City of Johannesburg

Johannesburg Water SOC Ltd

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REQUEST FOR PRICING (GOODS AND SERVICES)	Form No: JW SCM Dev MBD1 Revision No: 02 Effective Date: February 2023

	JW RFP 12/05/2026	**CLOSING DATE:**	27 May 2026	**CLOSING TIME:**	14:00
DESCRIPTION:	**SUPPLY, DELIVERY AND OFFLOADING OF 35 X HELICAL GEARBOX AND MOTOR UNITS COMPLETE WITH ASSOCIATED FIXTURES/COMPONENTS FOR NORTHERN WASTEWATER TREATMENT WORKS**				
BRIEFING SESSION DATE AND TIME	18 MAY 2026 12:00	**Is the meeting compulsory?**	Yes		
BRIEFING SESSION VENUE	**NORTHERN WORKS** Northern Works: Situated 35 km North of Johannesburg on the Provincial Road P79-1 from Johannesburg to Hartbeespoort Dam.				
ISSUE DATE	12 May 2026				

BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO:			
Bidding procedure enquiries must be sent to the below Official		**Technical enquiries must be directed to**	
CONTACT PERSON	Ishmael Kuduza	**CONTACT PERSON**	Thabiso Thabeng
TELEPHONE NUMBER	011 688 1976	**TELEPHONE NUMBER**	011 510 2602
E-MAIL ADDRESS	Ishmael.kuduza@jwater.co.za	**E-MAIL ADDRESS**	thabiso.thabeng@jwater.co.za

SUPPLIER INFORMATION

Mr Dineo Majavu (Chairperson), Mr Ntshavheni Mukwevho (Managing Director and Executive Director),
Mr Kgaugelo Mahlaba (Chief financial Officer and Executive Director) Mr Sipho Mthembu, Ms Zandile Meeleso, Mr Pholoso Matjele,
Mr Molate Mashifane, Ms Pamela Mabece, Mr Collen Sambo, Mr Makoko Makgonye, Ms Thabiso Kutumela,
Mr Kefiloe Mokoena

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NAME OF BIDDER				
POSTAL ADDRESS				
STREET ADDRESS				
TELEPHONE NUMBER	**CODE**		**NUMBER**	
CELLPHONE NUMBER				
E-MAIL ADDRESS				
VAT REGISTRATION NUMBER			**CIDB GRADING**	N/A
SUPPLIER COMPLIANCE STATUS	**TAX COMPLIANCE SYSTEM PIN:**		**CENTRAL SUPPLIER DATABASE No:**	MAAA
B-BBEE VERIFICATION CERTIFICATE	[TICK APPLICABLE BOX] ☐Yes ☐No		**B-BBEE SWORN AFFIDAVIT** (EMEs OR QSEs)	[TICK APPLICABLE BOX] ☐Yes ☐No

BID SUBMISSION:

BID DOCUMENTS MUST BE DEPOSITED IN THE RFP BOX SITUATED AT GROUND FLOOR IN JOHANNESBURG WATER

ADDRESS: TURBINE HALL, 65 NTEMI PILISO STREET, NEWTOWN, JOHANNESBURG, 2001

PLEASE ALLOW SUFFICIENT TIME TO ACCESS THE JOHANNESBURG WATER OFFICE IN TURBINE HALL AND DEPOSIT YOUR RFP DOCUMENT IN THE JOHANNESBURG WATER RFP BOX SITUATED AT RECEPTION BEFORE THE RFP CLOSING DATE AND TIME.

- **TIMES: THE BUILDING WILL OPEN 7 DAYS A WEEK FROM 06:00AM UNTIL 18:00PM** Late bids will not be accepted for consideration.
- **All pricing/quotation must be submitted by completing the attached or on the official company letterhead, signed and accompanied by the returnable documents stated below.**

☐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 member's persons in the service of the state.

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1. BACKGROUND OF THE PRODUCT

Background

Helical gearboxes and motors serve as indispensable power transmission components in bulk wastewater treatment works, powering essential electromechanical systems such as aerators and mixers, Renowned for their helical gear configuration which delivers superior torque capacity, efficiency, and durability under prolonged, high-load operations, these units are pivotal to maintaining seamless process flows, regulatory compliance, and operational resilience at Johannesburg Water facilities.

The current fleet in Northern WWTW has surpassed its design lifespan, manifesting in heightened failure frequencies, diminished performance, and elevated risks of process interruptions. This RFP addresses the urgent imperative for replacement with thirty-five (35) units, precisely matched to existing installations, to avert costly breakdowns and uphold uninterrupted wastewater treatment critical to public health and environmental protection.

Bidder Responsibilities and Mandatory Site Acquaintance

Bidders bear full and unequivocal responsibility to thoroughly acquaint themselves with all site conditions, including but not limited to existing equipment configurations, mounting arrangements, spatial limitations, environmental factors (e.g., corrosive atmospheres and vibration profiles), and integration with ancillary systems. This constitutes a mandatory requirement for bid eligibility.

Failure to confirm full comprehension of these site-specific requirements through physical site inspections, liaison with Johannesburg Water representatives, and submission of a detailed site understanding verification form will render the bid non-responsive and subject to disqualification. Bidders must explicitly acknowledge this obligation in their submission, providing evidence of site visits and a signed confirmation of compatibility assurances. This rigorous mandate ensures selected suppliers deliver zero-disruption replacements, safeguarding operational continuity. Bidders must complete in full and sign the form provided under clause 1.8 of this document as means of evidence for the above.

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1.1 SCOPE OF WORK

Supply, Delivery, and Offloading

The primary scope of this project encompasses the procurement, supply, delivery, and offloading of thirty-three (35) helical gearboxes and motors complete with associated fixtures and components. This units shall precisely match the specifications of existing site installations to ensure seamless compatibility and operational integration. All supplied items must strictly adhere to Johannesburg Water's approved standards, technical specifications, and quality assurance protocols. See clause 1.6 for the applicable Johannesburg Water standards and technical specifications.

The required gearbox sizes, categorized by motor power rating and quantity, are detailed in the table below:

No	Gearbox Motor Power Rating (kW)	Qty
1	75	8
2	90	10
3	110	17
TOTAL		**35**

The required electric motor sizes, categorized by power rating and quantity, are detailed in the table below:

No	Motor Power Rating (kW)	Qty
1	75	8
2	90	10
3	110	17
TOTAL		**35**

Delivery shall be executed at designated Johannesburg Water sites, with offloading performed in a manner that minimizes disruption to ongoing operations. The Contractor shall provide all necessary documentation, including material certificates, test reports, and compliance certifications, prior to final acceptance.

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1.2 SPECIFICATIONS

Gearboxes are site-specific, with installation designs varying between units even those of the same power output due to differences in the bioreactors they serve. These bioreactors, designed and commissioned at different times, result in non-identical setups influenced by historical engineering practices, site constraints, and process needs. It's essential for bidders to appreciate these site-specific requirements during replacement projects. This ensures compatibility, minimizes retrofit risks, and maintains operational reliability in bulk wastewater treatment.

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GEARBOXES EQUIPMENT SPECIFICATIONS

No	Power output	Description	Design	Mounting	Performance	Features and operating conditions
1	75 kW	Hansen or equivalent Helical Gear Units	Compact two to four-stage helical parallel shaft gear unit	To be verified on site by the Contractor before making an offer	As per JW approved standards (Listed under clause 1.6)	Pressure lubrication with shaft-end pump, 1 grease nipple each.
2	90 kW	Hansen or equivalent Helical Gear Units	Compact two to four-stage helical parallel shaft gear unit			Pressure lubrication with shaft-end pump. Rotex-style coupling compatibility.
3	110 kW	Hansen or equivalent Helical Gear Units	Compact two to four-stage helical parallel shaft gear unit			

NB: Operating conditions of 24h duty, -10 to 45°C no radial/axial forces, direct sunlight, high humidity. Gearboxes to be suitable for motor mounting position V1

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1.3 Gearboxes Design and Operating Principles

- **Helical Gearing:** Angled teeth for gradual mesh, high efficiency (≥98%/stage), low noise/vibration, high torque capacity via multiple contact points. Parallel shafts ensure compact horizontal layout.
- **Power Transmission:** High-speed input (1400-1480 rpm) reduces via 2-4 stages to low-speed output; EBD design integrates agitator loads.
- **Lubrication:** Pressure system, shaft-driven pump circulates oil bath to gears/bearings; monitored by flow switch, dipstick, level protection; prevents overheating in 24h service.
- **Mounting**: Site specific. Contractor to verify these details before making an offer to Johannesburg Water. Motors are all vertically mounted (downward).
- **Gearbox/Motor Couplings:** Gearbox and motor couplings must be the same as existing in the targeted bioreactor (Contractor to verify these details before making an offer). Aerator gearboxes may require a mild steel spacer ring between the IEC adapter housing and the electric motor.
- **Gearbox Output Couplings:** Couplings must be the same as existing in the targeted bioreactor (Contractor to verify these details before making an offer).
- **Quantities of Gearboxes:** Table provided under clause 1.5 must be consulted to verify quantities of gearboxes and couplings per targeted bioreactor.

1.4 Electric Motor Equipment Specifications

The electric motors for the above gearboxes must match the input power required for each gearbox size. Electric motors must be 4-pole Squirrel Cage Induction Motors, Totally Enclosed and Fan Cooled (TEFC) type. All motors must be three-phase 400V motors. All motor bearings must be pre-lubricated and sealed. The service factor of the motors must be at least SF1.1. Table provided under clause 1.5 must be consulted to verify quantities per targeted bioreactor.

1.5 Typical Mounting Dimensions

The typical mounting dimensions of the gearboxes and motors are as provided below. However, as stated and specified above, the Contractor has the responsibility to verify the dimensions before making an offer to JW. Errors which may result in cost implications will not be entertained at the implementation stage and all the additional cost implications due to errors will be for the account of the Contractor. The information provided below should be treated as

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typical and not definitive or accurate and does not in any way remove the responsibility from the Contractor to verify the details before making an offer to JW.

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Gearbox	QTY Required	Typical Dimensions					
		Motor PCD or IEC Adapter PCD	Impeller/Turbine PCD	Mounting Frame	IEC Adapter Height	Mild Steel Spacer Ring	Existing Motor/Gearbox Coupling
110kW Aerator for Unit 4	9	500mm (IEC 280 V1)	380mm	750mm x 750mm (hole to hole)	approx. 340mm	30 to 35mm	Pin type, PN235
75kW Aerator for Unit 4 (RNE)	6	500mm (IEC 250 V1)	360mm	750mm x 920mm (hole to hole)	approx. 300mm	30 to 35mm	Pin type, PN200
75kW Aerator for Unit 4 (RNF)	2	500mm (IEC 250 V1)	360mm	875mm x 1020mm (hole to hole)	approx. 400mm	30 to 35mm	Pin type, PN200
110kW Aerator for Unit 3 Module 1 and Module 3	2	600mm (IEC 315 V1)	480mm	750mm x 750mm (hole to hole)	approx. 375mm	30 to 35mm	EcoflexT135
90kW Aerator for Unit 3 Module 1 and Module 3	2	500mm (IEC 280 V1)	480mm	750mm x 750mm (hole to hole)	approx. 345mm	30 to 35mm	EcoflexT135
110kW Aerator for Unit 3 Module 2	3	500mm (IEC 280 V1)	480mm	750mm x 750mm (hole to hole)	approx. 340mm	30 to 35mm	EcoflexT135
90kW Aerator for Unit 3 Module 2	5	500mm (IEC 280 V1)	480mm	580mm x 580mm (hole to hole)	approx. 350mm	30 to 35mm	EcoflexT135
110kW Aerator for Unit 5 Module 1	3	500mm (IEC 280 V1)	360mm	750mm x 750mm (hole to hole)	approx. 345mm	30 to 35mm	EcoflexT135
90kW Aerator for Unit 5 Module 1	3	500mm (IEC 280 V1)	360mm	590mm x 590mm (hole to hole)	approx. 350mm	30 to 35mm	EcoflexT135

Total	35

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1.6 Applicable Johannesburg Water Particular Specifications

No	JW Standard or Specification	Applicability
1	M08 – Gearboxes	All gearboxes
2	G01 – Colour Coding	Mechanical units/equipment
3	E01 – Electric Motors	All electric motors
4	E26 – Colour Coding	Electrical Units/Equipment

1.7 Offered Equipment Datasheets

The below datasheets for the offered equipment must all be completed by the Bidders and submitted together with their bids. Failure to complete the datasheets in full, and failure to complete all the datasheets will result into disqualification. The minimum technical requirements as per the datasheets must be met by the offered equipment or the Bidder's bid will be disqualified. Bidders are also requested to submit together with their bids the copies of the OEM product technical datasheets for the offered gearboxes and electric motors; *Bidders will not be disqualified for failure to submit the copies of OEM product technical datasheets*.

1.7.1 Gearbox Datasheet for the 110kW Gearbox

110kW Gearbox			
Item No.	**Category**	**Requirement / Specification**	**Service provider Specification/Offer**
1	**Design**		
1.1	Brand offered	-	
1.2	Model offered	-	
1.3	Ambient Temperature	-10°C to +45°C	
1.4	Gear Type	Case-hardened helical gears	
1.5	Efficiency	≥95% (3-stage)	
1.6	Noise Level	≤90 dBA at 1 m	
1.7	Output speed [rpm]	26rpm +/-5%	
1.8	Rotational direction	bidirectional	
1.9	Type of driving machine	AC motor	
1.10	Motor power, nominal PM [kW]	110	

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110kW Gearbox			
Item No.	**Category**	**Requirement / Specification**	**Service provider Specification/Offer**
1.11	Motor mounting code	IM V1	
2	**Mechanical Construction**		
2.1	Housing Material	High strength cast iron	
2.2	Shafts	Stainless steel with replaceable sleeves	
2.3	Bearings	Roller bearings with taper bearings for thrust loads	
2.4	Gear Life	≥2 × bearing life	
3	**Bearing Design Life**		
3.1	Aerators	L10 ≥ 100 000 hours	
4	**Lubrication**		
4.1	System	Oil lubrication with dry well for low-speed shaft	
4.2	Monitoring	Oil level indicator, dipstick, oil level protection and oil flow switch	
4.3	Drain	Stainless steel valve with extension pipe	
5	**Couplings & Drives**		
5.1	Motor connection	Motor adapter	
5.2	Adapter type	IEC	
5.3	Flexible Couplings	Same as existing	Same as existing
5.4	Output Coupling	Same as existing	Same as existing
6	**Service Factors**		
6.1	Aerator Gearbox SF	Minimum 2.25	
7	**Driving AC Electric Motor**		
7.1	Brand offered	-	
7.2	Model offered	-	
7.3	Motor Power Rating [kW]	110	
7.4	Motor type	Squirrel Cage IM, TEFC	
7.5	Speed [rpm]	1420 to 1500	
7.6	Voltage [V]	400VAC, 3 phase	
7.7	Efficiency class	IE3 or better	
7.8	Efficiency @ FL [%]	-	
7.9	Power Factor @ 50% Load	≥0.85	
7.10	Mounting	IM V1	

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110kW Gearbox			
Item No.	**Category**	**Requirement / Specification**	**Service provider Specification/Offer**
7.12	Insulation Class	F or better	
7.13	IP Rating	≥IP55	
7.14	Duty Factor	S1	
7.15	Service Factor	≥SF1.1	
7.16	Bearings life	L10 ≥ 50 000 hours	
7.17	Bearings type	Pre-lubricated and sealed	
7.18	Anti-condensation heater	220VAC supply, 23^0C maintained temperature	
7.19	Windings thermistor protection	PTC	

1.7.2 Datasheet for the 90kW Gearbox

90 kW Gearbox			
Item No.	**Category**	**Requirement / Specification**	**Service provider Specification/Offer**
1	**Design**		
1.1	Brand offered	-	
1.2	Model offered	-	
1.3	Ambient Temperature	-10°C to +45°C	
1.4	Gear Type	Case-hardened helical gears	
1.5	Efficiency	≥95% (3-stage)	
1.6	Noise Level	≤90 dBA at 1 m	
1.7	Output speed [rpm]	33rpm +/-5%	
1.8	Rotational direction	bidirectional	
1.9	Type of driving machine	AC motor	
1.10	Motor power, nominal PM [kW]	90	
1.11	Motor mounting code	IM V1	
2	**Mechanical Construction**		
2.1	Housing Material	High strength cast iron	
2.2	Shafts	Stainless steel with replaceable sleeves	
2.3	Bearings	Roller bearings with taper bearings for thrust loads	

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90 kW Gearbox			
Item No.	**Category**	**Requirement / Specification**	**Service provider Specification/Offer**
2.4	Gear Life	≥2 × bearing life	
3	**Bearing Design Life**		
3.1	Aerators	L10 ≥ 100 000 hours	
4	**Lubrication**		
4.1	System	Oil lubrication with dry well for low-speed shaft	
4.2	Monitoring	Oil level indicator and dipstick	
4.3	Drain	Stainless steel valve with extension pipe	
5	**Couplings & Drives**		
5.1	Motor connection	Motor adapter	
5.2	Adapter type	IEC	
5.3	Flexible Couplings	Same as existing	Same as existing
5.4	Output Couplings	Same as existing	Same as existing
6	**Service Factors**		
6.1	Aerator gearbox SF	Minimum 2.25	
7	**Driving AC Electric Motor**		
7.1	Brand offered	-	
7.2	Model offered	-	
7.3	Motor type	Squirrel Cage IM, TEFC	
7.4	Speed [rpm]	1420 to 1500	
7.5	Voltage [V]	400VAC, 3 phase	
7.6	Efficiency class	IE3 or better	
7.7	Efficiency @ FL [%]	-	
7.8	Power Factor @ 50% Load	≥0.85	
7.9	Mounting	IM V1	
7.10	Motor power, nominal PM [kW]	90	
7.11	Insulation Class	F or better	
7.12	IP Rating	≥IP55	
7.13	Duty Cycle	S1	
7.14	Service Factor	≥SF1.1	
7.15	Bearings life	L10 ≥ 50 000 hours	
7.16	Bearings type	Pre-lubricated and sealed	
7.17	Anti-condensation heater(s)	220VAC supply, 23^{0}C maintained temperature	

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90 kW Gearbox			
Item No.	**Category**	**Requirement / Specification**	**Service provider Specification/Offer**
7.18	Windings thermistor protection	PTC	

1.7.3 Datasheet for 75kW Gearbox

75 kW Gearbox			
Item No.	**Category**	**Requirement / Specification**	**Service provider Specification/Offer**
1	**Design**		
1.1	Brand offered	-	
1.2	Model offered	-	
1.3	Ambient Temperature	-10°C to +45°C	
1.4	Gear Type	Case-hardened helical gears	
1.5	Efficiency	≥95% (3-stage) or higher	
1.6	Noise Level	≤90 dBA at 1 m	
1.7	Output speed [rpm]	36rpm +/-5%	
1.8	Rotational direction	bidirectional	
1.9	Type of driving machine	AC-motor	
1.10	Motor power, nominal PM [kW]	75	
1.11	Motor mounting code	IM V1	
2	**Mechanical Construction**		
2.1	Housing Material	High strength cast iron	
2.2	Shafts	Stainless steel with replaceable sleeves	
2.3	Bearings	Roller bearings with taper bearings for thrust loads	
2.4	Gear Life	≥2 × bearing life	
3	**Bearing Design Life**		
3.1	Aerators	L10 ≥ 100 000 hours	
4	**Lubrication**		
4.1	System	Oil lubrication with dry well for low-speed shaft	
4.2	Monitoring	Oil level indicator and dipstick	

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75 kW Gearbox			
Item No.	**Category**	**Requirement / Specification**	**Service provider Specification/Offer**
4.3	Drain	Stainless steel valve with extension pipe	
5	**Couplings & Drives**		
5.1	Motor connection	Motor adapter	
5.2	Adapter type	IEC	
5.3	Flexible Couplings	Same as existing	Same as existing
5.4	Output Couplings	Same as existing	Same as existing
6	**Service Factors**		
6.1	Aerator gearbox SF	Minimum 2.25	
7	**Driving AC Electric Motor**		
7.1	Brand offered	-	
7.2	Model offered	-	
7.3	Motor type	Squirrel Cage IM, TEFC	
7.4	Speed [rpm]	1420 to 1500	
7.5	Voltage [V]	400VAC, 3 phase	
7.6	Efficiency class	IE3 or better	
7.7	Efficiency @ FL [%]	-	
7.8	Power Factor @ 50% Load	≥0.85	
7.9	Mounting	IM V1	
7.10	Motor power, nominal PM [kW]	75	
7.11	Insulation Class	F or better	
7.12	IP Rating	≥IP55	
7.13	Duty Cycle	S1	
7.14	Service Factor	≥SF1.1	
7.15	Bearings life	L10 ≥ 50 000 hours	
7.16	Bearings type	Pre-lubricated and sealed	
7.17	Anti-condensation heater(s)	220VAC supply, 23^0C maintained temperature	
7.18	Windings thermistor protection	PTC	

1.8 Site Acquaintance, Acknowledgement of Obligation and Compatibility Assurance Form (Mandatory)

The form below is mandatory and must be completed in full. It must also be counter-signed by a Johannesburg Water site technical representative who was consulted during the visit or visits.

