Briefing Attendance Register** – See attached below.
2. **The Site Tender Briefing Minutes** – See attached below.
3. **Queries/Request for Information** – Addressed below.
4. **Amendments and Corrections to the Tender Document** – See attached below.
5. **Drawings to be Issued** - See attached to email.

Please acknowledge receipt of this notice by signing and returning page 1 of 17, as part of a tender document on or by Friday, **18th July 2025 @11h00**. Failure of the tenderer to comply with the requirements of the addenda may result in the tender submission being made non-responsive.

Name of Authorized Signatory

Tenderer's Signature

Name of Firm

Date



Company Stamp

1. The Site Tender Briefing Attendance Register:



30661-5W- CONSTRUCTION OF THE SOUTHERN WASTEWATER TREATMENT WORKS MULTIDISCIPLINARY UPGRADES



SITE MEETING ATTENDANCE REGISTER

BUSINESS UNIT NAME	: Durban	DATE	: 13 June 2025	LOCATION:	: Durban
MEETING PURPOSE	: Site Briefing	TIME	: 11h00	FACILITATED BY:	: iX Engineers / EtheKwini Municipality

ATTENDEES

NO.	NAME	COMPANY	TEL	CELL	EMAIL	SIGNATURE
1	Diver Rantel	iX Engineers	-	084 039 4288	diver.r@ixengineers.co.za	<i>[Signature]</i>
2	L.T. ANDERSON	Maziya/Mandlenk	021-171 0221	0678345996	daneemmandlenk@co.za	<i>[Signature]</i>
3	GRAHAM HORIZOL	EMC	0836311074	0836311074	horizol@emweb.co.za	<i>[Signature]</i>
4	KGOTISO MOROKO	KGOTISO MOROKO TRADERS	0827573752	0651708998	sales@kgotisomoro.co.za	<i>[Signature]</i>
5	K-SOLOFENE Moteng	ANOCOS	12710 500 0840	12705000840	moteng@anocosa.co.za	<i>[Signature]</i>
6	Sheniso Zuma	Usabon Joint-Venture	032 815 3355	072 475 6907	kenneth@usabon.com	<i>[Signature]</i>
7	Ramo Ramokgadi	Water and Wastewater Tech SA	067 773 6751	072 855 8555	ramokgadi@wtsa.co.za	<i>[Signature]</i>
	Akshay Badhon	Channel Construction	031 205 7401	065 933 4168	akshay@channelgroup.co.za	<i>[Signature]</i>

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10	EXCELENTI ZIBI	EXCELENT TRADING	063 311 1297		lthembenzi@excelenti.co.za	<i>[Signature]</i>
11	Petunia Silima	KSB Pumps & Valves	0609778987		petunia.silima@ksb.com	<i>[Signature]</i>
12	Linda Kellian	KSB Pumps & Valves			linda.kellian@ksb.com	<i>[Signature]</i>
13	HARDLIE MUHAMAD	MAGNUS PROSPECTS	0105000840	0105000840	admin@magnusprospects.co.za	<i>[Signature]</i>
14	Khomotso Mamoqatse	KHOMOTSO ACCELERATED GROWTH CONSTRUCTION	0605700211	0605705211	admin@agpm.co.za	<i>[Signature]</i>
15	Divhan Raphunga	isiphethu water services	012 1104403	0766625090	draphunga@isiphethu.co.za	<i>[Signature]</i>
16	Tshepo Rakhe	Dynatron Group	012 080 0630		Admin@dynatrongroup.co.za	<i>[Signature]</i>
17	JOHANN PULSKER	MAGNUS ELECTRICAL	0312741090	0826534212	JOHANN@Magnus.co.za	<i>[Signature]</i>
18	SABER KHOZA	REMAKO GROUP HOLDINGS	010 900 5899	083 317 8593	info@remakogroup.co.za	<i>[Signature]</i>
19	Sponelo Ngidi	Ukhlanga Trading Enterprise	031 563 9061	083 4874445	Nozipho@ukhlanga.co.za	<i>[Signature]</i>
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	Nathan Smith	Dwaba Solutions	0613390607		ns6179379@gmail.com	[Signature]
	Sandiso Gbame	UNIQ EPC	0791820702	0791958417	landers@uniquinternational.com	[Signature]
	SANDELE MALIBUKO	GREENKO SOLUTIONS	0118481040	0791040500	sales@greenko.co.za	[Signature]
	Mervyn Damos	MEC IKHAYO SOLUTIONS	0748519619		houstonmichell99@gmail.com	[Signature]
	Brandon Wood	Mphahzi Global	0614465383	0614465383	Brendanwood67@gmail.com	[Signature]
	YOGES LATCHMANAN	SCHNEIDER ELECTRIC	0847127914	0847127914	yoges.latchmanan@se.co.za	[Signature]
	Jerome Anderson	Bellhug	083-2828678		jerome.anderson@qg.mall.co.za	[Signature]

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	Sanele Khambule	Siganzoba Phambela	0826224826	0736805850	SiganzobaPhambela.co.za	[Signature]
	Charles Magia	Magnavolt Trading	0824441217	0118271315	info@magnavolttrading.co.za	[Signature]
	Petrus Mavhungu	BLESSED ENGINEERING SOLUTIONS	0763554333	0763554333	Petrus@BLESSEDENG.CO.ZA	[Signature]
	PELUSO RAMAANO	TOPPO CONSTRUCTION & GENERAL SERVICES	0713184854	0713184854	toppocons@gmail.com	[Signature]

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5	SCOTT MARGAND	ScotTie Projects	0680751174		info@scottieprojects.co.za	
6	Desi Khambele	Suphaselela Trading	02638971		blackaniso@gmail.com	
	JOBE	Intermount Trading	0756825177	0756825177	intermount86@gmail.com	
7	JOBE	Intermount Trading	---	0736825694	intermount86@gmail.com	
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	SIPHEHLE MAKHANYA	FIRST WORKS	0817608336	0315661441	SALES1@BENEFITSGROUP.co.za	
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	Megan Modley	Sizabonke cc/TA Pilcon Projects	0315308393	0718357662	Megan.pilcon@sigmaton.com	
	Colin Campbell	Hydroflu	0319141007	0836281148	Colin.Campbell@hydroflu.com	
	Kevin Chitungo	AUMANAT	0317006954	0686832562	rep@aumanat.co.za	

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SM/K

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	Michael Mosira	4231 PROTECTION	0727170317	0828510198	4231protection.co.za	Mosira
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	SNEHEMBA NDIMA	CCCC JV	076 851 6956	076 851 6956	wutianhao1993@126.com	Snehemba
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	Mark	Proxa	011 678 9001	064 751 3578	mark@proxawater.com	Mark
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	JITTESH HEERALALL	ELECTRON	031-7001320	0828196422	jitteshh@electron-sa.co.za	Jittesh
	ELTON MOODLEY	ELECTRON	0317001320	0612963367	eltonm@electron-sa.co.za	Elton
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	Sine Mchonde	Channel Construction	031 205 7401	063 713 4408	Aksha@channelgroup.co.za	Sine

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2. The Site Tender Briefing Minutes:



CONSTRUCTION OF THE SOUTHERN WASTEWATER
TREATMENT WORKS MULTIDISCIPLINARY UPGRADES
Contract No. 30661-5W

Tender Briefing Meeting Minutes



CONTRACT No. 30661-5W – CONSTRUCTION OF THE SOUTHERN WASTEWATER TREATMENT WORKS MULTIDISCIPLINARY UPGRADES

TIME AND VENUE

Meeting Title:	Site Tender Briefing
Location:	02 Byfield Rd, Merebank East, Bluff, Durban, 4052
Boardroom:	On Site
Date:	13 th June 2025
Time	10h15 to 13h00

1. ATTENDANCE AND CIRCULATION

Present

Name	Representation	Email	Contact No.
Shanir Ramjathan (SR)	IX Engineers	shanir.r@ixengineers.co.za	031 254 5700
Franclyn Samuel (FS)	IX Engineers	franclyn.s@ixengineers.co.za	012 745 2500
Shiven Ramlal	IX Engineers	shiven.r@ixengineers.co.za	031 254 5700
Ritesh Kandai (RK)	eThekwini	Ritesh.Kandhai@durban.gov.za	031 311 9063
Andrew Swain (AS)	PO3	Andrew@liika.co.za	-
Abraham de Wet (AW)	Water Spec	abraham@waterspec.co.za	-

Present Contractors

Name	Representation	Email	Contact No.
L.F Andersson	Maziya/Mandlethu	diane@mandlethugroup.co.za	

Electro-Mechanical Upgrades
Contract No. 30661-5W
Minutes of: Tender Briefing

Held on 13th of June 2025
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Name	Representation	Email	Contact No.
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Stembiso Zuma	Vusaken	kenneth@vusaken.com admin@vusaken.com	-
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Alesha Badhoo	Channel Construction	alesha@channelgroup.co.za	-
Menzi Khambule	Simandlov	sibusiso@simandlov.co.za	-
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Petunia Silima	KSB Pumps and valves	petunia.silima@ksb.com	-
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Tshepiso Rakale	Dynatron Group	admin@dynatrongroup.co	-
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Tarilyn Bloem	JJAS Trading	tarilyn.bloem@yahoo.com	-
Christopher	DSC	durbanspincity1@gmail.com	-
Irfaan Masthan	WK Construction	tenders@wkcsa.co.za	-
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Colin Campbell	Hidrostal	colin.campbell@hidrostal.com	-
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Linda Killian	KSB Pumps and valves	linda.killian@ksb.com	-
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Scott	Scottie Projects	info@scottieproject.co.za	-
Lobe	-	oceandropzcivils@gmail.com	-

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Nathan Smith	Dwaba Solutions	n561179379@gmail.com	-
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Mervyn Damos	M@C Ikhaya Solutions	houstonmichlle99@gmail.com	-
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Charles Bloem	B=Sebata	manchris343@gmail.com	-

Apologies

Name	Representation	Email	Contact No.
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Ashley Pillay	eThekwini	Ashley.Pillay@durban.gov.za	031 311 9063
Bruce Munnings	IX Engineers	Bruce.m@ixengineers.co.za	041 391 8844
Rajeev Maharaj	IX Engineers	Raieev.m@ixengineers.co.za	031 254 5700

Item	Subject
2.	TENDER ASPECTS
2.1	The Southern Wastewater Treatment Plant is located approximately 14 km south of Durban, 1 km inland from the coastline.
2.2	Tender Documents can be accessed on the eThekweni website and on National Treasury eTenders. - eThekweni Website: https://www.durban.gov.za - National Treasury eTenders: https://www.etenders.gov.za
2.3	The Contract Number for this project is 30661-5W.
2.4	This project requires a CIDB Contractor grading of 9EP or 9ME.
2.5	The tender closing date Friday, 04 July 2025 @11h00 and tender submission address is 166 KE Masinga Road, Municipal Building, Durban.
2.6	Queries relating to these documents are to be directed to Mr Shanir Ramjathan on email address shanir.r@ixengineers.co.za . - Queries / questions must be forwarded relating to these documents are to be addressed by 19 June 2025 - Response to the queries shall be sent by 26th June 2025
2.7	All contractors are to download the Tender Document and print prior to submitting tender documents. Electronic BoQ is available on the eThekweni or eTenders platform.
2.8	Tender submissions must be hardcopies which includes a USB/Memory Stick with all present tender documents from contractor. SR requests all returnable to be scanned.
2.9	30% Contractor Participation Goal is required for this project.
2.10	SR emphasized the communication lines. SR stated that all communication is to be done via email.
2.11	This is a compulsory clarification meeting. The certificate of attendance T2.2.2, shall be signed at the pump station.
3.	BACKGROUND
3.1	The site covers 30.65 hectares and is within an industrial and residential area. SR emphasizes sensitivity to area and works once site is handed over.
3.2	Main inflows come from the Jacobs, Umlaas, and Wentworth Valley Trunk Sewers
3.3	Effluent undergoes varying levels of treatment depending on the source - Veolia manages tertiary treatment for the Umlaas stream
3.4	Final discharge is via a 4.2 km long deep-sea outfall pipeline.
4.	CONTRACT DATA

Item	Subject
4.1	SR stated that the conditions of tender are the Standard Conditions of tender as per the of CIDB Standard for Uniformity.
4.2	Conditions of Contract are the FIDIC (yellow book) Second Edition 2017.
4.3	Project Programme is 104 weeks that is approximately 26 months.
4.4	The penalties is R20 000.00 per day
4.5	The Defects Liability period is 703 days.
5.	EVALUATION ASPECTS SR emphasised the Functionality Criteria and Preference Points System of Page 14 of the tender document.
5.1	• The 90/10 preference points system • Price 90 pts • Ownership goals - max. 5pts • Location – 5 pts
5.2	SR highlighted the Entity Specific Returnable, Eligibility Returnable on Page 18 and Supplementary Returnable Documents on Page 19 of the tender document. SR also noted that failure to complete these returnables will lead to a non-responsive tender.
5.3	SR noted the Bidders Experience on Page 7-8 of the tender document.
5.4	SR noted the Key Resources criteria on Page 9 of the tender document.
6.	SCOPE OF WORKS
6.1	SR discussed the scope of works that are to be completed. SR highlighted the project electrical and mechanical portion of the project.
6.2	SR stated that the works to be completed is Electrical, Mechanical, Refurbishments on the existing building and Civil works.
6.3	AS discussed in detail of the entire electrical scope of works that is required. AS noted that the works include an upgrade of the old electrical infrastructure which include a new MV supply, new reticulation cables and distribution network, new communications ring, new transformers, switchgear, motor control centres, sensors, variable speed drives, building services, lightning protection and decommissioning of all old items.