Mr Dineo Majavu (Chairperson), Mr Ntshavheni Mukwevho (Managing Director and Executive Director),
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SITE VERIFICATION VISIT, ACKNOWLEDGEMENT OF OBLIGATION AND COMPATIBILITY ASSURANCE FORM (MONDARY REQUIREMENT)

Acknowledgement by the Bidder's Representative:

We_____(bidder's name) hereby acknowledge that we had an obligation to visit the Northern Wastewater Treatment Works to verify the following amongst other matters:

1. Existing Equipment (gearboxes and motors)
2. Existing equipment configurations
3. Existing mounting Arrangements (couplings, frames etc)
4. Spatial limitations
5. Relevant environmental factors
6. Compatibility and ancillary systems integrations

We also hereby confirm that the above were verified to our satisfaction before an offer was made to Johannesburg Water under this contract. Furthermore, we assure Johannesburg Water that all the units (gearboxes and motors including input and output couplings) that we are offering in this bid are compatible with the existing units as per breakdown provided under clause 1.5 of this document.

We visited Northern Wastewater Treatment Works on the following date(s):

_____

The site technical representative of Johannesburg Water who assisted us to gain access to the different relevant equipment is_____.

Acknowledgement of visit by JW Technical Representative:

I,_____, holding a position of_____

Hereby confirm that company_____visited Northern Wastewater Treatment Works on:_____to verify gearbox and motor technical specifications and other relevant matters.

Signature:_____**Date**:_____

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2. DELIVERABLES

The successful bidder shall be required to provide:

- **Inspection:** Site-specific survey reports/sheets/information documenting bioreactor dimensions, mounting configurations, and interface requirements
- **Supply**: Site-specific gearboxes and motors complete with associated fixtures as per technical specifications, together with quality certificates and OEM warranties. The input and output couplings must be fitted on the motors and gearboxes.
- **Factory Acceptance Inspection**: Organise a factory inspection meeting(s) before the gearboxes, motors and couplings are delivered. At this meeting, the gearboxes, motors and couplings and the required documentation will be inspected against the specifications in this contract, JW particular specifications (enclosed herein) and the agreed to QCP. Part of Factory Acceptance Inspection will require that each gearbox be coupled with a motor and run on no-load for a period agreed to in the QCP.
- **Delivery:** Timely transport of all the units and associated components to site (e.g., bioreactors, stores etc. as determined by JW), including packaging for heavy equipment and proof of delivery notes. The input and output couplings must be fitted on the motors and gearboxes.
- **Offloading:** Contractor responsibility using cranes/forklifts, with site safety method statements and inspection handover protocols.
- **Site Acceptance Inspection:** Organise a site inspection meeting after offloading on site. At this meeting, the gearboxes, motors, couplings and the required documentation will be inspected against the specifications in this contract, JW particular specification (enclosed) and the agreed to QCP.
- **Training**: Comprehensive operator and maintenance training sessions (on-site or at supplier facility), including detailed manuals, attendee certification, and follow-up support for a minimum of 3-6 months. The number of training attendees is at least 25 taken in at least two sessions.

3. LOCATION AND DELIVERY:

The service provider will be required to render services at the following address which is given in good faith and may change to suit JW's operational requirements.

Northern WWTW
William Nicol Ext
(R511+/- 8km north of Fourways)

Mr Dineo Majavu (Chairperson), Mr Ntshavheni Mukwevho (Managing Director and Executive Director),
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5 STATUTORY, REGULATORY AND OHSA REQUIREMENTS

The Service provider shall comply fully with:

- The Occupational Health and Safety Act, 85 of 1993, and all applicable regulations.
- Johannesburg Water's safety policies, procedures, and site rules.

4. RFP FORM AND PRICE SCHEDULES

To: Johannesburg Water (SOC) Ltd.

Having examined the RFP documents including Addenda Nos _____ [insert numbers], the receipt of which is hereby duly acknowledged, we, the undersigned, offer **Supply, delivery and offloading of 35 helical gearboxes and motors for Northern WWTW**
as specified in conformity with the said RFP documents and as may be ascertained in accordance with the Schedule of Prices attached herewith and made part of this RFP.

Details of my / our offer are / are as follows:

We undertake, if our RFP is accepted, to execute the contract in accordance with the requirements as specified.
We agree to abide by this RFP for a period of ninety (90) days from the date fixed for RFP opening, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

Until a formal Contract is prepared and executed, this RFP, together with your written acceptance thereof and your notification of award, shall constitute a binding Contract between us.

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We understand that Johannesburg Water is not bound to accept the lowest or any RFP it may receive, and that the contract may be awarded in whole or in part and to more than one bidder.

Should my/our RFP be successful, it be understood that a contract will come into existence as a once off contract which will commence from the date indicated in the letter of acceptance.

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PRICING INSTRUCTIONS

The Bidders must quote a single, all-inclusive price (excluding VAT) covering the manufacture, supply, factory acceptance test/inspection, insured delivery to site, 12-month warranty and offloading of all equipment, materials, and components as well as site acceptance inspection as specified in the Scope of Works, with Johannesburg Water assuming responsibility for all subsequent site installation, testing, commissioning, and related works with the support of the Supplier, if needed.

Prices must be clearly itemized in the Bill of Quantities (BoQ) must remain firm for the contract duration, and account for all risks, overheads, profit, and compliance with all the requirements, municipal by-laws, and SANS standards; no claims for variations will be entertained based on Bidder misunderstanding of the requirements.

All rates must be inclusive of every related cost, no exclusions allowed. RFPs quoting provisional or excluded items risk disqualification as per JW SCM policies. Specifically include:

Supply Costs: Manufacturing/fabrication of site-specific gearboxes (materials, OEM parts, custom adaptations per engineering drawings), quality certifications (ISO 9001, SANS compliance), warranties (min. 12-24 months), packaging for transport, and profit/overheads (10-15% typically).

Delivery Costs: Freight/haulage to Johannesburg Water sites (e.g., Northern Wastewater Treatment Works), insurance during transit, delivery notes, and compliance with road transport regs (e.g., abnormal load permits for heavy units >30 tonnes).

Offloading/Handling Costs: On-site unloading via contractor's cranes/forklifts, site access preparations (e.g., matting for soft ground), safety gear/PPE, waste removal (packaging), and handover inspections.

Associated Costs: Engineering approvals, meetings, document preparation, site surveys, motor interface adapters, painting/coatings (anti-corrosive for wastewater environment), and escalations.

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Training Costs: Operator and maintenance training sessions (on-site or at supplier facility), comprehensive manuals, certification of attendees, follow-up support (e.g., 3-6 months). The number of training attendees is at least 25 taken in at least two sessions.

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Evaluation process

The evaluation on price alteration will be conducted as follows:

- Where the RFP award strategy is to evaluate and award total bid offer, the following must apply:

  (i) If there is an alteration on the rate, total for the line item, sub-total/ sum brought/carried forward for the section but no alteration on the total bid offer, the bidder will not be disqualified.

  (ii) If there is an alteration on the total bid offer on form of offer, then the amount in words must be considered or vice-versa.

  (iii) If there is an unauthenticated alteration on the total bid offer is not authenticated the bidders will be disqualified for the entire RFP.

  Where the RFP pricing schedule or bill of quantities is requesting rates/price from bidder/s without providing a total, the following will apply:

  (i) If there is an unauthenticated alteration on the unit rate/price the bidder must be disqualified.

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Registration No. 2000/029271/30

Bidder to complete in full the Bill of Quantiles below:

Item No	Description	Unit	Quantity	Rate	Amount
1	**CONTRACTUAL AND OHS REQUIREMENTS**				
1.1	OHS file and compliance	Sum	1		
1.2	Other Contractual Requirements	Sum	1		
2	**SUPPLY, DELIVERY AND OFFLOADING OF HELICAL GEARBOX AND MOTOR UNITS AND ASSOCIATED FIXTURES**				
2.1	75kW helical gearbox and electric motor as per specifications c/w IEC motor interface adapter	No.	8		
2.2	90kW helical gearbox and electric motor as per specifications c/w IEC motor interface adapter	No.	10		
2.3	110kW helical gearbox and electric motor as per specifications c/w IEC motor interface adapter	No.	17		
2.4	75kW electric motor as per specifications	No.	8		
2.5	90kW electric motor as per specifications	No.	10		
2.6	110kW electric motor as per specifications	No.	17		
2.7	75kW motor-gearbox complete input coupling as per existing on site and specifications	No.	8		
2.8	90kW motor-gearbox complete input coupling as per existing on site and specifications	No.	10		
2.9	110kW motor-gearbox complete input coupling as per existing on site and specifications	No.	17		
2.10	75kW gearbox complete output coupling as per existing on site and specifications	No.	8		
2.11	90kW gearbox complete output coupling as per existing on site and specifications	No.	10		
2.12	110kW gearbox complete output coupling as per existing on site and specifications	No.	17		
2.13	Training of at least 25 JW personnel in at least 2 sessions	Sum	1		
	SUB TOTAL				
	15% VAT				
	TOTAL				

Signature of person authorized to sign this RFP (Pricing Schedule Sign-off):

Name: _____ **Signature:** _____

Date: _____

5. AWARD AND ALLOCATION STRATEGIES

5.1.1. Award Strategy

Contract is to be awarded to the highest scoring bidder.

5.1.2. Allocation Strategy

Work is to be allocated to the highest preference ranking bidder.

6. EVALUATION CRITERIA

6.1. EVALUATION PROCESS

RFP evaluation process to be as follows:

STAGE	DESCRIPTION
Stage 1	Mandatory evaluation
Stage 2	Administrative compliance evaluation
Stage 3	Price and preference evaluation

6.1.1. Stage 1: Mandatory evaluation

EVALUATION CRITERIA: (GATE KEEPERS)			
No	**CRITERIA**	**DOCUMENTARY EVIDENCE**	**YES/NO**
1	Attendance of Mandatory RFP Briefing Meeting		
2	Pricing Schedule is completed in full and signed		
3	Certified copy of a valid letter/certificate that the bidder has been approved by the gearbox Original Equipment Manufacturer (OEM) to supply/sell/distribute the industrial gearboxes that the bidder is offering. The letter/certificate must be in the OEM's letterhead **or** Certified copy of a valid letter/certificate that confirms that the bidder is a Subsidiary of the gearbox Original Equipment Manufacturer (OEM) of the gearboxes that the bidder is offering. The letter must also indicate the services the Subsidiary is allowed/authorised to offer of which must include the supply/sale/distribution of the industrial gearboxes The letter/certificate must be in		

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	the OEM's letterhead **NB: For each brand of gearbox offered under the Technical Datasheets a separate valid letter as outlined above is required.** For a bidder which is an Original Equipment Manufacturer (OEM) of the gearboxes that are offered, a certified copy of proof of equipment ownership is required to be submitted. An acceptable proof is only the Trademark Registration or Manufacturing Certificates of the offered gearboxes, which will be in the name of the bidder.	
4	Bidder fully completed all the technical datasheets, and all the offered units comply with the technical requirements and specifications as per the technical datasheets	
5	At least two (2) signed reference letters or completion certificates in respect of successful completion of projects related to scope of work, which is supply and delivery of gearboxes.	
6	Signed reference letters or completion certificates that confirms that the combined value of completed work in respect of item 5, above, have a minimal rand value of R20 million.	
7	Submitted a fully completed form in clause 1.8 of this document. The form serves to prove that site acquaintance visits were made, site conditions were verified and compatibility is assured. The form must have a signature of Johannesburg Water Site Technical Representative who was engaged during the visit(s).	

NB: Bidders that fail to comply with the above mandatory requirements will not be evaluated further.

NB: Unverifiable reference letters or completion certificates may result in disqualification of the bidder.

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6.1.2. Stage 2: Administrative evaluation

Price related MBD forms applicable for this RFP.

NO.	REFERENCE TORFP DOCUMENT	DESCRIPTION	REQUIREMENT
3.	CSD	Central Supplier Database Registration	Provide proof of CSD registration. Complete MAAA number on coverpage or copy of CSD report.
	MBD 4	Declaration of Interest	Complete and signed MBD 4 form
4.	MBD 5	Declaration of Procurement AboveR10m (All Applicable Taxes Included)	Complete and signed MBD 5 Form.
5.	MBD 6.1	Preference Points Claim in Terms ofThe Preferential Procurement Regulations 2022	Complete and signed MBD 6.1 Form.
6.	MBD 8	Declaration of Bidder's Past SupplyChain Management Practices	Complete and signed MBD 8 Form.
7.	MBD 9.	Certificate of Independent Bid Determination	Complete and signed MBD 9 Form.
8.	Annexure – Proof of Specific Goals	Refer to documents listed in 4.3 verification documents to be submittedwith the RFP document	Submit applicable documentation with theRFP submission

Johannesburg Water

Registration No. 2000/029271/30

CONTACTABLE REFERENCE

To Johannesburg Water (SOC) Ltd

I, the undersigned being duly authorized to do so, hereby furnish a reference to Johannesburg Water relative to the **Supply, delivery and offloading of 35 x helical gearboxes and motors, complete with associated fixtures/components for Northern WWTW**

Name of Bidder: ……

Description of Services provided in relation to scope of work

……

……

……

……

Duration: Year-Month-Day when the Goods / Services were provided……

Contract/Project Value: ……

Name of authorised person (Client): ……..

Signature: ……..……..Date ……..……

Telephone/Mobile: ……

Email: ……

Completed on behalf (Name of Client) ……

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

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Description of Services provided in relation to scope of work

……

……

……

……

Duration: Year-Month-Day when the Goods / Services were provided……

Contract/Project Value: …….

Name of authorised person (Client): ……..

Signature: ……..……..Date ……..……

Telephone/Mobile: ……

Email: ……..……

Completed on behalf (Name of Client) ……

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

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6.2. **Stage 3:** The responses will be evaluated on the **80/20 preference point's principle**. 80 Points Price and 20 Points Specific Goals. Pricing schedule to be completed fully by the bidder. Bidders who failure to quote or complete the pricing schedule as per this requirement will be disqualified.

The required proof for claiming points for specific goals is as follows:

The specific goals allocated points in terms of this RFP	**Number of points allocated (80/20 system)**	**Number of points claimed. (80/20 system) (To be completed by the Bidder)**
Business owned by 51% or more –Women	10	
SMME (EME or QSE) owned by 51% or more - Black People	10	
Total	**20**	

SPECIFIC GOALS – ANY ONE OR A COMBINATION OF ANY	**MEANS OF VERIFICATION THAT MUST BE SUBMITTED OR A COMBINATION THEREOF TO PROVIDE POINTS CLAIMED**
Business owned by 51% or more-Women	• Valid construction sector BBBEE Certificate issued by SANAS accredited verification agency or construction sector Affidavit sworn under oath, OR • CIPC registration document showing percentage of ownership and share certificate where applicable • ID copy

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SMME (EME or QSE) owned by 51% or more - Black People	• Valid construction sector BBBEE Certificate issued by SANAS accredited verification agency or construction sector Affidavit sworn under oath, OR • CIPC registration document showing percentage of ownership and share certificate where applicable • ID copy

Note: A Bidder failing to submit proof of specific goals claimed as per the RFP conditions may not be disqualified but only points for price will be allocated and zero points for specific goals.

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7. AWARDING STRATEGY

This request for pricing will be awarded to the highest scoring bidder in terms of price and points scored for specific goals.

8. RETURNABLE DOCUMENTS

The following documents **must** be returned together with this Request for Pricing:

8.1. This request for pricing document must be completed and submitted with pricing or quotation.

8.2. Proof of points claimed for specific goal must be submitted in order to qualify for Specific Goals points.

8.3. Complete and sign the following Municipal Bidding Documents (MBD).

8.3.1. MBD 3.1 Firm Price(s) Purchase

8.3.2. MBD 4 form (Declaration of Interest).

8.3.3. MBD 6.1 Form (Preference points claim form).

8.3.4. MBD 8 (Declaration of Bidder's Past Supply Chain Management Practices)

8.3.5. MBD 9 (Certificate of Independent Bid Determination).

8.4. Latest municipal account/statement not older than three months or valid lease agreement for both the company and all active Directors.

8.5. The required documentary evidence for functionality or technical evaluation (where Applicable).

9. GENERAL TERMS AND CONDITIONS

Price(s) quoted must be valid for ninety (90) days from date of your offer.

Price(s) quoted **must** be firm for the duration of the contract and must be exclusive of VAT.

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Bidders will be afforded a period of three (3) days to complete the following returnable documents (MBD 4, MBD 8 and MBD 9) in instances where such forms are incomplete.

Bidders who did not submit municipal statement of account or valid lease agreement for both the company and all active directors will be afforded a period of two (2) days to submit. In a case where the company or active Directors have municipal commitments overdue for more than 90 days they will be offered three (3) days to settle their overdue amounts or submit proof of an arrangement agreed to between that municipality and that company or Director.

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SPECIAL CONDITIONS

GENERAL **NB** The attention of the Bidder is drawn to the fact that "Conditions of a General Nature and General Conditions of Contract for the Supply and Delivery of Goods and Services" shall apply, where applicable, to this contract.

1. DEFINITIONS

1.1 That "Johannesburg Water (SOC) Ltd" shall herein after be referred to as "JW".

1.2 The "Managing Director" shall mean the Managing Director: Johannesburg Water (SOC) Ltd or his authorized representative.

1.3 "Vat" shall mean Value Added Tax in terms of the Value Added Tax Act 89 of 1991 as amended.

1.4 "WWTW" shall mean the Wastewater Treatment Works.

2.PRICE:

2.1 All prices shall exclude Value Added Tax at the standard rate as gazetted from time to time by the Minister of Finance in terms of the Value Added Tax Act 89 of 1991 as amended.

2.2 All price(s) offered shall include the cost of all rate of exchange insurances, services, labour, equipment, materials, transportation and be the net price after all discounts and settlement discount have been deducted. The net price/s shall be without any extra or additional charges to JW whatsoever.

2.3 All bidders shall indicate the applicable Rate of Exchange and shall give a breakdown of their RFP prices; stipulating the Imported Content of each Item.

2.4 The base rate of exchange (ROE) to calculate any adjustment will be based on that applicable (as published by the South African Reserve Bank) on closing date of the RFP.

e.g: 1 Euro = 15 South African Rands.

2.5 The bidders shall at his own cost, within twenty-one (21) days of the date of the written notification of acceptance of

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his RFP, obtain Forward Exchange cover from a bank approved by JW to safeguard himself against fluctuations in the rate of exchange of foreign currencies. The bidder shall then continue to purchase such Forward Exchange cover on a quarterly (three-monthly) basis, for the duration of the contract. All fluctuations between the offered prices based on the Rate of Exchange given in clause 2.4 and that of the price based on the Forward Exchange cover rates shall be for the account of the bidder.

3.SURETY BOND

3.1 No surety bond shall be required in terms of this contract.

4.COMPLIANCE WITH LEGISLATION AND SPECIFICATION:

4.1 The Contractor shall comply with all Municipal By-laws, and any other Laws, Regulations or Ordinances and shall give all notices and pay all fees required by the provisions of such By-laws and Regulations specified therein.

4.2 The Contractor shall comply with all the requirements prescribed in the specification.

5. EMPLOYMENT OF LABOUR:

5.1 The Contractor must ensure that all relevant legislation is complied with in the employment of labour.

5.2 The Contractor shall provide a dedicated technical team to JW on an as and when required basis at no extra cost to JW. This team will be required to monitor the performance of their product as well as technical assistance to JW where required.

6. INSURANCE AND INDEMNIFICA-TION:

6.1 In addition to any insurance required to be held by the Contractor in terms of the Contract in terms of the Occupational Injuries and Diseases Act no. 130 of 1993, the Contractor must be fully insured against all accidents, loss or damage arising out of the conditions or operation of the vehicles or execution of any work including all third-party risks. The Contractor hereby indemnifies and agrees to keep indemnified throughout the period of the contract JW against all claims by third parties or the Contractor's own employees resulting from the operations carried out by the Contractor under this contract.

6.2 A current certificate of good standing in terms of the Compensation for Occupational Injuries and Diseases Act must be furnished by the Contractor within 21 days of notification of acceptance of the RFP, but before any site

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work is performed including deliveries and offloading.

6.3 The Contractor shall be liable for any damages or injury of whatever nature caused directly or indirectly as a result of his operations, to any of JW's or Municipal Government or Private Property or to his own vehicles and personnel.

7. REMEDIES, BREACH, WHOLE AGREEMENT, WAIVER, VARIATION AND INDULGENCES:

7.1 If the Contractor or any person employed or associated with him or in the case of a Company, a Director or shareholder or person also associated with such Company, either directly or indirectly gives or offers to give any gratuity, reward or commission or other bribe to any person in the employ of JW this contract shall be avoidable at the instance of JW.

7.2 If the Contractor has not complied with the Managing Director's requirements or if he is in breach of any of the Conditions of this contract and:

7.2.1 fails to remedy such breach within 14 (fourteen) days of receipt of written notice requiring it to do so (or if not reasonably possible to remedy the breach within 14 (fourteen days), within such further period as may be reasonable in the circumstances, provided that the Contractor furnishes evidence within the period of 14 (fourteen) days reasonably satisfactory to JW, that it has taken whatever steps are available to it to commence remedying the breach), then the JW shall be entitled, without notice and in addition to any other remedy available to it at law or under this agreement, including obtaining an interdict, to cancel this agreement or to claim specific performance of any obligation whether or not the due date for performance has arrived, in either event without prejudice to JW's right to claim damages.

7.2.2 Should JW elect to cancel the contract then and in such instance a certificate presented by the Managing Director of JW shall constitute proof of the contractor's indebtedness to JW.

7.3 This agreement constitutes the entire agreement between the parties relating to the matter hereof.

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7.4 No amendment or consensual cancellation of this agreement or any provision or term hereof or of any agreement, bill of exchange or other document issued or executed pursuant to or in terms of this agreement and no settlement of any dispute arising under this agreement and no extension of the time, waiver or relaxation or suspension of any of the provisions or terms of this agreement or of any agreement, bill of exchange or other document issued pursuant to or in terms of this agreement shall be binding unless recorded in a written document signed by the parties. Any such extension, waiver or relaxation or suspension, which is so given or made, shall be strictly construed as relating to the matter in respect whereof it was made or given.

8. DISPUTES:

8.1 In the event of any dispute arising between JW and the Contractor in connection with or arising out of the contract, it shall be referred to the Managing Director of JW who shall state his decision in writing and give notice of the same to the Contractor within 28 days of the dispute having been submitted to the Managing Director of JW. Such decision shall be binding upon the Contractor subject to clause 9.2

8.2 Should the Contractor be dissatisfied with the decision of the Managing Director he/she may, within 28 days after receiving notice of such decision, require that the issue or issues be referred to a single arbitrator to be agreed upon between the parties or, failing agreement, to be nominated by the Chairman of the Association of Arbitrators and any such reference shall be deemed to be submission to the arbitration of a single arbitrator in terms of the Arbitration Act, 1965. The award of the arbitrator shall be final and binding on both parties.

8.3 Not later than one week after receipt of notice calling for arbitration, JW may give notice to the Contractor that the dispute or disputes be settled by Court of Law having jurisdiction.

9. SCOPE OF WORK:

9.1 The Contractor shall be required to supply, deliver and offload 35 helical gearboxes, motors and associated fixtures as per specification in this document.

9.1.1 The bidder will be required to complete an assessment on the existing equipment to verify

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the mounting dimensions and interfaces requirements before making an offer and supplying the gearboxes and motors.

9.1.2 An Authorised JW Representative will issue the Contractor with a Purchase Order / Purchase Instruction detailing the scope of works that must be undertaken.

9.1.3 For site tasks, the Bidder's personnel will be required to complete a daily time sheet which shall be required to be signed by the JW Representative at the start and end of each day.

9..4 After completion of Works, the Contractor is required to submit O&M manuals of the equipment supplied. The O&M manuals contents will be agreed to with JW beforehand.

10. PAYMENT:

10.1 Payment on this contract will be as follows:

10.1.1 The Contractor is required to submit a comprehensive invoice. Copies of signed delivery notes and QCP's for all items claimed for shall be attached to the Contractor's Invoice. Failure to provide these documents will result in non-payment of the invoices.

10.1.2 Invoices must be submitted within 7 days from the date of delivery of the repaired equipment to JW.

10.1.3 The contractor shall submit by the invoice for work done to the relevant JW site for which services were rendered for. Payment will be based on the invoices subject to any adjustment by the JW Representative in respect of errors, downtime, penalties or any other claim that 'JW' may have in respect of this contract.

10.1.4 Payment will be made within approximately 30 days from the Regional Maintenance Manager approving the invoice.

10.1.5 Invoices for payment must be submitted under the contractor's name.

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11. WARRANTY:

11.1 The provisions of this contract shall be subject to the warranties that apply to new equipment supplied by the contractor. Therefore, if the rectification of a defect in these assets or the replacement of a part is covered by warranty, such rectification/replacement shall be done at no cost to JW.

11.2 The warranty period referred herein clause 11.1 above, will be for a period of at least twelve (12) months from the time that the equipment has been delivered to JW's site and accepted by JW in a form of a QCP.

12. REPLACEMENT OF EQUIPMENT:

12.1 In the event that any machinery supplied or deployed by the Contractor becomes defective or unserviceable while under the warranty, the Contractor shall, at its own cost, replace such faulty machinery within three (3) days of notification or within a period agreed to between the Contractor and JW for items with longer lead times. The replacement machinery shall be of the same type, capacity, and technical specification, or better, and shall be acceptable to the Employer (JW). A comprehensive technical failure report shall be compiled by the Contractor and sent to JW within ten (10) working days.

13. DURATION:

13.1 The tenure of the contract shall be with effect from the date of signing the contract for a period of six (6) months.

14. QUANTITIES:

14.1 The required quantities are given in the BoQ. However, the quantities are all re-measurable and not fixed and may be decreased or increased by JW as per the needs at the time of implementation.

15. DAMAGED GOODS

15.1 Any stock items ordered, which in the opinion of JW are deemed to be damaged, whether in transit, offloading or stacking, will be the total responsibility of the Contractor and will not be accepted on site.

16. PLACE AND TIME OF DELIVERIES:

16.1 Delivery shall be made to any of the WWTW operated by JW and during normal working hours, Monday to Friday 07:30 hours to 15:30 hours.

16.2 The delivery and offloading of the gearboxes and motors must be done at the locations prescribed below, to the satisfaction of Johannesburg Water (JW).:

Northern Works: Situated 35 km north of Johannesburg on

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Provincial Road P79-1 from Johannesburg to Hartebeespoort Dam.

17. RFP VALIDITY:

17.1 The RFP shall be valid for a period of 90 days from the date of closing of RFPs.

18. ADJUDICATION OF RFPS:

18.1 The highest, lowest or any RFP will not necessarily be accepted by JW.
JW reserves the right to adjudicate the RFP to JW's best interest and it is not necessarily intended to award the Contract to only one Contractor. The scope of may be split between Contractors.

19. ACCEPTANCE OF RFP:

19.1 A valid and binding contract shall be concluded at the time that the Contractor signs an official Contract Document at the offices of JW after the Contractor is in possession of the letter of acceptance.

20. PENALTIES FOR DEFECTIVE QUALITY:

20.1 Should the quality of work, performance requirement, or acceptance criterion be falling outside the tolerances specified in the approved scope of work, specifications, or contractual requirements, Johannesburg Water (JW) reserves the right to impose penalties as follows:

The invoiced amount for the order, or the affected portion of the works in which the substandard quality was identified, shall be reduced by twenty-five percent (25%), exclusive of VAT.

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21. PENALTIES FOR DELIVERIES

21.1 If the Contractor fails to deliver the required full scope by the due date, a penalty of 1 (one) per cent of the total current order value of the contract for each day's delay in delivery of the scope shall be applied.

21.2 No liability in terms of Clause 21.1 shall attach to the Contractor if he shall prove to the satisfaction of the Regional Maintenance Manager \ Duly their authorised representative that the delivery has been delayed or become impossible due to fire, war, riot, strikes, act of God, lockout, accident or other unforeseen occurrence or circumstances beyond the Contractor's control, provided,

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however, that in all cases the Contractor has notified Johannesburg Water in writing within 24 (twenty-four) hours of it first coming to the Contractor's notice, that delivery will be delayed or become impossible for the abovementioned reasons.

21.3 Due to the nature of JW's license conditions for operating the various JW Wastewater Treatment works, should the Contractor supply JW with poor quality products or should the product supplied fail to comply with the JW technical specifications during the tenure of the contract, JW may immediately terminate the contract.

21.4 Where the contract is terminated as referred to herein clause 21.3 above, JW may request the services of the alternative recommended Bidder.

22. ADDITIONAL INFORMATION

22.1 Any additional information may be obtained from Thabiso Thabeng on 011 510 2602 or email thabiso.thabeng@jwater.co.za

23. NOTICE

23.1 Any notice or communication required or permitted to be given in terms of this agreement shall be valid and effective only if in writing and may be given in one or more of the following manners: -

23.1.1 Sent by prepaid registered post (by airmail if appropriate) in an envelope correctly addressed to it at an address chosen as its *domicilium citandi et executandi* to which post it is delivered, in which event such notice shall be deemed to have been received on the 7th (seventh) business day after posting (unless the contrary is proved); or

23.1.2 Delivered by hand to a responsible person during ordinary business hours at the physical address chosen as its *domicilium citandi et executandi,* in which event such notice shall be deemed to have been received on the day of delivery; or

23.1.3 Sent by telefax to its chosen telefax number stipulated in 16.1, in which event such notice shall be deemed to have been received on the date of dispatch (unless the contrary is proved).

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23.2 notwithstanding anything to the contrary herein contained a written notice or communication actually received by a party shall be adequate written notice or communication to it notwithstanding that it was not sent to or delivered at its *domicilium citandi et executandi.*

PART B
TERMS AND CONDITIONS FOR BIDDING

1. BID SUBMISSION:
1.1. BIDS MUST BE SUBMITTED BY THE STIPULATED TIME . LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION
1.2. **ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED–(NOT TO BE RE-TYPED) OR ONLINE**
1.3. THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2022, THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.
2. TAX COMPLIANCE REQUIREMENTS
2.1 BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.
2.2 BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VIEW THE TAXPAYER'S PROFILE AND TAX STATUS.
2.3 APPLICATION FOR THE TAX COMPLIANCE STATUS (TCS) CERTIFICATE OR PIN MAY ALSO BE MADE VIA E-FILING. IN ORDER TO USE THIS PROVISION, TAXPAYERS WILL NEED TO REGISTER WITH SARS AS E-FILERS THROUGH THE WEBSITE WWW.SARS.GOV.ZA.
2.4 FOREIGN SUPPLIERS MUST COMPLETE THE PRE-AWARD QUESTIONNAIRE IN PART B:3.
2.5 BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.
2.6 IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.
2.7 WHERE NO TCS IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.
3. QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS
3.1. IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)? ☐ YES ☐ NO

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3.2. DOES THE ENTITY HAVE A BRANCH IN THE RSA?
☐ YES ☐ NO

3.3. DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA?
☐ YES ☐ NO

3.4. DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?
☐ YES ☐ NO

3.5. IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION?
☐ YES ☐ NO

IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 ABOVE.

GENERAL CONDITIONS OF CONTRACT (GCC) WILL BE APPLICABLE TO THIS RFP.

NB: FAILURE TO PROVIDE ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID.

SIGNATURE OF BIDDER: ……

CAPACITY UNDER WHICH THIS BID IS SIGNED: ……

DATE: ……

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PRICING SCHEDULE – FIRM PRICES (PURCHASES)

NOTE: ONLY FIRM PRICES WILL BE ACCEPTED. NON-FIRM PRICES (INCLUDING PRICES SUBJECT TO RATES OF EXCHANGE VARIATIONS) WILL NOT BE CONSIDERED

Name of Bidder……	Bid Number……...
Closing Time ……. …..	Closing Date ……..

OFFER TO BE VALID FOR……DAYS FROM THE CLOSING DATE OF BID.

- Required by: …Johannesburg Water……
- At: …Various JW sites…….
- Brand and Model …….
- Country of Origin …….

Note: All delivery costs must be included in the bid price, for delivery at the prescribed destination.

** “all applicable taxes” includes value- added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies.

*Delete if not applicable

MBD 4

DECLARATION OF INTEREST

1. No bid will be accepted from persons in the service of the state[1].

2. Any person, having a kinship with persons in the service of the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to persons in service of the state, it is required that the bidder or their authorised representative declare their position in relation to the evaluating/adjudicating authority.

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

3.1 Full Name of bidder or his or her representative:……..

3.2 Identity Number: …….

3.3 Position occupied in the Company (director, trustee, hareholder[2]):……..

3.4 Company Registration Number: …….

3.5 Tax Reference Number:……

3.6 VAT Registration Number: ……

3.7 The names of all directors / trustees / shareholders members, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below.

3.8 Are you presently in the service of the state? **YES / NO**

3.8.1 If yes, furnish particulars. ……

……..

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

(a) a member of –
  (i) any municipal council;
  (ii) any provincial legislature; or
  (iii) the national Assembly or the national Council of provinces;

(b) a member of the board of directors of any municipal entity;
(c) an official of any municipality or municipal entity;
(d) an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999);
(e) a member of the accounting authority of any national or provincial public entity; or
(f) an employee of Parliament or a provincial legislature.

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

3.9 Have you been in the service of the state for the past twelve months? ……**YES / NO**

3.9.1 If yes, furnish particulars.……..……..

…….

3.10 Do you have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid? …… **YES / NO**

3.10.1 If yes, furnish particulars.
……
……

3.11 Are you, aware of any relationship (family, friend, other) between any other bidder and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

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

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

3.12.1 If yes, furnish particulars.
……
……

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

3.13.1 If yes, furnish particulars.
……
……

3.14 *Do you or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract. **YES / NO**

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

**Tenderers are encouraged to truthfully declare all other company interests they may have, with specific reference to Question 3.14, of which if not fully completed, might lead to disqualification. Tenderers are encouraged to utilise the CIPC bizportal*

(www.bizportal.gov.za) , free registration to check the companies for which a director is a director for. This can be done by inserting an ID number for the director tendering and the portal will show all companies, whether active or not.

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

Full Name	Identity Number	State Employee Number

…….. ……..

Signature **Date**

…… ……

Capacity **Name of Bidder**

DECLARATION FOR PROCUREMENT ABOVE R10 MILLION (VAT INCLUDED)

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

*1 Are you by law required to prepare annual financial statements for auditing? **YES / NO**

**In the event the Annual Financial Statements submitted with this tender reflect that the tenderer is not required by law to have such statement audited, Johannesburg Water reserves the discretion to interpret your selection of "Yes" as a "No" and analyse it accordingly.*

1.1 If yes, submit audited annual financial statements for the past three years or since the date of establishment if established during the past three years. **YES / NO**

……

……

2. If the bidder is not required by law to prepare annual financial statements for auditing, they shall be required to furnish their Annual Financial Statements -

i.for the past three years , or
ii. since their establishment if established during the past three years

3. Do you have any outstanding undisputed commitments for municipal services towards a municipality or any other service provider in respect of which payment is overdue for more than 30 days? **YES / NO**

3.1 If no, this serves to certify that the bidder has no undisputed commitments for municipal services towards a municipality or other service provider in respect of which payment is overdue for more than 30 days.

3.2 If yes, provide particulars.

……

4. Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract?

4.1 If yes, furnish particulars

……

……

5. Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality / municipal entity is expected to be transferred out of the Republic? **YES / NO**

5.1 If yes, furnish particulars

……..

……..

CERTIFICATION

I, THE UNDERSIGNED (NAME) ……

CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS CORRECT.

I ACCEPT THAT THE STATE MAY ACT AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

…….. ……..
Signature Date

…… …….
Position Name of Bidder

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 below 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 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
PRICE	80
SPECIFIC GOALS	20
Total points for Price and SPECIFIC GOALS	**100**

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

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

preferences, in any manner required by the organ of state.