Item	Subject
6.4	FS and AW discussed in detail of the entire mechanical scope of works that is required as per the scope. They noted the works to include an upgrade of the old mechanical infrastructure which include new duty pumps, new pipework/valves and other accessories, drainage pumps, sluice gates, actuators, motorized overhead crane, A-frame lifting gantry, new HVAC system and the decommissioning of all old items.
6.5	FS highlighted strict adherence to the tender document regarding the electrical and mechanical works and emphasised eligibility.
6.6	SR discussed in detail of the building works required. SR stated that the works include new columns, beams, slabs, masonry, demolition of the existing brickwork, installation of new doors and windows, repairing concrete and waterproofing roof of building.
6.7	SR discussed in detail of the minor civil works required. SR stated the these works include paving and repairs of the road to pump station.
6.8	RK emphasised the electrical and mechanical upgrades required and highlighted the materials must meet the specifications in the tender document which shall be strictly adhered too.
7.	PRICING THE BOQ
7.1	SR stated that the BoQ is in Volume 2. There are 17 sections.
7.2	SR stated that the Form Offer needs to be completed and signed - C1.1.1.
7.3	SR emphasised timeous submission of all documentation and contractor eligibility. Submission date closure for the tender is on the 4 th of July 2025 @11h00.
7.4	SR requested an electronic BoQ in the Excel version must also be included with tender submission.
8.	QUESTIONS AND ANSWERS
8.1	Q: Until when questions be received for this contract and who do we contact for any questions on this contract? A: The person to contact for any queries is Shanir Ramjathan, Tel: 031 254 5700, Email: shanir.r@ixengineers.co.za , questions will be received until 19 th June 2025.
8.2	Q: Will there be an extension of time for the tender submission? A: At this stage there are no extensions. If there are any changes to this date, information will be uploaded on the eThekweni Website.

Item	Subject
8.3	Q: Where can we get the tender documents? A: eThekwini data and eTenders website.
8.4	Q: Is there CIDB requirements? A: Yes, 9EP or 9ME.
9.	ADDENDUMS TO BE ISSUED
9.1	N/A
10.	MEETING CLOSURE
10.1	N/A

3. Queries/Request for Information – Addressed below as Q&A's:

During the site tender briefing, all prospective bidders were informed to submit queries by the 19th of June 2025. A list of the queries was compiled and answered by the professional team, see listed below:

Q. Request for the site meeting register.

A. Kindly find attached to this document.

Q. Request for the unprotected excel BoQ.

A. The unprotected BoQ will not be uploaded. The BoQ required from all prospective bidders is on the eThekwini and eTenders website.

Q. Request for the Main LV SLD drawings.

A. The drawing is uploaded to the eThekwini website under P08959-E-CH-011-01-LV SLD and MCC Layout.

Q. Request to extend the tender submission date.

A. Tender submission date extended by 2 weeks, ending on the 18th of July 2025 @11h00 (Addendum 1) and **submission date of queries has been to 3rd July 2025.**

Q. Request Pipe Support Drawings: P08959-M-DT-013-01

A. Refer to drawings - P08959-M-DT-020-01 & P08959-M-DT-010-01 for Pipe Support Details.

Q. Request for Volume 7 of 9 on websites.

A. The document has been added to eThekwini website.

Q. Request for clarification on MV switchgear quantity and configurations.

A. The MV switchgear is divided between the BoQ's for the new main substation, the low level pump station and Veolia Water.

Q. Request for clarification if the drawing "P08959-E-SH-002-01_RevD_SWWTS_MV SINGLE LINE DIAGRAM" is in line with the above quantities.

A. Answered as per the above response.

Q. Request for clarification if all busbar ratings for the switchgear are 630A.

A. Yes.

Q. Request for clarification relevance of drawing P08959-E-SH-001-01_RevD_SWWTW – MAIN SUBSTATION SINGLE LINE DIAGRAM.

A. Price according to the BoQ.

Q. Request for clarification if Air Insulated Switchgear with Fixed Vacuum CB is accepted or considered.

A. Yes, on approval of the design engineer.

Q. Request for clarification if both SF6 or Vacuum CB would be considered for the Mini-Substation requirements.

A. Yes. Both will be considered on approval of the design engineer.

4. **Amendments and Corrections to the Tender Document:**

4.1 Replace Pages 55 and 56 in [Volume 5 of 9](#) with the attached replacement pages.

[Description of Amendment:](#)

4.1.1: Pages 55 and 56: Table 7:

The Table Heading and Table Column Headings have been amended as follows:

Replace Heading: *“Table 7 : Submersible Pump Duties”*

With Heading : *“Table 7 : Immersible Pump Duties”*

4.1.2: Pages 55 and 56: Table 7:

In the second and third columns of Table 7, **Replace** the headings **“MLSS Transfer”** and **“RAS Pumps No.1”** with the headings **“Sump No. 1 & 2 Drainage Pumps”** and **“Pump well Drainage Pumps”** respectively, as below, and as per the attached replacement pages.

4.2 Replace the Data Sheets for the Mechanical Equipment on Pages 68 to 90 in [Volume 5 of 9](#) with the attached replacement pages numbered 68 to 90.

the Contractor's supply. Gantries will be erected by the contractor under this contract.

Each pump set shall be fitted with the necessary approved pipework, calibrated glycerine filled pressure gauges suitably dampened against vibration, flexible couplings, pipe supports, bends, resilient seal gate valves and non-return valves (ball check, suitable for 10 bar pressure rating), and with suitable connections and stopcocks for fitting the necessary pressure gauges. Pressure gauges shall be supplied on the delivery side of each pump. Gauges shall be fitted with clog free in-line pressure sensors with flexible rubber sleeves of the membrane type.

Each discharge pressure gauge shall have a maximum reading of not more than twice the closed valve pressure of the pump.

Fully detailed drawings showing the proposed layout of pumps and pipework shall be submitted with the tender. The suction and delivery pipework shall terminate in a flanged pipe at a distance as shown on the drawings.

The pipework shall be of 316L stainless-steel with corrosion protection as specified and shall be flanged and drilled to SABS 1123 for a working pressure of 1 000 kPa (10 bar). Bends and branches shall provide non-turbulent flow conditions and the layout of the pipework shall be such as to facilitate dismantling and inspection. The pipes are to be properly supported and so arranged that all stresses created in the pipeline by static and dynamic forces including recoil shock, will be taken up by suitable anchors. Unless a specific size is specified, pipework shall be sized so as to limit maximum flow velocities to 1.6 metres per second, but no pipes shall have a diameter of less than 150 mm.

All suction and delivery pipework shall be provided with a flexible coupling in a convenient position to facilitate removal and reinstallation of a pump. Check valves on delivery mains shall only be used in a horizontal position.

All brackets and supports in dry well of pump stations shall be of grade 316L stainless-steel and shall be of grade 316L stainless steel in wet wells of pump stations.

8.2.5 Pressure Switches

Where pressure switches are used to protect pumps against closed or blocked lines by interrupting the supply to the motor, a pressure switch shall be mounted on the pump outlet and a vacuum switch shall be mounted on the pump inlet.

8.2.6 Pressure Gauges

A suitably rated pressure or combination pressure/suction gauge shall be installed on the suction and discharge of each pump.

8.2.7 General

The following shall be provided for each pump:

1. A suitable check valve on the discharge pipework.
2. protection against running against a closed discharge, i.e. discharge pressure switch or pressure relief valve.
3. Protection against running dry, i.e. suction pressure switch, pump stator temperature switch or low flow signal from related flow meter or no-flow switch.