2. DEFINITIONS

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

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1 POINTS AWARDED FOR PRICE

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

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

80/20

$$Ps = 80\left(1 - \frac{Pt - P\,min}{P\,min}\right)$$

Where

Ps = Points scored for price of tender under consideration

Pt = Price of tender under consideration

Pmin = Price of lowest acceptable tender

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)**	**Number of points claimed (80/20 system) (To be completed by the tenderer)**
SMME (An EME or QSE) 51% or more Black owned	10	
Business owned by 51% or more –Women	10	
Total	**20**	

5. **DECLARATION WITH REGARD TO COMPANY/FIRM**

5.1 Name of company/firm…….

5.2 Company registration number: ……...

5.3 TYPE OF COMPANY/ FIRM

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

[TICK APPLICABLE BOX]

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

i) The information furnished is true and correct;

ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;

iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;

iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –

(a) disqualify the person from the tendering process;

(b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;

(c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;

(d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and

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

.....

SIGNATURE(S) OF TENDERER(S)

SURNAME AND NAME: .....

DATE: .....

ADDRESS: .....

.....

.....

.....

DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

1 This Municipal Bidding Document must form part of all bids invited.

2 It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.

3 The bid of any bidder may be rejected if that bidder, or any of its directors have:

a. abused the municipality's / municipal entity's supply chain management system or committed any improper conduct in relation to such system;
b. been convicted for fraud or corruption during the past five years;
c. willfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years; or
d. been listed in the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004).

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

Item	Question	Yes	No
4.1	Is the bidder or any of its directors listed on the National Treasury's Database of Restricted Suppliers as companies or persons prohibited from doing business with the public sector? (Companies or persons who are listed on this Database were informed in writing of this restriction by the Accounting Officer/Authority of the institution that imposed the restriction after the *audi alteram partem* rule was applied). **The Database of Restricted Suppliers now resides on the National Treasury's website(**www.treasury.gov.za**) and can be accessed by clicking on its link at the bottom of the home page.**	Yes ☐	No ☐
4.1.1	If so, furnish particulars:		
4.2	Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)? **The Register for Tender Defaulters can be accessed on the National Treasury's website (www.treasury.gov.za) by clicking on its link at the bottom of the home page.**	Yes ☐	No ☐
4.2.1	If so, furnish particulars:		
4.3	Was the bidder or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes ☐	No ☐

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

CERTIFICATION

I, THE UNDERSIGNED (FULL NAME) ……..……..…… CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM TRUE AND CORRECT.

I ACCEPT THAT, IN ADDITION TO CANCELLATION OF A CONTRACT, ACTION MAY BE TAKEN AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

……... **……..**
Signature **Date**

……. **……..**
Position **Name of Bidder**

MBD 9

CERTIFICATE OF INDEPENDENT BID DETERMINATION

1 This Municipal Bidding Document (MBD) must form part of all bids[1] invited.

2 Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging).[2] Collusive bidding is a *pe se* prohibition meaning that it cannot be justified under any grounds.

3 Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:

a. take all reasonable steps to prevent such abuse;

b. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and

c. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.

4 This MBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of bid-rigging.

5 In order to give effect to the above, the attached Certificate of Bid Determination (MBD 9) must be completed and submitted with the bid:

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

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

MBD 9

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

_____

(Bid Number and Description)

in response to the invitation for the bid made by:

_____

(Name of Municipality / Municipal Entity)

do hereby make the following statements that I certify to be true and complete in every respect:

I certify, on behalf of:_____that:

(Name of Bidder)

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

    (a) has been requested to submit a bid in response to this bid invitation;
    (b) could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and
    (c) provides the same goods and services as the bidder and/or is in the same line of business as the bidder

6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium[3] will not be construed as collusive bidding.
7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
    (a) prices;
    (b) geographical area where product or service will be rendered (market allocation)
    (c) methods, factors or formulas used to calculate prices;
    (d) the intention or decision to submit or not to submit, a bid;
    (e) the submission of a bid which does not meet the specifications and conditions of the bid; or
    (f) bidding with the intention not to win the bid.
8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this bid invitation relates.
9. The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.

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

10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

……	……
Signature	Date
…….	……
Position	Name of Bidder

Js9141w 4

JOHANNESBURG WATER (SOC) Ltd.

BULK WASTEWATER

PARTICULAR SPECIFICATION

E01 : ELECTRICAL MOTORS

Johannesburg Water

Johannesburg Water (SOC) Ltd.
PO Box 61542
Marshalltown
2107

Revision 4

August 2019

City of Johannesburg
Johannesburg Water (SOC) Ltd

DOCUMENT CONTROL SHEET

Document Title: **Particular Specification – E01 : Electrical Motors**

JW Reference: **BWW523C**

Document Ref. No: **E01**

DOCUMENT APPROVAL

ACTION	FUNCTION	NAME	DATE	SIGNATURE
Prepared	Senior Electrical Engineer	B Pieterse	August 2019	
Reviewed	Director	R Baard	August 2019	
Approved	Regional Maintenance Manager	T Thabeng	August 2019	

RECORD OF REVISIONS

Date	Revision	Author	Comments
4	2019-08-20	B Pieterse	Review of Electrical Standards, plus New Design Guidance
3	2014-06-03		Review of Mechanical / Electrical and Control / Instrumentation Standards, plus New Design Guidance
2	2012-05-30		Review of Mechanical / Electrical and Control / Instrumentation Standards, plus New Design Guidance
1	2009-05-12		Review of Mechanical / Electrical and Control / Instrumentation Standards, plus New Design Guidance

PARTICULAR SPECIFICATION: VOLUME E01: ELECTRICAL MOTORS

CONTENTS

E01.1 SCOPE

This specification shall cover all electric motors to be designed, supplied installed and tested that shall drive any of the items of equipment to be supplied under the contract. This specification shall be read together with those specifying the mechanical driven equipment.

E01.2 INTERPRETATIONS

E01.2.1 Abbreviations

In this Specification, the following abbreviations will apply:

ANSI : American National Standards Institute
ASTM : American Society for Testing and Materials
BS : British Standards Institution
SANS : South African National Standards

E01.2.2 Standards

The latest edition, including all amendments to until the date of tender, of the following particular national and international specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

(a) SANS 1804-2 : Low-voltage three-phase standard motors

(b) SANS 60529 : Degrees of protection provided by enclosures (IP code)

(c) SANS 60034 : Rotating electrical machines

(d) BS 1486-2 : Heavy duty lubricating nipples

(e) SANS 60034-1 : Rotating electrical machines Part 1: Rating and performance

(f) ISO 281 : Rolling bearings - dynamic load ratings and rating life

E01.3 GENERAL REQUIREMENTS

(a) Electric motors shall be manufactured in South Africa and shall comply with the requirements of SANS 1804-2.

(b) Imported motors shall be accepted only if they form an integral part of the equipment offered. Where imported motors are offered they shall be submitted to the South African Bureau of Standards to be tested in accordance with the requirements of SANS 1804-2.

(c) The Engineer shall be provided with the appropriate certificates obtained from the South African National Standards stating that such motors do comply, prior with the installation of the motors. However, where tests reveal that motors do not comply, it shall be the responsibility of the Contractor to supply alternative motors that comply with the requirements of SANS 1804-2.

(d) Where imported motors are not normally kept in stock in South Africa, written proof shall be provided of the availability of replacement parts as well as the delivery period of the parts after placing the orders.

(e) All motors shall be standard catalogue models and shall be readily available.

(f) All motors shall where possible, be from the same manufacturer and shall have the same interchangeable frames. Variations in type and size shall, where possible, be limited to prevent stocking a variety of special spares.

(g) All motors shall be wound for direct-on-line (DOL) type of starting.

E01.4 WORKING VOLTAGE AND SUPPLY SYSTEMS

(a) The motors shall be capable of operating within ± 10% of the nominal supply voltage without risk of damage. All motors shall be suitable for operating continuously at the specified 3-phase voltage system under actual service conditions, including the ± 10% voltage tolerance, without exceeding the specified temperature rise determined by the resistance on a basic full load heat run.

(b) All motors shall be capable of operating continuously under actual service conditions at any supply frequency between 48 and 51 Hz together with any voltage between ± 5% of the nominal supply voltage.

(c) The slip-in speed of any motor at 80 percent of the nominal voltage at 50Hz shall not exceed a percentage agreed on by the engineer, and the motors shall be capable of operating at this voltage for a period of five minutes without deleterious heating.

E01.5 TEMPERATURE RISE

The temperature rise, as determined by resistance, of all motors, shall not exceed the following derated values:

Insulation class	E	B	F	H
Temperature rise (K)	50	60	80	100

E01.6 EFFICIENCY AND POWER FACTOR

(a) All motors supplied will be energy-efficient as described in SANS 60034-31: Selection of energy-efficient motors

(b) The efficiency of all motors shall be guaranteed by the contractor. Deviations from the guaranteed efficiency shall be within the limits specified in SANS 1804-2.

(c) The guaranteed efficiency of each motor size and rating shall be as determined in accordance with SANS 60034. A basic test certificate of efficiency will be accepted for a motor of identical size and rating or a basic test of efficiency shall be conducted if no certificate is available.

(d) The power factor of motors with a capacity of 20 kW or more shall not be less than 0,85 under all operating conditions.

E01.7 VIBRATION

(a) Motors shall be statically and dynamically balanced.

(b) All motors shall be checked for inadvertent vibration without load, and at full rated voltage at the manufacturer's works, and the vibration amplitude as measured shall be in accordance with SANS 60034-1.

(c) The ratio of axial to radial vibration shall not exceed 0,5.

E01.8 NOISE LEVEL

Unless specified differently all motors shall be of 'normal sound power', in compliance with SANS 60034.

E01.9 ENCLOSURE AND FRAME

(a) Each motor shall be ingress protected to the degree required by its application, and its enclosure shall be designed for the system of cooling associated therewith.

(b) Notwithstanding the requirements above, the minimum degree of protection shall be IP 55 to SANS 60529, or alternatively specified. Motors shall preferably be of the totally enclosed fan-cooled (TEFC) type.

(c) The motor cooling system must be of an aerodynamic design with minimal noise levels and superb airflow distribution over the frame with superior mechanical strength. All motor

cooling fan covers will be constructed in metal.

(d) All motors of the vertical-spindle type and exposed to the weather, shall be provided with a robust canopy of approved design by the Engineer.

E01.10 MOTOR TYPE

Motors shall be of the squirrel-cage induction type. Slip-ring induction motors or other approved types will be considered if the contractor is of the opinion that better results could be obtained by using such motors. Full electrical and mechanical details of each alternative shall be submitted with the tender documents. Alternative motors must be accepted by the Engineer in writing.

When motors are connected to VFD's with variable torque loads operated under usual service conditions, inverter-ready general-purpose motors must be supplied (IEC 60034-1)

When motors are connected to VFD's operating at extremely low speeds and/or with a constant torque load, or when operating over base speed, definite-purpose, inverter-duty motors must be supplied (IEC 60034-1).

Larger inverter-duty motors must be equipped with a constant speed auxiliary blower to provide adequate cooling at low motor operating speeds. The contractor must submit a statement from the motor supplier on the need for an auxiliary blower when omitted.

Inverter-duty motors above the 500 frame size should have both bearings insulated, and be equipped with a shaft grounding brush with a ground strap from the motor to the drive case. For frame sizes below 500, the contractor must check with the motor manufacturer regarding requirements for motor bearing insulation.

E01.11 RATING AND STARTING REQUIREMENTS

(a) Motors shall be adequately rated for the service for which they are intended, and due allowance shall be made for the temperature, altitude, climatic conditions and variations in the supply voltage. Motors shall not exceed 120% of the required capacity without prior approval from the Engineer.

(b) Not only shall motors be based on the full load requirements, but also the motor capacity and starting characteristics shall be compatible with the requirements of the driven equipment.

(c) Where motors are required to drive high inertia loads, the starting torque of the motor and the torque curve of the driven load shall be submitted to the Engineer for approval prior to manufacture. Such motors shall be capable of at least three starts per hour, with two consecutive starts from normal operating temperature, or more frequently if required by the Engineer.

(d) Motors shall be of the continuously running duty class S1 unless otherwise specified in the detailed specification or if a more onerous duty is dictated by the drive requirement.

(e) All squirrel-cage induction motors shall be suitable for direct on line starting at full voltage. Single-speed motors shall conform to SANS 60034-12, Design B characteristics unless approved by or dictated by the drive requirements.

(f) Unless otherwise approved, the 15% tolerance on locked-rotor torque permitted by SANS 60034-1 will not be accepted and shall be limited to 10%.

(g) Documentation shall include performance curves to suit the designed working conditions.

(h) When making a selection of the motor size for driven equipment, motor power shall be over-rated by a factor of thirty percent (30%) more than the demand of the driven equipment.

E01.12 BEARINGS

(a) All motors shall, wherever possible, be provided with pre-lubricated sealed bearings.

(b) Re-greasable bearings shall require only one lubrication per year. Grease lubrication of ball or roller bearings, where approved, shall be by means of hexagonal button-type grease

nipples to BS 1486- 2, Nos. 21A or 21B (industrial type).

(c) Grease-lubricated bearings shall have relief holes to ensure that the bearings have been correctly packed, which holes shall be positioned so that the excess grease can be easily removed. Cups shall be fitted to contain excess grease.

(d) Bearings shall be protected against eddy currents and shall be capable of withstanding vibrations caused by unbalanced loads.

(e) All bearings shall be designed for a minimum L_{10h}, basic life rating of 50 000 hours at the rated load and speed for the application in accordance with ISO 281.

E01.13 EARTHING

All motors shall be provided with a machined or spot-faced boss earth point, tapped to receive a bolt of not less than 10 mm in diameter for earthing purposes. This earth point must be located on one side of the motor, between the mounting feet.

A protective earth cable must be installed between the MCC earth bar and the motor earth point, sized in accordance with SANS1042-1.

Earth bonding must be installed between the motor frame and the motor support structure as well as the cable support structure.

E01.14 HEATERS AND DRAINAGE

Non-submersible motors that will be located outdoors or in a damp location such as in a drainage sump shall be provided with suitable means of drainage to prevent the accumulation of water due to condensation. They shall also be fitted with anti-condensation heaters suitable for a 220V AC supply if considered advisable by the manufacturer.

All motors shall be supplied with anti-condensation heaters (220V AC supply) to keep the motor temperature at 23°C when the motor is not operational to prevent moisture from condensing in the motor unless specified otherwise.

Heater terminal boxes shall be fitted on the motor frame and shall be of robust design, liberally sized and complete with suitable terminal block and mechanical cable gland or conduit entry.

E01.15 TERMINAL ARRANGEMENTS

(a) All motor terminal boxes must be oversized to fit a cable one size bigger than the standard cable as a minimum

(b) The terminal box must be installed with an OME supplied seal between the terminal box and the motor chassis

(c) Motor cable termination blocks must confirm to the IEC 60034-1 standard

(d) The line connections of each motor shall be brought out to a terminal box located in an approved position. In the case of two-speed motors, separate terminal boxes shall be provided for each speed.

(e) Terminal boxes shall be of the totally enclosed type designed to exclude the ingress of dust and moisture and sealed from the internal circuit of the motor, and shall be manufactured from sand-cast metal. The wall thickness of the terminal boxes and the dimension of the cable inlet shall be as specified in SANS 1804-2. The terminal box shall be so designed that the cable entry may be made in any one of four positions placed at right angles to one another.

(f) Winding termination in the motor terminal boxes shall be properly secured or fastened to avoid hot connections during operation.

(g) Terminal boxes shall be of ample size to allow the cable to be terminated in the box. Under no circumstances shall the cable be allowed to be in contact with the inside of the box or lid.

(h) Terminals shall be of a substantial design and shall be suited to receive cable lugs. Pinch-screw connections will not be accepted.

(i) The terminal arrangement shall permit the motor to be disconnected from its supply cable without damaging the cable tails and shall allow the supply cable and motor windings to be tested separately.

(j) The electrical clearance and creepage distances, with the correct cable terminations in position, shall comply with the requirements of SANS 60034.

(k) Terminal markings shall be clear and permanent. Irrespective of the direction of rotation required on the site, the connections shall be such that, when the supply leads L1 - L2 - L3 are connected to the motor terminals U - V - W respectively, the motor shall rotate in a clockwise direction when viewed from the driving end.

(l) Motors suited for only one-directional rotation, shall be clearly marked as such by an arrow fixed to the motor frame at the driving end.

(m) Before the contractor orders terminal boxes for electrical equipment, he shall supply details of the proposed boxes to the engineer for approval. These precautions are necessary to ensure that the size of the connecting blocks installed is sufficient to accommodate the cables supplied and connected by another contractor, and that sufficient space exists within the box to route cables conveniently.

E01.16 MOTOR/LOAD COUPLING

(a) Motors shall be coupled direct to the equipment to be driven by means of approved couplings and/or gearboxes unless specified differently. Refer to the relevant sections for specific specifications on transmission couplings and gearboxes. Vee-belt and chain drives will be considered only if direct coupling of the motor to the equipment is impossible or impractical.

Motors driving vee-belt or chain drives shall be fitted with heavy-duty bearings suited to the full side thrust at 120% of full load torque and short-term overloads of up to 250% of the full load torques during starting. The stiffness of the rotor shaft shall be checked to ensure that resonance and fatigue do not occur.

(b) Where applicable, the flanges of the motors and equipment shall be identical.

(c) The precision tolerance class shall apply to all flange-mounted motors with regard to concentricity, perpendicularity and shaft run-out.

E01.17 INFORMATION PLATES FOR MOTORS

In addition to the information required by SABS 948-1the following shall also be marked on the nameplates:

(a) Year of manufacture,

(b) The order number,

(c) Total mass of motor in kilogram,

(d) Diagram indicating the number, type and positions of heaters and temperature detectors if applicable,

(e) Bearing types and sizes, and

(f) Bearing grease interval or bearing replacement interval where pre-packed bearings are used.

E01.18 ADDITIONAL SPECIFICATIONS FOR TWO-SPEED MOTORS

The following additional specifications apply to all two-speed motors:

(a) Terminal markings shall be as per SANS 1804-2.

(b) The starting current shall not exceed six times the full load current of the high-speed rating.

E01.19 SUBMERSIBLE MOTORS

The following additional requirements apply specifically to all submersible motors:

All submersible motors shall be suited for submersion up to a depth of 1,5 times the depth of submersion shown on the drawings for each application, or as specified in the detail specifications.

All submersible motors shall have dynamically balanced rotors supported by maintenance-free, sealed-for-life ball bearings.

All motors shall be suitably coated to ensure the satisfactory operation of the motor under the specified class of service.

All terminal boxes shall be waterproof and suited for submersion up to the depth as specified for the motors.

An adequate length of waterproof cable, purpose-made for submersion, shall be supplied with each submersible motor. The coupling of this cable to the normal power-distribution cable, which usually is of the PVC type with steel-wire armour, shall be placed at least 1 m above the maximum water level by means of a purpose-made, weatherproof, outdoor junction box. The submerged cable shall be supported to minimize any movement of the cable, which results from turbulence caused by the operation of the equipment or the flow of the water.