8.3 Pump Duties

Table 7 : Immersible Pump Duties

Description	Sump Pumps No. 1 & 2 Drainage Pumps	Pump Well Drainage Pumps
Pump type	Immersible, solids handling, centrifugal.	Immersible, solids handling, centrifugal.
Duty/standby arrangement	2 off 1x duty/1x standby, a total of four (4)	1x duty, a total of one (1)

Description	Sump Pumps No. 1 & 2 Drainage Pumps	Pump Well Drainage Pumps
Delivery rate and duty point per pump	12.0 ℓ/s @ 10.0 m	5.0 ℓ/s @ 8.0 m
Type of fluid/medium to be pumped	Final Effluent Discharge	Final Effluent Discharge
Static head minimum	Approx. 5.0 m	Approx. 5.0 m
Static head operating condition	Approx. 5.0 m to 6.0m	Approx. 5.0 m
Static head maximum	Approx. 6.0 m	Approx. 5.0 m
Self-priming height	N/A	N/A
Suction pipe length	N/A	N/A
Delivery pipe length	Approx. 45.0 m, 150 mm Φ	Approx. 20.0 m, 80 mm Φ
Orifice plate as per supplier recommendation	N/A	N/A
Total head (operating)	10.0 m	8.0 m

8.4 Site Testing of Pumping Plant

On completion of erection of the pumps and of rendering them operational, the Contractor shall make suitable arrangements to test them in the presence of the Engineer.

Each pump shall be tested over its whole range of delivery. Where pumps are to operate in parallel, tests shall also be carried out to check these operating conditions.

The rate of delivery during testing shall be determined by cutting off the inflow to the sump and timing the drop in water level therein. Where this is not possible, other appropriate measurements shall be taken.

During the tests, the average values of voltage and current drawn by the motor shall be noted and recorded. Motor efficiencies and power factors shall be used as supplied by the manufacturer.

The test results shall be compared with the tendered pump characteristics and the following tolerances will be allowed:

Delivery rate : - 0 to + 10%

Overall efficiency : - 5%

In the event of the pumps failing to achieve the tendered performance in regard to discharge or efficiency within the tolerance allowed, then the Employer shall have the right to reject the pumps, to recover all monies paid to the Contractor under the Contract for such pumps and to confiscate the surety by way of agreed and liquidated damages; whereupon the Contractor at his own expense shall remove all rejected plant where ordered to do so by the Engineer. Alternatively, the Engineer shall have the right to negotiate with the Contractor a reduction in the price of the pumping plant based on the increased power consumption over an 8 year life.

Each pump shall be operated, and a check made that no undesirable effects occur when it is tripped.

8.5 Characteristic Curves for Pumps

The Tenderer shall submit the following characteristic curves of performance of the pumps offered.

- Pump (1) head - quantity curve
- (2) efficiency curve
- (3) NPSH curve
- Motor (1) efficiency curve

MECHANICAL DATA SHEETS

Contents

[DATA SHEET DS1:MAIN DUTY LOW-LEVEL PUMP SETS – END SUCTION](#)69

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[DATA SHEET DS3: SUMP NO. 1 & 2 DRAINAGE PUMP SETS](#)78

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[DATA SHEET DS7: ISOLATION VALVE](#).....88

DATA SHEET DS1 - Main Duty Low-Level Pump Sets – End Suction (With Cordon Shaft):			
Item	Description	EWS Requirements	Tenderer's Offer
1.	GENERAL		
1.1	Make		
1.2	Model		
1.3	Country of Manufacture		
1.4	QTY	2	
1.5	Warranty	24 Months	
2.	PUMP PERFORMANCE		
2.1	Flow Rate (2 x pumps in parallel) [L/S]	3000 <i>to be confirmed by tenderer</i>	
2.2	Total Dynamic Head [m]	39 <i>to be confirmed by tenderer</i>	
2.3	NPSHa [m]	Min. 10.148 m depending on level of sump <i>to be confirmed by tenderer</i>	
2.4	Efficiency at duty point	>79 %	
2.5	Power Absorbed at duty point [kW]	<i>To be confirmed by tenderer</i>	
2.6	Pump Speed [RPM]	<i>To be confirmed by tenderer</i>	
2.7	Recommended motor kilowatts [kW]	<i>To be confirmed by tenderer</i>	
2.8	NPSHr at duty point [m]	<i>To be confirmed by tenderer</i>	
2.9	Liquid to be pumped	Raw partially screened sewage/effluent	
2.10	Liquid [pH]	5.5 to 9.5	
2.11	Specific gravity of pumped liquid	1,02	
2.12	Static head [m]	2.5 - 6.0	
2.13	Liquid temperature [°C]	10 to 35 (Ambient)	
2.14	Minimum throughlet (Solids Handling) [mm]	100 diameter	
3.	PUMP DESIGN		
3.1	Pump Type	Multi vain, radial flow, end suction	
3.2	Pump Mounting	Vertical	
3.3	Impeller	Multi Vain	
3.4	Impeller shrouding	Single or double	
3.5	Number of impeller vanes	<i>To be confirmed by tenderer</i>	
3.6	Impeller max. diameter [mm]	<i>To be confirmed by tenderer</i>	
3.7	Impeller min. diameter [mm]	<i>To be confirmed by tenderer</i>	
3.8	Impeller diameter for duty point required. [mm]	<i>To be confirmed by tenderer</i>	
3.9	Impeller fixing to shaft	Taper / parallel	
3.10	D.E.bearing type	<i>To be confirmed by tenderer</i>	
3.11	N.D.E. bearing type	<i>To be confirmed by tenderer</i>	
3.12	Shaft sealing	Double mechanical	

DATA SHEET DS1 - Main Duty Low-Level Pump Sets – End Suction (With Cordon Shaft):			
Item	Description	EWS Requirements	Tenderer's Offer
3.13	Rotation looking on D.E.	C.W. or C.C.W	
3.14	Suction branch size [mm]	<i>To be confirmed by tenderer</i>	
3.15	Delivery branch size [mm]	<i>To be confirmed by tenderer</i>	
3.16	Type of Volute	Modified Concentric	
3.17	Radial Forces	<i>To be confirmed by tenderer</i>	
3.18	Axial Forces	<i>To be confirmed by tenderer</i>	
3.19	Number of Back Vanes	<i>To be confirmed by tenderer</i>	
3.20	Number of Deflector Vanes	<i>To be confirmed by tenderer</i>	
3.21	Reduction Elbow Size	<i>To be confirmed by tenderer</i>	
3.22	Type of Sealing Arrangement	Cyclo-Seal	
4.	MECHANICAL SEAL		
4.1	Primary seal rotating face	Silicon Carbide with co binder preferred	
4.2	Primary seal stationary face	Silicon Carbide with co binder preferred	
4.3	Elastomers	Viton - mandatory	
4.4	Secondary seal rotating face	Silicon Carbide with co binder preferred	
4.5	Secondary seal stationary face	Silicon Carbide with co binder preferred	
4.6	Elastomers	Viton preferred	
4.7	Springs	AISI 316 S/S	
4.8	All primary and secondary seal parts	AISI 316 S/S	
4.9	Rotation	To be suitable for both directions	
5.	ELECTRICAL MOTOR		
5.1	Manufacture		
5.2	Country Of Manufacture		
5.3	Type	Squirrel Cage TEFC	
5.4	Type of Efficiency	IE3 or better	
5.5	Installed Power	Motor to be sized for 125% of absorbed power	
5.6	Motor Speed [RPM]		
5.7	Class of Insulation [Class]	H	
5.8	Voltage [kV]	3.3 (MV)	
5.9	Lock Rotor Current [A]	A	
5.10	Efficiency at 75% Load [%]	%	
5.11	Power Factor at 75% Load [%]	%	
5.12	Efficiency at 100% Load [%]	%	
5.13	Power Factor at 100% Load [%]	%	