Thermistor protection temperature switches shall be provided for submersible motors.

Seal monitors shall be provided for submersible motors, together with the required seal monitor relays. The cost for the seal monitor relays shall be deemed included in the rates tendered for the equipment.

E01.20 ADDITIONAL REQUIREMENTS

(a) The rotation speed of motors shall not exceed 1 500 rpm unless approved by the Engineer.

(b) Thermistor protection shall be provided for each winding of each motor. Motors rated below 22kW shall have no thermistor and heater protection devices installed on them. Motor rated 22kW and above shall have both thermistor and heater protection devices installed on them.

(c) Motors below 55kW shall be started by the DOL type method of starting. Motors including 55kW and above shall be started by the softer-starter type method of starting.

(d) A separate thermistor and heater terminal box shall be fitted on the motor frame next to the power terminal box and shall be of robust design, liberally sized and complete with suitable terminal block and mechanical cable gland or conduit entry.

(e) The minimum preferred class of insulation is Class F, derated in accordance with the relevant clause above.

E01.21 TECHNICAL DATA SHEETS

Details of all individual electric machines and equipment requiring electrical energy shall be indicated on the technical data sheet provided for in the tender Schedules (included in the technical data sheets.

E01.22 TESTING

Tests on completion (commissioning tests) shall be performed as described below in this specification.

E01.22.1 Performance Tests

(a) One motor of every type shall be tested for temperature rise and excess torque. Type test certificates on identical motors will be acceptable in lieu of these tests. Should type test certificates not be available, the first motor of each size manufactured shall be tested. All tests shall be in accordance with SANS 60034.

(b) The measurement of the temperature rise of the stator windings of motors for use on voltages up to 1 000 volts shall be by the increase in resistance method as is now permitted by SANS 60034.

E01.22.2 Routine Tests

(a) Each motor shall be tested at the manufacturer's works for light-run, locked rotor, insulation resistance, high voltage, air-gap clearances and Tan Delta on each complete stator.

(b) All tests shall be in accordance with SANS 60034.

E01.22.3 Test Certificates

(a) Four copies of all test certificates, showing the results of all tests performed, shall be supplied at a date not later than the delivery date of the motors.

(b) The test certificates shall contain power factor and efficiency figures for 125%, 100%, 75%, 50% and 25% of full load conditions as calculated from the test results.

E01.22.4 Witnessing of Tests

All type and routine tests on motors larger than 45 kW shall be witnessed by the Engineer.

E01.22.5 Testing of Terminal Box Assembly

(a) Proof shall be given to show that a prototype terminal and cable box assembly of the type being supplied on medium voltage motors has been tested under internal short-circuit conditions and that the pressure relief diaphragm ruptured protecting the case of the terminal box from serious damage. In addition, that a through fault current test was made to demonstrate that the complete assembly is capable of handling the short-circuit current without damage. The fault current for these tests shall have been 45 000 ampere for a duration of 0.25 seconds.

(b) These type tests shall have been witnessed by an independent authority.

E01.23 DRAWINGS FOR APPROVAL

The following drawings shall be submitted for approval:

(a) Dimensioned outline and foundation drawings of the motors. (Shaft diameter, shaft height and motor weight to be clearly shown).

(b) Detailed drawings of the bearing arrangement, showing all lubrication pipes, coolers and pumps.

(c) Cross-sectional dimensioned drawings of the cable boxes.

(d) Detailed drawings of the motor base plate showing full constructional details with dimensions.

(e) For motors of 250 kW and larger fully dimensioned drawings of the shaft showing all tolerances.

(f) For motors designed for voltages of 3.3 kV and above, drawings showing the end winding bracing arrangements.

E01.24 STORAGE

The contractor must ensure that the storage requirements as specified by the manufacturer are adhered to strictly so as avoid voiding of the warranty. Every effort must be taken to ensure the motor is protected against ingress of water, vermin or anything that may affect its future operation. The following are only given as guidelines, the contractor is expected to exercise due care in the storage and handling of electric motors.

(a) The motor should be store upright in its normal position, free of dust, dirt, gasses and corrosive atmospheres.

(b) Motors should be stored under roof on a concrete base, normally in a store environment. Do not remove the motor from the wooden pallet.

(c) For bigger units, which cannot be housed in a store or relevant building, shed must be built with a proper concrete floor. Do not remove the motor from the wooden pallet.

(d) Store the bigger units close to the final position within access with overhead crane or mobile crane.

(e) Do not stack any objects on top of or against the motor.

(f) Motors must be stored in places free from vibrations in order to avoid damage to the bearings.

(g) The motors space heaters/ anti condensation heaters and similar accessories must be switched on at all times to avoid condensation and corrosion within the enclosure.

(h) If painting has been damaged during transportation, it must be repainted to avoid rusting.

(i) Ensure all machined surfaces and shaft extensions are covered with grease or a rust inhibiting substance.

(j) For slip-ring motors, the brushes must be lifted to avoid condensation between contact surfaces and slip rings.

(k) Before operation all brushes and contact surfaces have to be inspected and brush seating confirmed.

(l) When any motor is kept for extended period, the shaft must be manually turned on monthly intervals.

(m) For big machines with frames greater than or equal to 400mm, the shaft should be rotated monthly at any number of turns and then put at rest at 180 degrees difference from previous stationary position.

(n) When a motor is not immediately required in operation, it should be protected against moisture, high temperature and impurities in order to avoid damage to the insulation system.

(o) If the ambient contains high humidity, periodical insulation resistance inspection is recommended during storage.

(p) The following guidelines show the approximate insulation resistance values that can be expected from a clean and dry motor at 40° Celsius ambient.

(q) Minimum insulation resistance = rated voltage (kV) + 1 (Mega ohm) using 2 times the rated voltage.

(r) These periodical measurements should be recorded and be available prior to installation.

E01.25 ERECTION AND INSTALLATION

E01.25.1 Erection

(a) When motors are erected, care shall be taken to ensure that adequate tolerance margins are made available to ensure interchangeability with replacement motors.

(b) A minimum of 10 mm of packers shall be provided under the motor frame or motor bedplate to allow for adjustments in height.

(c) Before holding-down bolts are grouted in, the motor shall be lined up and the bolts shall be properly centred in the hole of the bedplate.

(d) The bending radius of the motor supply cable should not be exceeded when installing the cable (SANS10142-1).

(e) Motor supply cables must be supported and should not hang from the terminal box/gland.

E01.25.2 Bearing Inspection

(a) The Engineer shall inspect motors having ball/roller bearings.

(b) The grease shall be examined to ensure that it is not hard.

(c) Providing that no roughness is felt when the shaft is rotated by hand and that the motor runs without undue noise or vibration, the bearings will be considered acceptable.

(d) Should the bearings fail or exhibit the symptoms of brinelling during the guarantee period,

the Contractor, free of charge, without delay, shall change them.

E01.25.3 Alignment

(a) After erection, the alignment of the half-couplings between the motor and the driven machine shall be measured. In the case of a pedestal, bearing motor the air gap clearance between the rotor and the stator shall also be measured. A record shall be kept of these figures and they shall be submitted to the Engineer for approval.

(b) A horizontal sleeve bearing or limited end-float roller bearing motor shall be run uncoupled from its load to ensure that it rotates at the axial position indicated on the shaft and that the rotor is free to move to either side of this position. Particular attention shall be paid to ensure that the free running position and the rotor end-float are in agreement with the axial movement of the flexible coupling.

E01.25.4 Drying Out

(a) The Contractor shall dry out all motors larger than 100 kW and all smaller motors which have stood in the open during rain or have been flooded or whose cold insulation resistance is below 1.5 MΩ, before they are connected to the supply. If a motor is flooded, the motor bearings shall be replaced as a matter of urgency.

(b) The method of drying the motor shall be by placing the motor in a heating oven.

Sufficient heat shall be applied to produce a temperature of 60ºC but not greater than 80ºC for a Class A or 90º C for Class B insulation systems. Insulation resistance measurements and temperature readings shall be taken regularly every half hour at the start of dry-out until the motor attains an even temperature and thereafter every hour.

The characteristic dry-out curve of insulation resistance versus temperature shall be plotted and dry-out may be considered complete four hours after the resistance readings have started to rise from the steady minimum value, providing that the winding temperatures have remained steady during this period.

(c) The Contractor shall provide all equipment and the personnel required for the drying-out operation.

(d) In the case of motor smaller than 100kW, the onus remains on the Contractor to satisfy himself that a motor is dry before it is connected to the supply.

(e) Any motor, which fails as a result of being commissioned in a damp condition, shall be repaired at the cost of the Contractor.

E01.25.5 Double Shaft Extensions

The unused shaft extensions of a double-ended shaft motor shall be covered with an approved rust preventative after the motor is commissioned.

E01.26 TESTING AND COMMISSIONING

The contractor must supply a Manufacturers Test Certificate with each motor supplied.

The contractor must do a visual inspection as well as an insulation test on each motor before installation.

The contractor must do a direction test on each motor before handing the installation over. Where equipment can be damaged when rotated in an incorrect direction, the equipment must be disconnected from the motor before the direction check is done.

All test results must recorded and submitted to the Engineer for approval. The Engineer must be informed timeously off all tests to allow witnessing.

E01.27 MEASUREMENT AND PAYMENT

No separate payment will be made for electric motors for equipment unless otherwise specified in the detail specifications. All direct and indirect costs associated with such motors shall be deemed included in the rates tendered for the equipment.

Where separate payment is required for electric motors and specified as such in the detail

specifications, the following payment items shall be applicable:

Item	**Unit**
Supply and delivery electric motors	No

The unit of measurement shall be the number of motors supplied.

The tendered rate shall include full compensation for the design, manufacture, corrosion protection, supply, handling, transport, testing and delivery of each complete motor as specified in the detail specification to ensure satisfactory operation after installation.

Separate items will be scheduled for different sizes/types of motors required.

Item	**Unit**
Installation, test and commission of electric motors	No

The unit of measurement shall be the number of motors installed.

The tendered rate shall include full compensation for the installation and coupling of the motor to the required load. The tendered rate shall include full compensation for all required installation material.

Separate items will be scheduled for different sizes/types of motors required.

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PARTICULAR SPECIFICATION

G01 : COLOUR CODING OF EQUIPMENT

2	2013-10-23	Minor updates and re-issued	J Ritchie	
1	2009-05-12	Review of Mechanical / Electrical and Control / Instrumentation Standards, plus New Design Guidance		
Rev	**Date**	**Description**	**Signature: JW Wastewater Partnership**	**Signature: Approval from Johannesburg Water**

City of Johannesburg
Johannesburg Water (SOC) Ltd

PARTICULAR SPECIFICATION: VOLUME G01 : COLOUR CODING OF EQUIPMENT

CONTENTS

G01.1 SCOPE

This Specification has been adopted by Johannesburg Water to ensure the colour coding of electrical equipment, mechanical plant and pipework located on Johannesburg Water's Wastewater Treatment Works shall conform to the ruling Occupational Health and Safety Act.

The Specification comprises of **three** parts, namely:

(a) SANS Code of Practice 10140-3, Identification colour marking – Part 3 : Contents of pipelines: 2003

(b) A table (Table 1) which supplements SANS 10140-3, above, in order to provide greater detail or clarity on the colour marking of pipelines conveying fluids commonly found on the treatment works

(c) A table (Table 2) which gives the colours adopted for certain electrical equipment and mechanical plant.

Throughout the Specification the colours used shall match the corresponding colours given in SANS Specification 1091, National Colour Standards for Paint: 2004 (as amended).

Where a colour code is not covered by this Specification, the matter shall be referred in writing to the Divisional Manager: Investment Delivery for ratification.

Table 1 : Colour Coding of Pipework on Johannesburg Water's Wastewater Treatment Works

Contents of Pipeline	Basic Colour	Colour Coding Indicator	
		Single Band	Second Band
Water, non-drinkable			
Cooling water	Brilliant Green		
Final treated effluent		White	
Recycled effluent		Black	Dark Violet
Air saturated effluent		Black	Dar Violet
Filtrate		Black	Aquamarine
Wash Water		Black	
Scum water		Black	Dark violet
Dewatering Liquors		Black	Dark Violet
Overflow from P.S.T's		Black	Crimson
Overflow from Clarifier		Black	Dark Violet
D.A.F Underflow		Black	Crimson
Supernatant Liquor		Black	Avocado
Overflow Gravity Thickener		Black	Crimson
Fire Fighting			
Boiler feed		Cornflower	
Hydraulic power		Salmon Pink	-
Poly-electrolyte		Light Grey	-
Raw sewage		Middle Brown	-
Settled sewage		Mid-grey	-
Thickener overflow from:			
Primary sludge		Crimson	-
Activated sludge		Canary Yellow	-
Digested sludge		Maroon	-
DAF liquors		Canary Yellow	Turquoise Blue
Filtrate		Ultramarine	-
Washwater		Black	-
Scum water		Dark Violet	Crimson
Treated effluent		Dark Violet	-
Dewatering liquors		Black	Ultramarine
Acids	Jacaranda		
Ferric chloride		Crimson	
Ferric sulphuric		Artic Blue	

Contents of Pipeline	Basic Colour	Colour Coding Indicator	
		Single Band	Second Band
Alkalis			
Lime Slurry	Dove Grey		
Gases			
Sludge gas	Light Stone	Jacaranda	
Steam	Pastel grey	Aluminium	Clad/lagging
Nitrogen	Light Stone	Black	Light Grey
Hydrogen	Light Stone	Black	Signal Red
Methane (digested)	Light Stone	Turquoise Blue	
Carbon dioxide	Light Stone	Light Grey	
Chlorine/Hypochloride	Canary Yellow		
Oxygen	White		
Compressed Air	Artic Blue		
Ventilated Air	Artic Blue		
Vacuum Air	Artic Blue		
Instrument Air	Artic Blue		
Sludges			
Anaerobically digested	Middle Brown	Maroon	
Anaerobically digested: thickened		Maroon	Light Grey
Raw Sludge	Dark Violet		
Lime treated	Dark Brown	Dove grey	
Primary	Dark Brown	Crimson	
Primary thickened	Dark Brown	Crimson	
Digester supernatant liquor	Middle Brown	Salmon Pink	
Activated : mixed liquor	Royal Blue	Canary Yellow	
Activated : gravity thickened	Royal Blue	Canary Yellow	Dark Violet
Activated : return sludge	Royal Blue	Canary Yellow	Middle Brown
Activated : DAF overflow/float	Royal Blue	Canary Yellow	Turquoise Blue
Activated : primary	Royal Blue	Canary Yellow	Crimson
Activated : digested	Royal Blue	Canary Yellow	Maroon
Activated : waste	Royal Blue	Canary yellow	
Pasteurised	Light Brown		
Oil			
Diesel oil	Black	White	
Hydraulic oil	Golden brown	Salmon Pink	
Lubricating	Golden brown	Brilliant Green	
Transformer	Golden brown	Crimson	
Other Liquids			
Polyelectrolyte	Golden Yellow	Jacaranda	
Cooling liquid	White		

Notes: This table supplements SANS 10140-3: 2003

All codes are in relation to SANS 1091: 1975

Table 2: Colour Coding of Electrical Equipment and Mechanical Plant

Item	Colour	Remarks	Code to SANS 1091
Electrical panels : (external)	Light Orange	NOSA	B.26
Electrical panels : (external) emergency power on	Signal Red		A.11
Electrical panels : (Internal)	White		G.80
Coupling guards and motor guards	Golden Yellow	SANS 10140-2	B.4
Motor cowls	Light Orange	Historical	B.26
Electrical motors, pumps and compressors	Deep Pastel Green		H.28
Gearboxes	Navy Light Grey	NOSA: See also "Small Gearboxes"	G.35
Blower	Deep Pastel Green	NOSA	H.28
Baseplates	Olive Drab		
Cranes	Golden Yellow		B.4
Valve bodies		See SANS 10104-3, Clause 4.2	
Valve hand-wheels			
Small gearboxes	To be same colour as prime mover		

G01.1.1 Machined Components

All machined components shall be protected by "Tectyl" or similar proprietary coating after manufacture. The coating shall be sufficiently durable to prevent corrosion during storage and installation and shall be removed using the manufacturers recommended solvent after final adjustment of the equipment. Final paining shall be carried out in accordance with the system specified.

G01.1.2 Records

The contractor and sub-contractors shall maintain records of the application environment, dates of applications, conditions of surfaces before preparation, blast profiles, wet and dry film thicknesses, overcoating times, paint types and batch number, method of application, tests and type of instruments used, which shall be incorporated into the Component Quality Plan and be available to the Engineer or his Representative for review and surveillance. Two copies of the completed Component Quality Plan shall be provided within 2 weeks of completion of the corrosion protection system.

G01.2 MEASUREMENT AND PAYMENT

For the purpose of this Contract the electro-mechanical items shall be supplied and installed conforming to this specification. The cosmetic panting application shall be included for and the surface preparation, transporting of equipment to and fore from the applicator shall be included for. No separate measurement item shall be included for the application of these coatings.

JOHANNESBURG WATER (SOC) Ltd.

BULK WASTEWATER

PARTICULAR SPECIFICATION

M08: MECHANICAL GEARBOXES

Johannesburg Water (SOC) Ltd.
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Revision 5 October 2021

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2021-10-11	5	J Prinsloo	Detailed Review
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2009-05-12	1		Review of Mechanical / Electrical and Control / Instrumentation Standards, plus New Design

PARTICULAR SPECIFICATION: M08: MECHANICAL GEARBOXES

CONTENTS

M08.1 SCOPE

This specification covers the detailed design parameters, manufacture, supply, off-loading installation, test and commissioning of complete Gearboxes. The Specification shall be read in conjunction with the Project Specification and other relevant Particular Specifications.

M08.2 INTERPRETATIONS

This specification shall be interpreted as follows:

- For the Employer design components, it shall be regarded as a specification.
- For the Contractor design components obligations, it shall be regarded as an Employer's requirements.