DATA SHEET DS1 - Main Duty Low-Level Pump Sets – End Suction (With Cordon Shaft):					
Item	Description	EWS Requirements	Tenderer's Offer		
5.14	Maximum allowable starts per hour	6			
5.15	Motor submergence	Dry well installation			
5.16	Primary motor protection	One thermistor per phase			
5.17	Secondary motor protection	Oil contamination sensor required			
5.18	Motor Cooling	Air cooled			
6.					
MATERIALS OF CONSTRUCTION					
6.1	Volute	Ductile Iron - ASTM A536 Grade 65-45-12 with 1.5% Nickle			
6.2	Impeller	ASTM487 / A743 Heat Treated CA6NM,13% Chromium Stainless Steel			
6.3	Shaft	17-4PH Stainless Steel			
6.4	Seal Plate	Ductile Iron - ASTM A536 Grade 65-45-12 with 1.5% Nickle			
6.5	Reduction Elbow	ASTM A234 WPB			
6.6	Volute Wear Ring	420 Stainless Steel Heat Treated 400-450 BHN with a minimum of 50 BHN			
6.7	Impeller Wear Ring	420 Stainless Steel Heat Treated 450-450 BHN with a minimum of 50 BHN			
6.8	Bolts,screws,studs,nuts and washers	316 S/S			
6.9	Cable entry gland	Spheroidal Graphite			
6.10	Motor housing	Spheroidal Graphite			
6.11	Impeller retaining bolt and split pins	316 S/S			
6.12	Cables	Polychloroprene multicore 30m long			
7.	SUCTION ARRANGEMENT				
7.1	Suction chamber or stool	<i>To be confirmed by tenderer</i>			
8.	SINGLE PUMP EFFICIENCY (Pump + Motor) – Guarantee Points				
	Pumps Speed	Q (l/s)	H (m)	P (kW)	Efficiency (Total)
8.1	n (synchronous speed) =rpm				
8.2	n (synchronous speed x 75%) =rpm				

DELIVERY

Time required for delivery of complete plant from date of notification to commence fabrication	weeks
Time required for erection and installation of plant from date of notification of availability of structures for erection and installation, or from time of completion of delivery, whichever is the later.	weeks
Time required for testing, commissioning and putting into proper working order of complete plant from date of notification.	weeks

Note: In addition, drawings showing details of equipment offered, its operation, control and other relevant details shall be submitted with the tender.

DATA SHEET DS2 - Main Duty Low-Level Pump Sets – Immersible			
Item	Description	EWS Requirements	Tenderer's Offer
1.	GENERAL		
1.1	Make		
1.2	Model		
1.3	Country of Manufacture		
1.4	QTY	2	
1.5	Warranty	24 Months	
2.	PUMP PERFORMANCE		
2.1	Flow Rate (2 x pumps in parallel) [L/S]	3000 <i>to be confirmed by tenderer</i>	
2.2	Total Dynamic Head [m]	39 <i>to be confirmed by tenderer</i>	
2.3	NPSH _a [m]	Min. 10.148 m depending on level of sump <i>to be confirmed by tenderer</i>	
2.4	Efficiency at duty point	>79 %	
2.5	Power Absorbed at duty point [kW]	<i>To be confirmed by tenderer</i>	
2.6	Pump Speed [RPM]	<i>To be confirmed by tenderer</i>	
2.7	Recommended motor kilowatts [kW]	<i>To be confirmed by tenderer</i>	
2.8	NPSH _r at duty point [m]	<i>To be confirmed by tenderer</i>	
2.9	Liquid to be pumped	Raw partially screened sewage/effluent	
2.10	Liquid [pH]	5.5 to 9.5	
2.11	Specific gravity of pumped liquid	1,02	
2.12	Static head [m]	2.5 - 6.0	
2.13	Liquid temperature [°C]	10 to 35 (Ambient)	
2.14	Minimum throughlet (Solids Handling) [mm]	100 diameter	
3.	PUMP DESIGN		
3.1	Pump Type	Single stage, close coupled, immersible, centrifugal, semi open vane	
3.2	Pump Mounting	Vertical	
3.3	Impeller	Multi Vain	
3.4	Impeller shrouding	Single or double	
3.5	Number of impeller vanes	<i>To be confirmed by tenderer</i>	
3.6	Impeller max. diameter [mm]	<i>To be confirmed by tenderer</i>	
3.7	Impeller min. diameter [mm]	<i>To be confirmed by tenderer</i>	
3.8	Impeller diameter for duty point required. [mm]	<i>To be confirmed by tenderer</i>	
3.9	Impeller fixing to shaft	Taper / parallel	
3.10	D.E.bearing type	<i>To be confirmed by tenderer</i>	
3.11	N.D.E. bearing type	<i>To be confirmed by tenderer</i>	
3.12	Shaft sealing	Double mechanical	

DATA SHEET DS2 - Main Duty Low-Level Pump Sets – Immersible			
Item	Description	EWS Requirements	Tenderer's Offer
3.13	Rotation looking on D.E.	C.W. or C.C.W	
		<i>To be confirmed by tenderer</i>	
3.14	Suction branch size [mm]		
3.15	Delivery branch size [mm]	<i>To be confirmed by tenderer</i>	
3.16	Type of Volute	Modified Concentric	
3.17	Radial Forces	<i>To be confirmed by tenderer</i>	
3.18	Axial Forces	<i>To be confirmed by tenderer</i>	
3.19	Number of Back Vanes	<i>To be confirmed by tenderer</i>	
3.20	Number of Deflector Vanes	<i>To be confirmed by tenderer</i>	
3.21	Reduction Elbow Size	<i>To be confirmed by tenderer</i>	
3.22	Type of Sealing Arrangement	Cyclo-Seal	
4.	MECHANICAL SEAL		
4.1	Primary seal rotating face	Silicon Carbide with co binder preferred	
4.2	Primary seal stationary face	Silicon Carbide with co binder preferred	
4.3	Elastomers	Viton - mandatory	
4.4	Secondary seal rotating face	Silicon Carbide with co binder preferred	
4.5	Secondary seal stationary face	Silicon Carbide with co binder preferred	
4.6	Elastomers	Viton preferred	
4.7	Springs	AISI 316 S/S	
4.8	All primary and secondary seal parts	AISI 316 S/S	
4.9	Rotation	To be suitable for both directions	
5.	ELECTRICAL MOTOR		
5.1	Manufacture		
5.2	Country Of Manufacture		
5.3	Type	Submersible, IEC 60034, IP68, continuous operation (S1)	
5.4	Type of Efficiency	IE3 or better	
5.5	Installed Power	Motor to be sized for 125% of absorbed power	
5.6	Motor Speed [RPM]		
5.7	Class of Insulation [Class]	H	
5.8	Voltage [kV]	3.3 (MV)	
5.9	Lock Rotor Current [A]		
5.10	Efficiency at 75% Load [%]	%	
5.11	Power Factor at 75% Load [%]	%	
5.12	Efficiency at 100% Load [%]	%	

DATA SHEET DS2 - Main Duty Low-Level Pump Sets – Immersible					
Item	Description	EWS Requirements		Tenderer's Offer	
5.13	Power Factor at 100% Load [%]	%			
5.14	Maximum allowable starts per hour	6			
5.15	Motor submergence	Dry well installation			
5.16	Primary motor protection	One thermistor per phase			
5.17	Secondary motor protection	Oil contamination sensor required			
5.18	Motor Cooling	Cooling Jacket			
6.	MATERIALS OF CONSTRUCTION				
6.1	Volute	Ductile Iron - ASTM A536 Grade 65-45-12 with 1.5% Nickle		EN – GJL 250	
6.2	Impeller	ASTM487 / A743 Heat Treated CA6NM, 13% Chromium Stainless Steel			
6.3	Shaft	17-4PH Stainless Steel			
6.4	Seal Plate	Ductile Iron - ASTM A536 Grade 65-45-12 with 1.5% Nickle			
6.5	Reduction Elbow	ASTM A234 WPB			
6.6	Volute Wear Ring	420 Stainless Steel Heat Treated 400-450 BHN with a minimum of 50 BHN			
6.7	Impeller Wear Ring	420 Stainless Steel Heat Treated 450-450 BHN with a minimum of 50 BHN			
6.8	Bolts, screws, studs, nuts and washers	316 S/S			
6.9	Cable entry gland	Spheroidal Graphite			
6.10	Motor housing	Spheroidal Graphite			
6.11	Impeller retaining bolt and split pins	316 S/S			
6.12	Cables	Polychloroprene multicore 30m long			
7.	SUCTION ARRANGEMENT				
7.1	Suction chamber or stool	To be confirmed by tenderer			
8.	SINGLE PUMP EFFICIENCY (Pump + Motor) – Guarantee Points				
	Pumps Speed	Q (l/s)	H (m)	P (kW)	Efficiency (Total)
8.1	n (synchronous speed) =rpm				
8.2	n (synchronous speed x 75%) =rpm				

DELIVERY

Time required for delivery of complete plant from date of notification to commence fabrication	weeks
Time required for erection and installation of plant from date of notification of availability of structures for erection and installation, or from time of completion of delivery, whichever is the later.	weeks
Time required for testing, commissioning and putting into proper working order of complete plant from date of notification.	weeks

Note: In addition, drawings showing details of equipment offered, its operation, control and other relevant details shall be submitted with the tender.

DATA SHEET DS3: Sump No 1 and 2 Drainage Pump Sets:			
Item	Description	EWS Requirements	Tenderer's Offer
1.	GENERAL		
1.1	Make		
1.2	Model		
1.3	Country of Manufacture		
1.4	QTY	4	
1.5	Warranty	24 Months	
2.	PUMP PERFORMANCE		
2.1	Flow Rate (1 x pumps) [L/S]	12.0 <i>to be confirmed by tenderer</i>	
2.2	Total Dynamic Head [m]	10.0 <i>to be confirmed by tenderer</i>	
2.3	NPSHa [m]	Min. 12.917 m depending on level of sump <i>to be confirmed by tenderer</i>	
2.4	Efficiency at duty point	>79 %	
2.5	Power Absorbed at duty point [kW]	<i>To be confirmed by tenderer</i>	
2.6	Pump Speed [RPM]	<i>To be confirmed by tenderer</i>	
2.7	Recommended motor kilowatts [kW]	<i>To be confirmed by tenderer</i>	
2.8	NPSHr at duty point [m]	<i>To be confirmed by tenderer</i>	
2.9	Liquid to be pumped	Raw partially screened sewage/effluent	
2.10	Liquid [pH]	5.5 to 9.5	
2.11	Specific gravity of pumped liquid	1.02	
2.12	Static head [m]	<i>To be confirmed by tenderer</i>	
2.13	Liquid temperature [°C]	10 to 35 (Ambient)	
2.14	Minimum throughlet (Solids Handling) [mm]	35 diameter	
3.	PUMP DESIGN		
3.1	Pump Type	Single stage, close coupled, immersible, centrifugal, semi open vane	
3.2	Pump Mounting	Vertical	
3.3	Impeller	Multi Vain	
3.4	Impeller shrouding	Single or double	
3.5	Number of impeller vanes	<i>To be confirmed by tenderer</i>	
3.6	Impeller max. diameter [mm]	<i>To be confirmed by tenderer</i>	
3.7	Impeller min. diameter [mm]	<i>To be confirmed by tenderer</i>	
3.8	Impeller diameter for duty point required. [mm]	<i>To be confirmed by tenderer</i>	
3.9	Impeller fixing to shaft	Taper / parallel	
3.10	D.E.bearing type	<i>To be confirmed by tenderer</i>	
3.11	N.D.E. bearing type	<i>To be confirmed by tenderer</i>	
3.12	Shaft sealing	Double mechanical	

DATA SHEET DS3: Sump No 1 and 2 Drainage Pump Sets:			
Item	Description	EWS Requirements	Tenderer's Offer
3.13	Rotation looking on D.E.	C.W. or C.C.W	
3.14	Suction branch size [mm]	<i>To be confirmed by tenderer</i>	
3.15	Delivery branch size [mm]	<i>To be confirmed by tenderer</i>	
3.16	Type of Volute	Modified Concentric	
3.17	Radial Forces	<i>To be confirmed by tenderer</i>	
3.18	Axial Forces	<i>To be confirmed by tenderer</i>	
3.19	Number of Back Vanes	<i>To be confirmed by tenderer</i>	
3.20	Number of Deflector Vanes	<i>To be confirmed by tenderer</i>	
3.21	Reduction Elbow Size	<i>To be confirmed by tenderer</i>	
3.22	Type of Sealing Arrangement	Cyclo-Seal	
4.	MECHANICAL SEAL		
4.1	Primary seal rotating face	Silicon Carbide with co binder preferred	
4.2	Primary seal stationary face	Silicon Carbide with co binder preferred	
4.3	Elastomers	Viton - mandatory	
4.4	Secondary seal rotating face	Silicon Carbide with co binder preferred	
4.5	Secondary seal stationary face	Silicon Carbide with co binder preferred	
4.6	Elastomers	Viton preferred	
4.7	Springs	AISI 316 S/S	
4.8	All primary and secondary seal parts	AISI 316 S/S	
4.9	Rotation	To be suitable for both directions	
5.	ELECTRICAL MOTOR		
5.1	Manufacture		
5.2	Country Of Manufacture		
5.3	Type	Submersible, IEC 60034, IP68, continuous operation (S1)	
5.4	Type of Efficiency	IE3 or better	
5.5	Installed Power	Motor to be sized for 125% of absorbed power	
5.6	Motor Speed [RPM]		
5.7	Class of Insulation [Class]	H	
5.8	Voltage [kV]	400,3-phase, 50Hz	
5.9	Lock Rotor Current [A]		
5.10	Efficiency at 75% Load [%]	%	
5.11	Power Factor at 75% Load [%]	%	
5.12	Efficiency at 100% Load [%]	%	
5.13	Power Factor at 100% Load [%]	%	