M08.2.1 Definitions

For the purpose of this Specification the following definitions are used:

a) "**Manufacture**" includes, as applicable, the purchase of materials or goods, fabrication and assembly, any specified corrosion protection measures and any off-site inspection or testing of materials or parts.

b) "**Supply**" includes, as applicable, the purchase of materials or goods, manufacture and fabrication, any specified corrosion protection measures and all required off-site inspection or testing.

c) "**Installation**" includes, as applicable, all handling and transport from storage, erection and aligning of Works.

d) "**Factory Acceptance Test (FAT)**" shall refer to all tests done on Plant or Plant items at the factory to ensure its functionality

M08.2.2 Abbreviations

In this Specification the following abbreviations will apply: -

°C	: Temperature in degrees Celsius
A	: Current
AC	: Alternating Current
AGMA	: American Gear Manufactures Association
ANSI	: American National Standards Institute
API	: American Petroleum Institute
ASCE	: American Society of Civil Engineers
ASME	: American Society of Mechanical Engineers
ASTM	: American Society for Testing and Materials
BFP	: Belt Filter Press
BS	: British Standards Institution
BSPT	: British Standard pipe thread
CAD	: Computer Aided Drawing
CAM	: Computer Aided Manufacturing
CIP	: Cleaning in Place
COC	: Certificate of Conformance
D	: Diameter
DB	: Air Dry Bulb temperature
dB(A)	: Sound pressure level, "A" weighed in decibels
DCS	: Distributed Control System
DFT	: Dry Film Thickness

DIN	: Deutsch Industry Normen
DN	: Nominal diameter
DO	: Dissolved Oxygen
DP	: Differential Pressure
Eff.	: Filter efficiency in %
EPDM	: Ethylene Propylène Diène Monomer
ERW	: Electrical resistance weld
ETP	: Effluent Treatment Plant
FA	: Flange adaptor
FAT	: Factory Acceptance Tests
FBE	: Flanged both ends
FOE	: Flanged one end
FW	: Field weld
HDPE	: High Density Polyethylene
ID	: Inside diameter
ISO	: International Organisation for Standardization
JW	: Johannesburg Water
ℓ/s	: Flow in litres per second
LV	: Low Voltage
m	: Distance in metre
m.a.s.l	: Metres above (mean) sea level
m/s	: Air speed in metres per second
MCC	: Motor Control Centre
mm	: Dimension in millimetres
MPVC	: Modified Polyvinyl Chloride Pipes
MV	: Medium Voltage
N+1	: N units in operation + 1 installed spare
Nm3/hr	: Normal cubic meters per hour
O&M	: Operation and Maintenance
OD	: Outside diameter
OHS	: Occupational Health and Safety
Pa	: Pressure in Pascals
PBE	: Plain both ends
PE	: Plain end
PN	: Nominal pressure (Rating)
PPE	: Personal Protective Equipment
PQP	: Project Quality Plan
PSV	: Pressure Safety Valve
QCP	: Quality Control Panel
RFA	: Restrained flange adaptor
rpm	: Rotational speed in revolutions per minute
SAECC	: South African Electrolytic Corrosion Committee
SANS	: South African National Standards
SAT	: Site Acceptance Tests
SAW	: Submerged arc weld
SCADA	: Supervisory Control and Data Acquisition
SIS	: Swedish Institute of Standards
SOC	: Slip-on coupling
SS	: Soft Starters
SS	: Soft Starters
SS	: Stainless Steel
SST	: Secondary Settling Tank

STP	: Standard Temperature and Pressure (i.e. T = 20°C, P = 101, 3 kPa).
t	: Wall thickness of pipes
TDS	: Total Dissolved Solids
uPVC	: Unplasticised Polyvinyl Chloride
VSD	: Variable Speed Drive
WB	: Air Wet Bulb temperature
WB	: Air Wet Bulb temperature
WP (B)	: Weld preparation (Butt)\

M08.2.3 Standards

All design standards for the mechanical gearboxes shall be subject to the latest amendments and editions of the following standard specifications: -

PD 5304:2014	:	Guidance on safe use of machinery
SANS9606-1: 1994	:	Testing of welders, where applicable to the type of welding required
BS ISO1312-1:2018	:	Rolling bearings. Accessories for sleeve type linear ball bearings. Boundary dimensions, geometrical product specifications (GPS) and tolerances for series 1 and 3
SANS 10162-4	:	Structural use of Steel Part 4: The design of cold-formed stainless steel structural
SANS 15614-1	:	Specification and qualification of welding procedures for metallic materials - Welding procedure test Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys
SANS 10064	:	The preparation of steel surfaces for coating
SANS 10111-2-1	:	Engineering Drawing Part 1: General principles Engineering Drawing Part 2: Geometric Tolerancing Section 1
SANS 10341	:	Installation and maintenance of bearings – General guidelines
SANS 1700-5-9	:	Fasteners Part 5: General requirements & material properties Section 8: Corrosion resistant stainless steel fasteners-Bolts, Screws & Studs
SANS 1700-5-10	:	Fasteners Part 5: General requirements & material properties Section 8: Corrosion resistant stainless steel fasteners-Nuts
ISO 281	:	Rolling bearings -- Dynamic load ratings and rating life
BS 4999-141	:	General requirements for rotating electrical machines. Specification for standard dimensions
SIS 05 59 00	:	Pictorial Surface Preparation Standards for Painting Steel Surface

M08.2.4 Other Particular Specifications

This specification must be read in conjunction with the following specifications: -

G01: Particular Specification for Colour Codes

G02: Particular Specification for Corrosion Protection

M01: Particular Specification for Screening Equipment

M02: Particular Specification for Degritter Equipment

M03: Particular Specification for Primary Tanks

M05: Particular Specification for Sludge and Wastewater Mixing Equipment

M05: Particular Specification for Surface Aerator Equipment

M09: Particular Specification for Archimedean Screw Pumps

M10: Particular Specification for Secondary Clarifier Tanks

M15: Particular Specification for Filter Belt Press Equipment

M16: Particular Specification for Conveyor Equipment

M17: Particular Specification for Actuators

M20: Particular Specification for Valves

M34: Particular Specification for Sluice Gates, Adjustable Weirs

M36: Particular Specification for Diffused Aeration Equipment

Volume 1: Automation and Control Design Standards SCADA

Volume 6: Automation and Control Design Standards Cabling

Volume 8: Automation and Control Design Standards Flow Measurement

Volume 9: Automation and Control Design Standards Level Measurement

Volume 11: Automation and Control Design Standards Temperature Measurement

Volume 23: Automation and Control Design Standards Pressure Measurement

M08.3 GENERAL DESIGN PARAMETERS

The gearbox or speed reducer equipment shall be designed such that the following requirements are met: -

- To ensure reasonable standards of engineering in design, materials selection and construction processes: -
- To facilitate manufacture, inspection, installation, maintenance, cleaning and repairs;
- To ensure safe and satisfactory operation for an acceptable life expectation of 15 years under the ambient conditions prevailing at the Site;
- The offered equipment shall be support in forms of spares by the original equipment manufacturer for at least 15 years in alignment with the specified life expectation of 15 years from project installation,
- To prevent undue stresses being produced by expansion due to temperature changes;
- To keep maintenance costs to a minimum that represent the value for money in both the initial purchase and subsequent running costs;
- To facilitate inter-changeability of units and/or sub-parts throughout the Contract works with regard to new equipment and equipment and/or sub-parts currently being used on the existing JW Wastewater Treatment Works;
- To operate without undue vibration and excessive noise. Maximum of 75dBA measured at 1 metre from operating equipment;
- To comply with the legal requirements in respect of safety such as the Occupational Health & Safety Act, 1993 and Regulations as well as the prevention of water and air pollution;
- To satisfy any specific requirement contained in the latest editions of the published statutory codes and legislation;

- To be suitable for operation 365 days per year, 24 hours per day under specified design conditions; and
- The minimum availability of the equipment shall be 99 %.

M08.4 SPECIFIC DESIGN PARAMETERS

The Tenderer shall submit with their Tender a catalogue of the make of gearbox offered and indicate how the selection of gearboxes was made.

Unless otherwise stated, the gearboxes shall be directly mounted to the motor. The gears shall be helical gears which are used in applications with high speeds, large power transmission and low noise levels.

Gear drives shall be sized to ensure that the running load peak does not exceed the endurance limits of the components.

Gearboxes shall have an efficiency of not less than 96% on two stage reduction and 95% on three stage reduction.

Simple cooling may be by convection from the gearbox casings but without assistance from cooling fins or fans. Adequate other cooling means shall be provided as applicable. The exterior of the gearbox shall be free from dust or moisture traps. Access for inspection purposes shall be allowed for in the design of the gearbox casing. Maintenance free oil lock seals on the high speed shafts shall be a standard design feature.

The tenderer shall provide with his tender all information on oil circulation for gearboxes that incorporate the use of oil circulating pump.

A stainless-steel ball valve and extension drainpipe and plug shall be provided to facilitate oil changes by the maintenance staff. The termination of this drain shall be accessible from the operating platform. The drain provision shall be a rigid design with due consideration to handling, installation and maintenance activities. The baseplate shall be design such that the driving shaft is accessible for inspection, while at the same time allow access to the drainage pipe, without decommissioning and dismantling the gearbox from the transmission assembly.

Where the lubrication system requires the use of an oil pump then the circulation system will be fitted with an oil flow detection system/ device such as an oil flow switch in order to ensure gear protection when operational by detecting any no flow or low flow conditions which shall further be monitored on the works SCADA system. The oil flow detection system shall be capable of switching off the drive unit in the least time as recommended by the original gearbox Manufacturer.

The bearing span shall be suitably selected for vertical gearbox application and shall promote shaft support for the intended application. Rigid lateral load distribution shall be by means of a standardized pinioned arrangement reducing noise and vibration.

A rigid half coupling shall be shrunk onto the output shaft of the gearbox and shall be secured by an additional keep plate and bolted connection in a recognised manner.

Substantial eye bolts shall be provided for all reasonable lifting purposes.

The gearboxes shall carry the manufacturer's identification details together with the rated shaft speeds, rated shaft torque, output power and maximum ambient operating temperature.

The gearboxes shall conform to the relevant British Standards and AGMA ratings with respect to the following requirements:

(a) The design ambient temperature shall be 45°C unless otherwise specified in the project specification.

(b) The noise at 100% of the full output power and 45°C ambient shall not exceed 75 dBA as measured 1 m in distance from the equipment.

(c) The gearing shall give double the life of the bearings when subjected to similar loadings.

The design of the gearbox shall be such that the following calculation shall be adhered to: -

$$\frac{\text{Actual Radial Load}}{\text{Permissible Actual Radial}} + \frac{\text{Actual Axial Load}}{\text{Permissible Axial Load}} \text{ shall be} \leq 1{,}0$$

Calculations shall be submitted. Failure to do so may render the Tender invalid.

M08.4.1 Gears

The gears shall be high efficiency case hardened helical gears and rated in accordance with the AGMA Code of Practice 420.04 for continuous operation.

Semi-hardened and subsequently machined gears will not be accepted.

M08.4.2 Service Factor

The minimum service factors indicated in the table below shall be based upon the installed power unless otherwise specified in the project specification: -

Process Units	**Service Factor**
Rotating Bridges: Sedimentation & Clarifier Tanks	1.5
Rotating Scraper System: WAS Thickeners, Primary Sedimentation & Fermentation Tanks	1.75
Aerators	2.25
Mixers	2
Screw & Plunger Pumps	2.25
Centrifugal and Positive displacement Pumps	2
Turbo Centrifugal Blowers	2.25
Dosing Pumps	2
Mechanical Screens	2
General speed reducing applications	2

M08.4.3 Bearings

Roller bearings shall be used throughout. Taper roller bearings shall be used to sustain radial and thrust loads. Bearings shall be designed for a design life in excess of the indicated hours in the table below, in accordance with ISO.281. Bearings for the output shaft shall be designed to withstand bending, up thrust, down pull and radial loads imposed by the equipment being driven. Tenderers shall indicate what

these forces are and how these shall be accommodated.

The Contractor shall ensure the lubricant used for the initial filling and specified in the maintenance manual, is adequate for prolonged operation in ambient temperatures of up to 45°C without overheating.

Process Units	Design Life	Operation
Rotating Bridges: Sedimentation & Clarifier Tanks	L10 for 100 000	Continuous
Rotating Scraper System: WAS Thickeners, Primary Sedimentation & Fermentation Tanks	L10 for 100 000	Continuous
Aerators	L10for 100 000	Continuous
Mixers	L10 for 100 000	Continuous
Screw & Plunger Pumps	L10 for 100 000	Continuous
Centrifugal and Positive displacement Pumps	L10 for 100 000	Continuous
Dosing Pumps	L10 for 100 000	Continuous
Mechanical Screens	L10 for 100 000	Continuous

M08.4.4 Lubrication

The gearboxes shall be constructed with a dry well for the low speed shaft bearing to avoid complete drainage of oil in the event of an oil seal failure. Provision to monitor the oil level must be provided. The bearing shall be grease lubricated with the greasing point easily accessible, where greasing point are not accessible due to gear orientation / auxiliaries attached to the gearbox, stainless steel extension pipes shall be used to ensure that points are accessible, the position of the extended grease lubrication points shall be subject to approval by the Employer's Agent / Employer's Representative. A stainless-steel ball valve and extension drainpipe and plug shall be provided to facilitate oil changes by the maintenance staff. The termination of this drain shall be accessible from the operating platform.

M08.4.5 Gearbox / Motor Coupling

The coupling shall be fully rated to transmit the motor full load power and tested to prove static and dynamic balance. The coupling shall accommodate small axial, lateral and angular misalignments without imposing undue stresses on the shaft and bearings. All coupling shall be suitable for standard motor IEC dimensioning (universal gearbox connection). The coupling shall be enclosed in a stationery solid-plate guard to the Employer's Agent / Employer's Representative satisfaction.

M08.4.6 V-belt

V-belts shall be designed to withstand the high tension and high-power drives, shall be long wearing, tough and trouble free. The V-belt cover shall be oil, heat and ozone resistant in order to protect the inner components. The compression section shall provide excellent gripping action and a high coefficient of friction but shall also allow an initial start-up clutching action in order to eliminate power spikes and excessive bearing loading. The moulded cogs shall provide optimum flexibility with minimal build-up of heat.

M08.4.7 Flexible Couplings

Flexible couplings consist of two types: gear type and multiple disc/diaphragm type. The gear type uses gear teeth to make them flexible and is either grease lubricated,

or oil lubricated depending upon their size. Diaphragm couplings do not require any form of lubrication and the flexibility is created by a series of multiple discs or a diaphragm made of spring steel and flexes as the shaft rotate.

Misalignment of the coupling is to be prevented by proper alignment of the coupling by means of a taper gauge or set of feeler gauges and a straight edge or dial indicator. Two types of misalignments are encountered by flexible couplings: Angular misalignment and parallel misalignment. Any adjustment to correct the misalignment in one direction may affect the other direction and both the angular and parallel alignment shall be checked after each adjustment.

A periodic check of the coupling alignment shall be performed as recommended by the Original Equipment Manufacturer during commissioning, testing and trail operation as specified in the project specification.

M08.4.8 Housing

The gearbox shall be manufactured of high strength cast iron which enables the gearbox to be used in harsh environments. The gearbox housing design shall incorporate a breathing plug and means of checking oil level.

All gearbox with a mass more than 25kg shall have lifting hooks or eyes integrally cast on the housing. All gearbox with a mass greater than 100 kg shall either have two removable eye bolts of the required strength securely attached to the valve body or lifting eyes forming an integral part of the valve body to facilitate easy handling during transport and installation

The breather plug shall be designed to effectively prevent pressure build-up inside the gearbox and also prevent dust and moisture ingress. Breather unit allowing continued oil spillage due to the overfilling of the gearbox shall not be accepted.

Oil level sight glasses (fully protected and UV resistant) shall be provided with levels marked for running and filling minimum and maximum positions respectively. These shall be arranged for easy viewing and shall take into account the angle of the gearbox mounting to ensure that the correct oil level in the gearbox is always visible. The filler cap and drain plug must be easily accessible without the need to remove any other part of the gearbox or connected equipment such as motor and belt drive covers & pulleys to get access to it. All gearboxes with motor of 110kW and above shall be provided with oil level protection. The design and installation configuration of the level protection shall be submitted to the Employer's Agent or Representative for review and acceptance.

M08.4.9 Shaft

The Input and output shafts shall be of sufficient dimension in order to avoid excessive torsional or bending stresses and deflection. The driven equipment (e.g. impeller) shall be secured to the shaft in such a way that it can be readily removed without any damage to the equipment or the shaft.

The shafts shall be protected by replaceable sleeves manufactured from non-corrosive material. The shaft shall be manufactured from stainless steel.

M08.5 FASTENERS

Nuts, bolts, studs and washers for incorporation in the Works shall conform to the requirement of the appropriate approved standard.

Bolts shall be of such standard length that a minimum of two to four complete threads

shall protrude beyond the nut when in the fully tightened condition. The same shall applies to stud units. Mating surfaces shall be adequately protected against corrosion whilst awaiting assembly of the faces and bolting, all to the approval of the Employer's Agent or Employer's Representative.

All high tensile bolts and studs used in the Works shall bear the letter HTS stamped or engraved on the end.

Washers shall be provided under all bolt heads and nuts. The threads of bolts and studs shall be lubricated before assembly with a lubricating substance subject to the approval of the Employer's Agent or Employer's Representative. Washers, locking devices and anti-vibration arrangements shall be provided where necessary and shall be subject to the approval of the Employer's Agent or Employer's Representative.

Stainless steel bolts, nuts and washers shall be in accordance with SANS 1700 A70, and the grade of stainless steel shall be subject to the approval of the Employer's Agent or Employer's Representative. Hot Dip Galvanised fasteners shall comply with the requirements of SANS 121.High strength friction grip (HSFG) bolts, nuts, load indicator washers and washers shall subject to the approval of the Employer's Agent or Employer's Representative and shall be hot dip galvanised. High strength friction grip bolts shall be tightened in accordance with the manufacturer's recommendations and the tension shall be re-checked not less than 3 hours after first tightening and then the bolts shall be retightened to the initial load all to the approval of the Employer's Agent or Employer's Representative.

All stainless steel holding down bolts, nuts and washers in contact with a dissimilar material shall be of stainless steel and provided with isolating washers and sleeves (insolating kit) where appropriate to prevent galvanic corrosion, unless otherwise specified in the project specification. The bed plates and machinery shall be provided with means of adjustment for line and level to maintain the items of Plant in correct alignment during grouting. Packers used for adjustment shall be of non-corrosive material to the approval of the Employer's Agent or Employer's Representative. Holding down bolts which are to be tightened after grouting shall be provided with bond breakers where they pass through the grout.

Where there is a risk of corrosion, bolts and studs shall be designed so that the maximum stress in the bolt and nut does not exceed half of the yield stress of the bolt material under all conditions. The shear value of high strength friction grip bolts shall be reduced in proportion to the reduced tensile stress compared with the normal design stress.

No tapped holes in mild steel shall be allowed. Where tapped holes are unavoidable, this shall be done into stainless steel.

Where bolts and nuts are required to be removed and re-assembled on a regular basis, these shall be of stainless steel.

Metal coatings and other treatments applied to fasteners shall be carried out in a manner which will not cause hydrogen embrittlement of the parent material.

M08.6 MATERIAL OF CONSTRUCTION

The equipment unit components shall be constructed using the critical material specified in the table below:

COMPONENT	MATERIAL
Gears	High cast iron to BS 1542 Class 220 or an equivalent standard.
Pinions	AGMA 390.02 class 12.
Housing	Epoxy coated high strength cast iron
Input and output shaft	Stainless steel or similar approved
Oil drainpipe (external to the housing)	304L stainless steel
Oil level sight glass	UV and chemical resistant glass
Base Plate	Hot dip galvanized mild steel
Fasteners	316 stainless steel
All other accessories shall be of the manufacturer's standard, industry approved, and corrosion protected.	

M08.7 RECOMMENDED SPARES AND SPECIAL TOOLS

The Tenderer must submit on the appropriate schedule a priced list of spare parts which it is recommended should be kept by Johannesburg Water for maintenance of the plant. Spares which the Management decides to order must be manufactured simultaneously with the rest of the equipment and be subject to the same tests for dimensions, tolerances, strength, etc. All spares must be packed separately, and the cases appropriately marked. All spares must be new and unused.