DATA SHEET DS3: Sump No 1 and 2 Drainage Pump Sets:					
Item	Description	EWS Requirements	Tenderer's Offer		
5.14	Maximum allowable starts per hour	6			
5.15	Motor submergence	Wet well installation, submersible			
5.16	Primary motor protection	One thermistor per phase			
5.17	Secondary motor protection	Oil contamination sensor required			
5.18	Motor Cooling	Cooling Jacket			
6.	MATERIALS OF CONSTRUCTION				
6.1	Volute	Ductile Iron - ASTM A536 Grade 65-45-12 with 1.5% Nickle	EN – GJL 250		
6.2	Impeller	ASTM487 / A743 Heat Treated CA6NM, 13% Chromium Stainless Steel			
6.3	Shaft	17-4PH Stainless Steel			
6.4	Seal Plate	Ductile Iron - ASTM A536 Grade 65-45-12 with 1.5% Nickle			
6.5	Reduction Elbow	ASTM A234 WPB			
6.6	Volute Wear Ring	420 Stainless Steel Heat Treated 400-450 BHN with a minimum of 50 BHN			
6.7	Impeller Wear Ring	420 Stainless Steel Heat Treated 450-450 BHN with a minimum of 50 BHN			
6.8	Bolts, screws, studs, nuts and washers	316 S/S			
6.9	Cable entry gland	Spheroidal Graphite			
6.10	Motor housing	Spheroidal Graphite			
6.11	Impeller retaining bolt and split pins	316 S/S			
6.12	Cables	Polychloroprene multicore 30m long			
7.	SUCTION ARRANGEMENT				
7.1	Suction chamber or stool	<i>To be confirmed by tenderer</i>			
8.	SINGLE PUMP EFFICIENCY (Pump + Motor) – Guarantee Points				
	Pumps Speed	Q (l/s)	H (m)	P (kW)	Efficiency (Total)
8.1	n (synchronous speed) =rpm				
8.2	n (synchronous speed x 75%) =rpm				

DELIVERY

Time required for delivery of complete plant from date of notification to commence fabrication	weeks
Time required for erection and installation of plant from date of notification of availability of structures for erection and installation, or from time of completion of delivery, whichever is the later.	weeks
Time required for testing, commissioning and putting into proper working order of complete plant from date of notification.	weeks

Note: In addition, drawings showing details of equipment offered, its operation, control and other relevant details shall be submitted with the tender.

DATA SHEET DS4: Dry-Well Drainage Pump Sets:			
Item	Description	EWS Requirements	Tenderer's Offer
1.	GENERAL		
1.1	Make		
1.2	Model		
1.3	Country of Manufacture		
1.4	QTY	1	
1.5	Warranty	24 Months	
2.	PUMP PERFORMANCE		
2.1	Flow Rate (1 x pumps) [L/S]	5.0 to be confirmed by tenderer	
2.2	Total Dynamic Head [m]	8.0 to be confirmed by tenderer	
2.3	NPSH _a [m]	Min. 12.917 m depending on level of sump to be confirmed by tenderer	
2.4	Efficiency at duty point	>79 %	
2.5	Power Absorbed at duty point [kW]	To be confirmed by tenderer	
2.6	Pump Speed [RPM]	To be confirmed by tenderer	
2.7	Recommended motor kilowatts [kW]	To be confirmed by tenderer	
2.8	NPSH _r at duty point [m]	To be confirmed by tenderer	
2.9	Liquid to be pumped	Raw partially screened sewage/effluent	
2.10	Liquid [pH]	5.5 to 9.5	
2.11	Specific gravity of pumped liquid	1.02	
2.12	Static head [m]	To be confirmed by tenderer	
2.13	Liquid temperature [°C]	10 to 35 (Ambient)	
2.14	Minimum throughlet (Solids Handling) [mm]	35 diameter	
3.	PUMP DESIGN		
3.1	Pump Type	Single stage, close coupled, immersible, centrifugal, semi open vane	
3.2	Pump Mounting	Vertical	
3.3	Impeller	Multi Vain	
3.4	Impeller shrouding	Single or double	
3.5	Number of impeller vanes	To be confirmed by tenderer	
3.6	Impeller max. diameter [mm]	To be confirmed by tenderer	
3.7	Impeller min. diameter [mm]	To be confirmed by tenderer	
3.8	Impeller diameter for duty point required. [mm]	To be confirmed by tenderer	
3.9	Impeller fixing to shaft	Taper / parallel	
3.10	D.E.bearing type	To be confirmed by tenderer	
3.11	N.D.E. bearing type	To be confirmed by tenderer	
3.12	Shaft sealing	Double mechanical	

DATA SHEET DS4: Dry-Well Drainage Pump Sets:			
Item	Description	EWS Requirements	Tenderer's Offer
3.13	Rotation looking on D.E.	C.W. or C.C.W	
3.14	Suction branch size [mm]	<i>To be confirmed by tenderer</i>	
3.15	Delivery branch size [mm]	<i>To be confirmed by tenderer</i>	
3.16	Type of Volute	Modified Concentric	
3.17	Radial Forces	<i>To be confirmed by tenderer</i>	
3.18	Axial Forces	<i>To be confirmed by tenderer</i>	
3.19	Number of Back Vanes	<i>To be confirmed by tenderer</i>	
3.20	Number of Deflector Vanes	<i>To be confirmed by tenderer</i>	
3.21	Reduction Elbow Size	<i>To be confirmed by tenderer</i>	
3.22	Type of Sealing Arrangement	Cyclo-Seal	
4.	MECHANICAL SEAL		
4.1	Primary seal rotating face	Silicon Carbide with co binder preferred	
4.2	Primary seal stationary face	Silicon Carbide with co binder preferred	
4.3	Elastomers	Viton - mandatory	
4.4	Secondary seal rotating face	Silicon Carbide with co binder preferred	
4.5	Secondary seal stationary face	Silicon Carbide with co binder preferred	
4.6	Elastomers	Viton preferred	
4.7	Springs	AISI 316 S/S	
4.8	All primary and secondary seal parts	AISI 316 S/S	
4.9	Rotation	To be suitable for both directions	
5.	ELECTRICAL MOTOR		
5.1	Manufacture		
5.2	Country Of Manufacture		
5.3	Type	Submersible, IEC 60034, IP68, continuous operation (S1)	
5.4	Type of Efficiency	IE3 or better	
5.5	Installed Power	Motor to be sized for 125% of absorbed power	
5.6	Motor Speed [RPM]		
5.7	Class of Insulation [Class]	H	
5.8	Voltage [kV]	400,3-phase, 50Hz	
5.9	Lock Rotor Current [A]		
5.10	Efficiency at 75% Load [%]	%	
5.11	Power Factor at 75% Load [%]	%	
5.12	Efficiency at 100% Load [%]	%	
5.13	Power Factor at 100% Load [%]	%	