Tenderers must submit a provisional price (if requested in the Bill of Quantities) for a complete set of special spanners, keys and tools required for the operation, adjustment and overhaul of the plant supplied. All spanners, keys and tools shall be new and unused.

M08.8 GUARANTEE OF PERFORMANCE

The Contractor shall guarantee the output and efficiency of all equipment, which guarantees shall be binding under the Contract. Where guaranteed performance is specified, certified test curves shall be drawn from the test data obtained from the purchased equipment and shall include efficiency (%), power consumption (kW), speed in rpm and speed/torque (rpm/kNm).

The Defects liability period shall extend over a period of 12 months calculated from the Completion as defined in the Contract Document. However, should a portion or all of the plant and equipment fail / or require rectification during this period, the Employer's Agent / Employer's Representative reserves the right to extend the Defects Liability Period in respect of such portion or all of the plant and equipment for a further period of not more than 12 months calculated from the date of Commissioning of such plant and equipment after rectification.

M08.9 CORROSION PROTECTION

Refer to Particular Specification G02: Corrosion Protection

M08.10 COLOUR CODES

The standard final colour codes for equipment supplied under this Contract shall be in accordance with Particular Specification G01: Colour Codes.

M08.11 QUALITY MANAGEMENT (QM) AND QUALITY ASSURANCE

M08.11.1 General

QM shall be categorised as 'critical and major' for this section of the Project.

The Contractor's Quality Management System shall be in accordance with industry standard.

The Contractor shall implement a comprehensive Quality Control programme and accept full responsibility for the quality of his workmanship and material used, irrespective of any quality surveillance that may be carried out by the Employer's Agent / Employer' Representative.

In keeping with the basic principles Quality Management System, the Contractor and Subcontractor(s) shall:

- Be responsible for compliance with all the requirements of the Specification in every respect;
- Carry out all inspections and tests called for in the Specification in the presence of the Employer's Agent / Employer' Representative. The cost of these inspections and tests shall be carried out at the sole expense and under the responsibility of the Contractor;
- Draft a Quality Control Plan for manufacture for approval by the Employer's Agent / Employer' Representative and comply with the approved Quality Plan during manufacturing process of all components indicating all the intended stages of testing during manufacture, cleaning and preparation for application as well as necessary hold points for independent quality surveillance;
- Draft a Quality Control Plan for corrosion protection for approval by the Employer's Agent / Employer' Representative and comply with the approved Quality Plan during corrosion protection process of all components indicating all the intended stages of testing during corrosion protection as well as necessary hold points for independent quality surveillance;
- Draft a Quality Control Plan for installation for approval by the Employer's Agent / Employer' Representative and comply with the approved Quality Plan during installation process of all components indicating all the intended stages of testing during installation as well as necessary hold points for independent quality surveillance; and
- Draft Quality Control Plans for any other construction process as may be required for approval by the Employer's Agent / Employer' Representative and comply with the approved Quality Plan during the execution of the process indicating all the intended stages of testing as well as necessary hold points for independent quality surveillance.

The Quality Control Plans will not be compromised once approved and shall be adhered to at all times. The Contractor shall operate approved quality assurance and control programmes in the Supplier's and Manufacturer's premises and on Site in order to verify that the Works comply with this Section. Prior to the commencement of any work, the Contractor shall prepare and submit to the Employer's Agent / Employer' Representative for approval, quality plans describing the procedures,

standards of acceptance, hold point inspections, routine and type tests to be carried out for each component both during manufacture and on Site.

Although it shall remain the responsibility of the Contractor to ensure that the Works conform to the Specification, the Employer's Agent / Employer' Representative shall be entitled to inspect, examine and test the materials, workmanship and performance of every item of Plant. The Employer's Agent / Employer' Representative will notify the Contractor which tests or inspections, detailed in the quality plan, he will attend.

Approval by the Employer's Agent / Employer' Representative of materials, workmanship, etc., during manufacture or at Site will not relieve the Contractor of his obligations to comply with all the requirements of the Contract.

All instruments and appliances necessary for the complete inspection and testing shall be provided by the Contractor. Calibration certificates for instruments shall be produced to the Engineer for review prior to the commencement of any tests and, if required by the Employer's Agent / Employer' Representative, instruments shall be re-calibrated at the Contractor's own account before commencement of the tests.

In general, Quality Management System should be bench marked in accordance with the relevant ISO 9000 requirements.

M08.11.2 Material Tests

The Manufacturer's material test data and the Contractor's quality records shall be subject to examination by the Employer's Agent / Employer' Representative. Reasonable samples of the cleaning and coating materials to be used may be taken for testing.

Rejection of the samples shall place a hold on the use of the materials of the same batch number and any components that have already been cleaned/coated with rejected material shall be re-cleaned and coated.

M08.11.3 Type of Tests

Where the Contractor offers Plant selected from the standard range of products from a specialist manufacturer, type tests in accordance with a recognised international standard are required on one unit of each type to prove satisfactory design and quality of manufacture of that Plant.

The Employer's Agent / Employer' Representative may waive the requirement for type tests if he is satisfied that tests have previously been performed on identical Plant. The Contractor shall submit the data and results with his Quality Plan in sufficient time to allow for repeat tests without delaying the Works should the Employer's Agent / Employer' Representative not approve the evidence submitted.

M08.11.4 Quality Control Records

Accurate and detailed quality control records shall be kept by the Contractor for all stages of the work.

All the quality control records shall be available for inspection by the Employer's Agent / Employer' Representative.

The collection of record documents for each item of Plant shall be collated and bound in a logical manner and retained by the Contractor as proof of quality achieved. These shall be available on demand for quality control and part payment releases.

The records shall be neatly filed and handed over to the Employer's Agent /

Employer' Representative. on completion of the work in the form of a Data Pack together with all relevant material and test certificates. Only after the Data Pack has been approved and signed off by the Employer's Agent / Employer' Representative. shall Plant be dispatched to Site.

M08.11.5 Substandard Quality Control

All material, certification and records of the Contractor shall be subject to examination by the Employer's Agent / Employer' Representative.

This shall include the checking and testing of the Plant at the Works and on Site, installation and pre-acceptance testing. If any deviation is found, additional testing and quality surveillance shall be carried out at the Contractor's own costs until approved by the Employer's Agent / Employer' Representative.

If the additional testing confirms inaccurate quality control by the Contractor on an item of Plant, all work shall be stopped on that item of Plant and shall only proceed after remedial action in the quality control system has been implemented.

M08.11.6 Access for Surveillance

For the purpose of carrying out quality surveillance, the Employer's Agent / Employer' Representative shall be granted access to any part of the Contractor's premises relevant to the work being carried out, at any reasonable time.

M08.11.7 Manufacture

Tenderers shall submit with their tender a detailed Project Quality Plan, stating how they control the flow of paperwork from commencement of the Project through final handover to the Client, a sample of their Quality Control Plan, (QCP) and Project Quality Plan, (PQP) both during the course of the Project, manufacture and finally, installation.

The successful Tenderer shall submit a QCP covering all aspects of the manufacturing process, indicating held points to allow the Employer's Agent or Representative opportunities to evaluate the equipment for compliance to this specification.

All items of equipment shall be subject to inspections by the Employer's Agent or Representative during design and manufacture per these QCP's.

In general, it is anticipated that this Project shall be in accordance with the relevant ISO 9000 requirements.

M08.11.8 Installation

The successful Tenderer shall submit a QCP covering all aspects of the installation of each item of equipment to be installed under this Project. The Employer's Agent or Representative shall be afforded every opportunity to certain stages of completion of the installation to ascertain compliance with the Specifications and to witness the Contractor's site activities at the Employer's Agent or Representative's discretion.

M08.12 SYSTEM PERFORMANCE

M08.12.1 Works testing:

All Equipment shall be subject to a Factory Acceptance Test (FAT) by the Manufacturer and witness by Employer's Agent / Employer' Representative at the Manufacturer's premises before despatch. All performance test results shall be made available to the Employer's Agent/ Employer's Representative for verification or when the QCP's require intervention or hold points for inspection.

Gearboxes shall be subject to testing using the selected project motors for at least 12 hours before dispatch to site. All results shall be available for inspection.

Equipment may only be despatch from factory once all relevant "hold points" on QCP's have been signed off by the Employer's Agent / Employer' Representative and/or the Approved Inspection Authority (AIA) in accordance with approved quality control plan.

M08.12.2 Before commissioning

- Check for correct oil level in gearboxes
- Ensure all HD bolts are torqued down correctly.
- Ensure the output shaft is rotating in the correct direction.
- The alignment and levelling of each assembly shall be checked, and the results shall be available for inspection by the Employer's Agent / Employer' Representative.
- The electrical functions and control shall be checked by a responsible inspector prior to attempting to start any motor on this Project.

M08.12.3 During Commissioning

- Ensure all oil pumps. Temperature, level, flow or pressure switches are functional
- Vibration testing and benchmarking.
- Ensure that there no oil leaks or visible damages to the gearbox housing.

M08.13 BEFORE EXPIRY OF THE DEFECTS LIABILITY PERIOD

The Contractor has an obligation to visit the site every quarter to inspect for the correct operation of the installed equipment. A report after each visit shall be submitted in writing within 14 days.

Should the first oil change (based on the original equipment manufacturers recommendation) occurs before the issuing of the certificate of completion of the gearbox equipment to the Employer. The Contractor must carry out the first oil change in each gearbox. The drained oil shall be sieved and inspected for any contamination in the oil. In the event of any unusual contamination, (metal deposits etc) the Contractor, will take the necessary steps, to investigate the cause, and where required to replace and or repair the gearbox (s) at no cost to the employer.

M08.14 EQUIPMENT TRAINING PROCEDURE

Training shall be provided by the Contractor (or specialist equipment suppliers) based on the supplied and approved operation and maintenance (O&M) manuals for all supplied equipment. This training shall be provided to the Operations and Mechanical including other support discipline staff of the Employer along with the Employer's Agent and/or Representatives. The duration of the training period shall be advised by the Contractor and agreed with the Employer's Agent and/or Representatives.

The training structure for the equipment and/or system should include both the theory and practical components of the equipment derived from the O&M manuals.

The preparation of the O&M manuals shall be based on the Johannesburg Water (SOC) Particular specification for Commissioning and Operation.

M08.15 OPERATION AND MAINTENANCE MANUAL SUMMARY

The Contractor shall hand over to the Employer' Agent or Employer's Representative four sets (x2 hard copies and x2 electronic copies on non-locked USB) of the Operation and Maintenance Manual compiled for each installation not later than at the time of commissioning of the installation. These manuals are a prerequisite for final takeover of the plant. A copy of the Operating and Maintenance Manual for each equipment type shall be bound in with the Operating and Maintenance Manual for the project. The manual shall be A4 size and properly bound. Drawings larger than A3 size shall be contained in separate plastic pockets.

The Operation and Maintenance Manual will contain the following:

- Brief description of the plant and installation.
- Concise operating instructions including start-up, operating, shutdown and troubleshooting procedures.
- Routine maintenance instruction this shall include failure mode analysis and preventative strategies.
- Precautionary measures, elementary trouble location, rectifying measures and emergency actions.
- Detailed information on equipment.
- Lists of spare parts including names and addresses of suppliers.
- Schematic Diagram and Drawings
- Risk, Health and Safety Assessment with proposed control measures.

M08.16 DRAWINGS

The drawings included in the Tender Documents are the Employer's Agent or Employer's Representative. 's proposal for the plant layout. Should the Tenderer offer alternative layouts, they shall submit drawings with his Tender in order for it to be evaluated.

Before the Contractor carries out any work, he will submit detailed working drawings to be approved by the Employer's Agent or Employer's Representative. . Approval of these drawings does not relieve the Contractor from his responsibility for the correctness of the drawings.

M08.17 INTERCHANGEABILITY

Where two or more similar types of equipment are required, these units will be identical in all respects.

All similar parts of items supplied will be interchangeable without any additional machining or fitting.

M08.18 MEASUREMENT AND PAYMENT

No separate payment will be made for gearboxes unless otherwise specified in the detail specifications. All direct and indirect costs associated with the gearboxes shall deemed to be included in the rates tendered for the equipment.

Where separate payment is required for gearboxes and specified as such in the detail specifications, the following payment items shall be applicable:

M08.18.1 General

The following items shall, inter alia, be included in the rates:

- Supply of all design and pre-manufacture documentation and obtaining approval thereof;
- Procurement/manufacture of gearbox equipment with associated items and delivery to Site;
- Installation of gearbox equipment with associated items and testing;
- Services required during period of initial use before handover to the Employer.

Payment under scheduled items shall be made per complete installation as specified, electrical connections, etc and grouting, etc. Measurement and payment will distinguish between supply / delivery; installation and testing; and commissioning and trail operation of the equipment.

M08.18.2 **Supply and Delivery to site with Documentation**

Item	**Unit**
Supply and delivery to site with documentation	No

The tendered rates shall include for full compensation of all costs incurred in design, drawings, manufacture, supply, testing at the manufacturers works, inspections, quality control, quality assurance, factory acceptance testing, corrosion protection, packing, delivery to site including transportation costs and offloading on site including any cranage requirements. No claims whatsoever for extras will be allowed on the grounds that a necessary piece of equipment or a part thereof is not specifically mentioned. Tender rate shall include any external oil filters, flow and pressure in their offer.

M08.18.3 **Installation, Testing and Commissioning of the Gearbox Equipment**

Item	**Unit**
Installation, Testing and Commissioning of the Gearbox Equipment	No

The tendered rates shall include for full compensation of all costs incurred in installation, site testing, setting into operation, the supply of O & M manuals, commissioning and maintenance during the warranty period of all equipment specified on Site including the provision of all labour, supervision, instruments, equipment, transport, on-site quality assurance and quality control, inspection and testing (including attendance at tests witnessed by the Employer's Agent / Employer' Representative), materials and Temporary Works necessary to completely install, test and commission and render fully operational gearbox equipment.

The rate shall also include the cost of the installation of all auxiliary equipment not specifically mentioned but obviously required, (e.g. all ancillaries, including all bolts, fastenings and brackets, safety guards and any work or material required for the proper installation of such equipment) to enable the equipment to be installed and/or function safely and correctly as specified until taken over by the Employer; the putting

into service of the complete installation; remedial work and any other work as specified and necessary.

The rate shall also include for all preliminary testing and the provision of testing equipment therefore including all disruptions to installation caused by such testing.

Payment will only be effected after full compliance of the equipment items with this Section and associated documentation has been approved by the Employer's Agent / Employer' Representative

The Contractor shall include in the Tendered rate for straining of the gearbox oil after 600 hours of initial operation. The Contractor shall furnish the Employer's Agent / Employer' Representative with a report recording any irregularities when cleaning the sieves after straining.

M08.18.4 **Trial Operations**

Item	**Unit**
Trial Operations	No

This specification allows for a number of calendar days within which the system Trial Operation can be completed after completion of commissioning process. The Contractor shall programme and price for providing full technical and operational support during trail operation.

M08.18.5 **Employer's Operator Training**

Item	**Unit**
Training	No

Payment for Training of the Employer's Operational Staff will be made under this Section as set out in project specification or agreed with the Employer's Agent / Employer' Representative. The lump sum shall be inclusive of all costs associated with the training programme and on-site training of personnel.

M08.18.6 **Spares**

Item	**Unit**
Spares	No

The cost of spares, considered to be necessary by the Contractor other than spares required by the Employer, delivered to Site and handed over will be paid as a lump sum. A Spare Part Schedule subject to approval by the Employer's Agent/ Employer's representative shall be submited before procurement of spares.

The actual lump sum to be paid shall be based on the unit rates priced in the Bill of Quantity for the actual spares ordered and supplied and the Employer is entitled to purchase all, some or none of the items listed. A provisional sum will be allocated in the Bill of Quantity for the complete list of spare parts as listed by the Contractor.

The rate tendered shall provide for the manufacture, supply, delivery to Site and handing over of the spares ordered and shall include permanent packing for long term storage. The spares shall be manufactured at the same time as the installed items.

----------**END**----------

ANNEXURE 1:

BASELINE RISK ASSESSMENT

ANNEXURE 2:

MEDICAL SCREENING POLICY

ANNEXURE 3:

SIGN OFF FORM

ANNEXURE 4:

ENVIRONMENTAL MANAGEMENT PLAN

ANNEXURE 5:

JW 6.4 (RETURNABLE ANNEXURE A)

ENVIRONMENTAL MANAGEMENT PLAN

JOHANNESBURG WATER SOC LTD

ENVIRONMENTAL MANAGEMENT PLAN

REVISION:05

Prepared By:

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Environmental Management Section

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LIST OF TABLES

LIST OF APPENDICES

LIST OF ACRONYMS Acronym	**Description**
BA	Basic Assessment
BAR	Basic Assessment Report
CA	Competent Authority

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DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EO	Environmental Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme Report
GDARD	Gauteng Department of Agriculture and Rural Development
GN	Government Notice
I&AP	Interested and Affected Party
JW	Johannesburg Water
km	Kilometre
m	meter
MSDS	Material Safety Data Sheets
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PHRAG	Provincial Heritage Resources Authority for Gauteng
RE	Resident Engineer
WUL	Water Use License
WULA	Water Use License Application
WWTW	Wastewater Treatment Works

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DEFINITIONS

Environment

The surroundings in which humans exist and which comprise of:

- Land, water and atmosphere of the earth.
- Micro-organisms, plant and animal life.
- Any part or combination of a) and b) and the interrelationships among and between them.
- The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that can influence human health and well-being.

Environmental Aspect

Those components of the company's activities, products and services that is likely to interact with the environment.

Environmental Authorisation

The written statement from the relevant environmental authority in terms of the National Environmental Management Act (Act 107 of 1998), with or without conditions, that records its approval of a planned activity and the implementation thereof and the mitigating measures required to prevent or reduce the effects of environmental impacts during the life of a contract.

Environmental Impact Assessment (EIA)

The decision making process of examining the environmental impacts of a development in terms of the NEMA (107 of 1998) and the EIA Regulations (Government Notice No. R982, R983, R984, R985 and R986) as amended.

Environmental Management Programme (EMPR)

An environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced.

Environmental Management System (EMS)

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A set of process and practices that enable an organization to reduce its environmental impacts and increase its operational efficiency. The EMS provides a framework that helps a company achieve its environmental goals through consistent control of its operations.

Auditing

A systematic and objective assessment of an organization's activities and services conducted and documented on a periodic basis internally and externally.

Environmental Objective

An overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantified where practicable.

Environmental Target

A detailed performance requirement quantified where practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.

Floodplain

A flat expanse of land bordering a river channel, formed through sediment deposition and other alluvial processes, and often characterized by frequent flooding as a result of bank overspill from the river channel.

Groundwater

Sub-surface water in the zone in which permeable rocks, and often the overlying soil, are saturated.

Hazardous waste

Waste that are proven to be toxic, corrosive, explosive, flammable, carcinogenic, radioactive, poisonous or classified as such in legal terms.