DATA SHEET DS4: Dry-Well Drainage Pump Sets:					
Item	Description	EWS Requirements	Tenderer's Offer		
5.14	Maximum allowable starts per hour	6			
5.15	Motor submergence	Wet well installation, submersible			
5.16	Primary motor protection	One thermistor per phase			
5.17	Secondary motor protection	Oil contamination sensor required			
5.18	Motor Cooling	Cooling Jacket			
6.	MATERIALS OF CONSTRUCTION				
6.1	Volute	Ductile Iron - ASTM A536 Grade 65-45-12 with 1.5% Nickle	EN – GJL 250		
6.2	Impeller	ASTM487 / A743 Heat Treated CA6NM, 13% Chromium Stainless Steel			
6.3	Shaft	17-4PH Stainless Steel			
6.4	Seal Plate	Ductile Iron - ASTM A536 Grade 65-45-12 with 1.5% Nickle			
6.5	Reduction Elbow	ASTM A234 WPB			
6.6	Volute Wear Ring	420 Stainless Steel Heat Treated 400-450 BHN with a minimum of 50 BHN			
6.7	Impeller Wear Ring	420 Stainless Steel Heat Treated 450-450 BHN with a minimum of 50 BHN			
6.8	Bolts, screws, studs, nuts and washers	316 S/S			
6.9	Cable entry gland	Spheroidal Graphite			
6.10	Motor housing	Spheroidal Graphite			
6.11	Impeller retaining bolt and split pins	316 S/S			
6.12	Cables	Polychloroprene multicore 30m long			
7.	SUCTION ARRANGEMENT				
7.1	Suction chamber or stool	To be confirmed by tenderer			
8.	SINGLE PUMP EFFICIENCY (Pump + Motor) – Guarantee Points				
	Pumps Speed	Q (l/s)	H (m)	P (kW)	Efficiency (Total)
8.1	n (synchronous speed) =rpm				
8.2	n (synchronous speed x 75%) =rpm				

DELIVERY

Time required for delivery of complete plant from date of notification to commence fabrication	weeks
Time required for erection and installation of plant from date of notification of availability of structures for erection and installation, or from time of completion of delivery, whichever is the later.	weeks
Time required for testing, commissioning and putting into proper working order of complete plant from date of notification.	weeks

Note: In addition, drawings showing details of equipment offered, its operation, control and other relevant details shall be submitted with the tender.

DATA SHEET DS5: Sluice Gates:			
Item	Description	EWS Requirements	Tenderer's Offer
1.	Equipment specifications		
1.1.	Sluice Gate No.	3	
1.2.	Name of manufacturer		
1.3.	Place of manufacture		
1.4.	Location	Sump No. 1 & 2	
1.5.	Type	Penstock	
1.6.	Number of items	3	
1.7.	General Arrangement		
1.8.	Gate width (mm)		
1.9.	Gate height (mm)		
1.10.	Invert to platform height (mm)		
1.11.	Unbalanced operating head (mm)		
1.12.	Seating type		
1.13.	Spindle type		
1.14.	Spindle diameter (mm)		
1.15.	No. of spindle supports		
1.16.	Operating gear		
1.17.	Operating gear support		
1.18.	Handwheel / crank diameter (mm)		
1.19.	Handwheel height from platform (mm)		
1.20.	Head gear bearing type		
1.21.	Gate plate thickness (mm)		
1.22.	Rib thickness (mm)		
1.23.	Gate mass (kg)		
1.24.	Total mass (kg)		
2.	Materials of Construction		
2.1	Gate and frame		
2.2	Wedges		
2.3	Sealing faces		
2.4	Gate guides		
2.5	Spindle		
2.6	Spindle support brackets		
2.7	Spindle support bushes		

DATA SHEET DS5: Sluice Gates:

Item	Description	EWS Requirements	Tenderer's Offer
2.8	Pedestal		
2.9	Handwheel		
2.10	Assembly and foundation bolts		
2.6	Spindle support brackets		
2.7	Spindle support bushes		
2.8	Pedestal		
2.9	Handwheel		
2.10	Assembly and foundation bolts		

DELIVERY

Time required for delivery of complete plant from date of notification to commence fabrication	weeks
Time required for erection and installation of plant from date of notification of availability of structures for erection and installation, or from time of completion of delivery, whichever is the later.	weeks
Time required for testing, commissioning and putting into proper working order of complete plant from date of notification.	weeks

Note: In addition, drawings showing details of equipment offered, its operation, control and other relevant details shall be submitted with the tender.

DATA SHEET DS6 - NON-RETURN VALVE / CHECK VALVE SWING CHECK (REFLUX) VALVES				
Item	Description	Material	EWS Requirements	Tenderer's Offer
1.	Body	C.I.	Double flanged with machined faces	
2.	Cover	C.I.	Bolted with non-asbestos gasket, Drill and tap 1/2" BSP	
3.	Door	C.I.	As per Project Specification	
4.	Door seat	Bronze	As per Project Specification	
5.	Body seat	Bronze	As per Project Specification	
6.	Counterweight	C.I.	As per Project Specification	
7.	Counterweight Arm	M.S.	As per Project Specification	
8.	Hinge shaft	SS.	As per Project Specification	
9.	Flange Drilling	SABS 1123	Table 1000. Holes off centres	
10.	Valve Standard	SABS 1551	Class 16 waterworks pattern	
11.	Mounting	Vert/Horiz.	Mount in Horizontal pipe.	
12.	Operating pressure	3 bar	As per Project Specification	
13.	Rated pressure	16 bar	As per Project Specification	
14.	Pipe Diameter	As per Project Specification	As per Project Specification	
15.	Number Required	As per Project Specification	As per Bill Quantities	
16.	Exterior Finish	As per Project Specification	As per Project Specification	
17.	Interior Finish	As per Project Specification	As per Project Specification	

DATA SHEET D7 - ISOLATION VALVE – WEDGE GATE VALVES				
Item	Description	Material	EWS Requirements	Tenderer's Offer
1.	Hand wheel	C.I.	Secured to rising spindle with nut and washer	
2.	Raising Nut	Gunmetal	Keyed to hand wheel fitted with grease lubricator	
3.	Spindle	SS	Rising spindle with acme threaded top end. Threaded and locked to gate.	
4.	Spindle Support	C.I.	Double flanged with machined faces	
5.	Closing direction	Clockwise	As per Project Specification	
6.	Gland	C.I.	With machined flange and bolted to spindle support	
7.	Gland follower	C.I.	Fitted with tee bolts and nuts.	
8.	Gland packing	PTFE	As per Project Specification	
9.	Wedge Gate	C.I.	Double faced solid wedge type	
10.	Gate face rings	Gunmetal	Fitted to gate and machined to form perfect fit to body	
11.	Valve Bonnet	C.I.	Single machined flange integral with valve body	
12.	Valve Body	C.I.	Double flanged with machined faces and under belly for gate	
13.	Valve Body Trim	Gunmetal	Trim rings to be machined to form perfect fit to wedge face rings	
14.	Flange Drilling	SABS 1123	Table 1000. Holes off center's	
15.	Valve Standard	SABS 664	Class 16 waterworks pattern	
16.	Mounting Position	Horizontal / Vertical	Horizontal	
17.	Operating Pressure	8 bar	As per Project Specification	
18.	Rated Pressure	16 bar	As per Project Specification	
19.	Pipe Diameter		As per Project Specification	
20.	Number Required		As per BOQ	
21.	Exterior Finish		As per Project Specification	
22.	Interior Finish		As per Project Specification	
23.	Type of valve		Rising / non rising spindle	

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