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Heritage Resource

Any place or object of cultural significance including buildings, structures, landscapes, graves and geological, archaeological artefacts and paleontological sites.

Landscape

Land modified for human use and occupation, embracing both the natural (wilderness) environment and the urban.

Management actions

Practical actions aimed at achieving management objectives and targets.

Management objectives

Desired outcome of management measures for mitigating negative impacts and enhancing the positive impacts related to project activities and aspects (i.e. risk sources).

Monitoring

A systematic and objective observation of an organization's activities and services conducted and reported on regularly.

Natural Vegetation

All existing vegetation species, indigenous or otherwise, of trees, shrubs, groundcover, grasses and all other plants found growing on the site.

Pollution

Any change in the environment caused by substances, radioactive or other waves, or noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such

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an effect in the future. Furthermore, pollution can also be regarded as an undesirable state of the natural environment being contaminated with harmful substances as a consequence of human activities.

Protected Plants

Plant species officially listed on the Protected Plants List (each province has one), and which may not be removed or transported without a permit to do so from the relevant provincial authority.

Reinstatement

Reinstatement is defined as the return of a disturbed area to a state, which approximates the state (where possible), which it was before disruption.

Riparian Habitat

The physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.

Runoff

The total water yield from a catchment including surface and subsurface flow.

Sensitive environmental features

Environmental features protected by legislation (e.g. heritage resources), or identified during the EIA as sensitive through specialists' findings and input received from Interested and Affected Parties.

Subsoil

The soil horizons between the topsoil horizon and the underlying parent rock.

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Topsoil

Topsoil can be regarded as the fertile upper part or surface of the soil.

Transplanting

The removal of plant material and replanting the same plants in another designated position.

Veld

Unimproved areas of natural vegetation

Wastewater

Water contaminated by the project activities.

Watercourse

A geomorphological feature characterized by the presence of a stream flow channel, a floodplain and a transitional upland fringe seasonally or permanently conveying surface water.

Waterlogged

Soil or land saturated with water long enough for anaerobic conditions to develop.

Weeds and Alien Invasive Plants

Weeds and Alien Invasive plants are defined as undesirable plant growth that shall include, but not be limited to all declared category 1, 2 and 3 listed Alien Invasive species as set out in the Conservation of Agricultural Resources Act (No 43 of 1983) regulations. Other vegetation deemed to be invasive should be those plant species that show the potential to occupy in number, any area within the defined construction area.

Wetland

Land where a surplus of water (i.e. waterlogging) is the key factor determining the nature of the soil development as well as the types of plants and animals living at the soil surface.

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1. BACKGROUND

The purpose of this document is to provide management measures that will ensure that potential negative impacts associated with the activity are minimized whilst positive impacts are optimised, provided that the EMP is implemented by a suitably qualified Environmental Officer (EO). The development proponent, the main contractor and the sub- contractor are responsible for the implementation of the EMP throughout the stages. Therefore, it is imperative that the EMP is circulated to site managers, contractors and Depots who will perform any work on site which has the potential to cause environmental damage. Any parties responsible for transgression of the underlying management measures outlined in this document will be held liable for non- compliances.

The following is a generic EMP to mitigate against “generally occurring impacts” associated with the construction phase of Johannesburg Water’s activities. "Generally occurring impacts" refers to potential impacts typical of Johannesburg Water’s activities and are not restricted to a single or specific site. The findings of this EMP will be implemented at all sites.

This section is an essential component of the contract specification and shall be included during **planning, design, construction, and operational phases.**

PURPOSE

The purpose of this EMP is to ensure that Johannesburg Water conducts all its activities related to the construction and maintenance in accordance with the provisions of NEMA, and other applicable legislations. This EMP has considered the provisions of the Constitution and the principles of Integrated Environmental Management.

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2. APPLICABLE LEGISLATIONS

Several laws and regulations apply to the protection of the environment. These laws contain environmental principles and standards that need to be applied when applicable permits and licences that need to be obtained. This EMP will be subject to regulatory control under a range of State, Provincial and Local regulations. Such legislation largely embraces pollution prevention, sustainable resource use, conservation, and socio cultural (heritage) protection. This chapter reviews legislation pertaining to this generic EMP.

According to Section 2 (1, 2 & 3) of the National Environmental Management Act No. 107 of 1998 (NEMA), all organs of state must apply certain principles set out in NEMA when taking decisions that may significantly affect the environment. The key principles of this Act include that all "actions" that they approve must be economically, socially, and environmentally sustainable. It further states that "people and their needs" must be at the forefront of "its concern" and their interests must be served equitably. These legislative requirements include, but are not limited to, the provisions of the legislation represented as described below:

The Constitution of the Republic of South Africa Act No. 108 of 1996)

Section 24 of the Constitution of South Africa (Act 108 of 1996) states that "Everyone has the right (a) to an environment that is not harmful to their health or well-being; and

(b) To have the environment protected, for the benefit of present and future generations through reasonable legislative and other"

Measures that:

- Prevent pollution and ecological degradation;
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development".
- Section 152 of the Constitution states that the objectives of local government are to:
- Ensure that services are provided to communities in a sustainable manner.

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- Promote social and economic development; and
- Promote a safe and healthy environment.

National Environmental Management Act No. 107 of 1998 (as amended)

The National Environmental Management Act 107 of 1998 (NEMA) requires that an environmental authorization is obtained before activities, which have been listed in terms of NEMA, are commenced with. The failure to obtain such an environmental authorization, before commencing with listed activities, could result in administrative sanctions, including compliance notices or directives ordering the cessation of the operations until authorized; and fines of up to ZAR10 million for each such contravention.

The Environmental Impact Assessment Regulations (EIA Regulations) set out the process to be followed in applying for an environmental authorization, while the listing notices; list the activities that require authorization (the Listing Notices). NEMA 107 of 1998 amended in 07 of April 2017.The following are the listed activities:

- EIA Regulations GNR 326
- Listing Notice 1; Government Notice Number (GNR) 327 (Basic Assessment).
- Listing Notice 2; Government Notice Number (GNR) 325 (Full EIA/ Scoping & Environmental Impact Report).
- Listing Notice 3; GNR 324 (It applies on both Basic Assessment and full EIA).

National Environmental Management: Biodiversity Act No. 10 of 2004

Provides management and conservation of South Africa's biodiversity within the framework of NEMA 107 of 1998; the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources.

The National Environmental Management Waste Act 59 of 2008

The National Environmental Management Waste Act (NEMWA) reforms the law regulating waste management in order to protect health and the environment providing reasonable measures for the

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prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.

The Occupational Health and Safety Act No. 85 of 1993

The Occupational Health and Safety Act make provision in regulation

- Section 8 for the general duties of employers to their employees.
- Section 9 of the Regulations makes provision for general duties of employers and self-employed persons to persons other than their employees.

National Heritage Resources Act (NHRA) No. 25 of 1999

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act. The South African National Heritage Resources Agency (SAHRA) is the responsible authority for implementing the National Heritage Resources Act (NHRA) 1999, (Act 25 of 1999).

Section 38(1) of the NHRA lists development activities that would require authorisation by the responsible heritage resources authority. Activities considered applicable to the proposed project include the following:

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length.

(b) the construction of a bridge or similar structure exceeding 50 m in length; and

(c) any development or other activity which will change the character of an area of land, or water -

i exceeding 5 000 m² in extent,

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ii involving three or more existing erven or subdivisions thereof; or

iii involving three or more erven or divisions thereof which have been consolidated within the past five years; or

iv the costs of which will exceed a sum set in terms of regulations by SAHRA or a Provincial Heritage

v Resources Authority.

(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a Provincial Heritage Resources Authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development.

Water Services Act No. 108 of 1997

This Act provides for the rights of people to basic water supply amongst others basic sanitation. It acknowledges that that there is a duty on all spheres of government to ensure that sanitation services are provided in a manner which is efficient, equitable and sustainable and that it should be sufficient for subsistence and sustainable economic activity. The provision of sanitation services must be undertaken in a manner consistent with the broader goals of water resource management. This goal is in line with the Act as it aims to provide sufficient sanitation services to the region in a sustainable manner.

Conservation of Agricultural Resources (CARA) Act, Act No. 43 of 1983

The CARA aims to ensure the protection of agricultural resources such as land with agricultural potential and water and makes provision for the eradication of alien and invasive species, and protection of topsoil.

NEMA Air Quality Act (AQA), Act No. 39 of 2004

The aim of this law is to regulate air quality and protect the environment in South Africa through reasonable measures to prevent pollution and ecological degradation, while securing sustainable development. The Act also provides national norms and standards for air quality management, monitoring and control. Under this legislation, Priority Air shed Areas can be proclaimed, where specific

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Air Quality Management Plans are applicable. Regulations are also published under this Act for the format of air quality assessments and what should be included in the assessment. Any Air Quality Management Plan which has been compiled for the area and any proposed WwTW should be in line with this Management Plan. This Act may list activities which may result in atmospheric emissions, and which may have a significant detrimental effect on the environment.

Government Gazette 32434 of 24 July 2009 listed activities, which require an atmospheric emission license before it commences. Air quality limits and thresholds are fundamental to effective air quality management, providing the indicators to safe exposure levels for the majority of the population. The current South African standards have been revised and National Ambient Air Quality Standards were promulgated on the 24th of December 2009 (Government Gazette No. 32816, Notice No. 1210). The newly proposed standards include particulate matter specifically PM10 (particulates with a diameter of less than 10 micrometre), sulphur dioxide (SO2), nitrogen dioxide (NO_2), ozone (O3), lead, carbon monoxide (CO) and benzene. These revised standards have been adopted as the VTAPA air quality objectives. Any emissions from the proposed WWTW should be within these standards.

National Water Act (NWA), 36 of 1998

Water use is controlled by the National Water Act (NWA) Act No. 36 of 1998. The NWA recognises that water is a scarce resource in South Africa and its provisions are aimed at achieving sustainable use of water to the benefit of all users. The provisions of the Act are thus aimed at discouraging pollution and waste of water resources. According to Section 21 of the NWA the following activities require a water use licence (WUL) prior construction:

"21.(a) taking water from a water resource;

21.(b) storing water;

21.(c) impeding or diverting the flow of water in a watercourse;

21.(d) engaging in a stream flow reduction activity contemplated in section 36;

21.(e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);

21.(f) discharging waste or water containing waste into a water resource through a pipe, canal,

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sewer, sea outfall or other conduit;

21.(g) disposing of waste in a manner which may detrimentally impact on a water resource;

21.(h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;

21.(i) altering the bed, banks, course or characteristics of a watercourse;

21.(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and

21.(k) using water for recreational purposes."

3. OBJECTIVES OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

The purpose of this EMP is to provide an easily interpreted reference document that ensures that the project environmental commitments, safeguards and mitigation measures from the environmental planning documents, project approvals, and scope of work are implemented.

The objectives for the EMP are:

- To develop, implement and maintain effective management systems for the environmental aspects.
- To document details of environmental protection infrastructure and controls so that they are able to provide long term protection for the natural environment.
- To ensure compliance with relevant legislation (National, Provincial and Local), regulatory requirements and environmental documents.
- To maximise the value and outcomes of environmental monitoring activities so that the information can be applied to the planning and implementation of future projects.
- To ensure that all Environmental Management considerations are implemented during the planning, operational and maintenance phases of the project.

All the environmental specifications and the procedures discussed in this document were also developed in accordance with the relevant legislation applicable to the development.

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3.1 Phases of the Project

The EMP deals with the following phases as detailed below:

3.1.1 The Planning and Design Phase

Overall Goal for Planning and Design: Undertake the planning and design phase of the development in a way that:

- Ensures that the design of the proposed development responds to the identified environmental constraints and opportunities.
- Ensures that the best environmental options are selected for all components of the project.
- **Ensures that there is sufficient financial provision for environmental assessment, monitoring, rehabilitation, and maintenance. The JW rehabilitation calculation template must be used (See Annexure D).**
- The qualified landscaping specialist must be appointed to undertake rehabilitation on site. The landscaping specialist must pose the following qualifications and work experience:

  - Landscaping Specialist should at least have BA/BSc Honours Degree or 4-year Degree in Natural Sciences/Ecological

  - The Landscaping Specialist must at least be registered with South African Council for Natural Scientific Professions (SACNASP) as a Professional Natural Scientist (Copy of SACNASP Certificate must be submitted).

  - At least three letters from their client/s must be submitted, detailing the landscaping work he/she has undertaken (letters should have the name of the client, description of the project and/or scope of work done, contact details and must be signed). Letters should be in their client's company letterhead, and it must indicate if the work has been completed satisfactorily or not. - Copy of CV must be submitted, specialist should at least have a minimum of five (5) years working experience as landscaping Specialist (See Table 1).

The EMP offers an ideal opportunity to incorporate pro-active environmental management measures with the goal of attaining sustainable development.

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Pro-active environmental measures minimize the chance of impacts taking place during the construction and operational phase. There is still the chance of accidental impacts taking place; however, through the incorporation of contingency plans (e.g., this EMP) during the planning phase, the necessary corrective action can be taken to further limit potential impacts. In order to meet this goal, action plans for planning and design stages of the project must be identified together with monitoring requirements.

3.1.2 The Construction Phase

The bulk of the impacts during this phase will have immediate effect (e.g., noise-, dust- and water pollution etc.) If the site is monitored on a continual basis during the construction phase, it is possible to identify these impacts as they occur. These impacts will then be mitigated through the contingency plans identified in the planning phase, together with a commitment for sound environmental management from Johannesburg Water and its agents.

3.1.3 Rehabilitation and Reinstatement Phase

This phase will involve restoring the land impacted during the construction phase back to its original state (in the case of slopes, gradients, soil profiles, and hydrology) or better. This process will be mainly on rectifying the negative impacts that have been caused during construction by the removing pollution or contaminants and other dangerous substances from groundwater, sediment, or surface water and improvement of the soil.

3.1.4 The Operational Phase

By taking pro-active measures during the planning and construction phases, potential environmental impacts emanating during the operational phase will be minimised. This, in turn, will minimise the risk and reduce the monitoring effort, but it does not make monitoring obsolete.

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4. ROLES AND RESPONSIBILITY

The implementation of this EMPr requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during the construction and operational phases. The stakeholders are discussed below:

4.1 Johannesburg Water and its Agents shall:

Ensure that the EMP is kept on JW's Sites and construction sites.

- Remain ultimately responsible for ensuring that the development is implemented according to the requirements of the EMP.
- Ensure that the Environmental section attends all project related tender briefing sessions.
- Although Johannesburg Water appoints specific role players to perform functions on its behalf, this responsibility is delegated.
- Be liable for restoring the environment in the event of negligence leading to damage to the environment.
- Ensure that the EMP is included in the tender documentation so that the contractor who is appointed is bound to the conditions of the EMP, and there's sufficient budget for environmental assessments and/or assessment during the planning, design, construction, replacement of vegetation and restoration of habitats, decommissioning (rehabilitation) phases of the project.
- Ensure that the contractor appointed understands, acknowledges and fully accepts the content of this EMP and their responsibilities for implementation and compliance.
- Monitor compliance with the conditions of the environmental authorisation and the EMP and compliance audits are undertaken.
- Ensure that the Environmental section signs all close out reports to confirm rehabilitation.

4.2 Appointments and competencies

- The contractor and its appointed sub-contractor must meet the relevant legislative and non-statutory appointments, which must be maintained valid for the entire contract duration.
- All appointees shall be suitably trained and certified competent for the responsibilities they are assigned for.

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- Copies of all relevant appointments and the relevant competence certificates must be kept in the relevant Environmental file.

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Table 1: Environmental Officer's Appointment Index

Appointment	Project Type	Legislative Ref	Competency requirements (Min)
Contractor SHE Officer	Unauthorised Project	JW EMP/ JW Waste Management Procedure	National Diploma in Safety & ISO14001:2015 (Introduction/Awareness, implementation, and auditing ISO14001:2015) + 2 years' Experience **OR** National Diploma in Environmental Management + 2 years' Experience OR NEBOSH / SAMTRAC & Basic ISO14001:2015/ Basic Environmental Awareness (Introduction and Implementations to ISO14001:2015) + 4 years' Experience. Register with SACPCMP.
Contractor Environmental Liaison Officer/Environmental Officer	Authorised project	JW EMP and Project Specific approved EMP /Directives/Environmental Authorisation/GA/WUL	National Diploma in Environmental Management/ + 3 years' Experience. BA/BSc Environmental Management + 3 years' experience. The recommended and/or market related minimum Salary/wages for ELO/EO should be **R17 000.00.**

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Environmental Representative/Environmental Rep	Unauthorised Project	JW EMP	Must hold a Senior Certificate (Matric) and one of the following qualifications. National Diploma in Environmental Management/ BA/BSc Environmental Management or Science/ISO 14001:2015(Introduction; Implementation and Auditing/Certificate in Environmental law/National Certificate in Environmental Management. The recommended and/or market related minimum salary/wages for Environmental Representative should be **R10 000.00.**
Consultant Environmental Control Office	Authorised project (as and when required)	JW EMP and Project Specific approved EMP /Directives/Environmental Authorisation/GA/WUL	Reputable Environmental Consulting Company National Diploma or BA/BSc Environmental Science or Management + 3 years' experience as an independent ECO/Consultant
Landscaping Specialist	Unauthorised and Authorised project	JW EMP and Project Specific approved EMP /Directives/Environmental Authorisation/GA/WUL	Reputable Environmental Consulting firm /Landscaping Company.

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			Landscaping Specialist should at least have BA/BSc Honours Degree or 4-year Degree in Natural Sciences/Ecological. - The Landscaping Specialist must at least be registered with South African Council for Natural Scientific Professions (SACNASP) as a Professional Natural Scientist (Copy of SACNASP Certificate must be submitted). - Specialist should at least have a minimum of five (5) years working experience as landscaping Specialist (See Table).

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4.3 The Contractor shall:

- Be bound to conform to the EMP conditions through his/her contract with Johannesburg Water, and is responsible for ensuring that he adheres to all the conditions of the EMP.
- Thoroughly familiarise with the EMP requirements before construction begins and must request clarification on any aspect of these documents, should they be unclear.
- Be responsible for mitigation and rehabilitating all environmental damage at his/her expense.
- Ensure adherence to, and implementation of, the environmental management specifications.
- Ensure that environmental damage, whether intentional or unintentional, is prevented in the first instance, mitigated and rehabilitated, and must adopt a proactive approach followed by a reactive approach.
- Ensures identification of, and compliance with, all environmental laws, all by laws and regulations.
- Ensure that any instructions (whether verbal or written) issued by the site manager, project manager, site engineer or EO, in terms of the EMP is adhered to.
- Ensure that an environmental compliance report is tabled at each site meeting, which must document all incidents, complaints, and non-compliances, and their close out progress, which has occurred during the period before the site meeting.
- Provide a photographic report to JW upon request showing close out of identified issues.
- Provide any project or compliance information that may be requested by JW in any format as requested.
- Ensure that proposed site camp areas are approved by JW environmental section prior to establishment.
- Ensure compliance with the EMP conditions even if there will be no site camps or the project is an emergency or subject to Directives.
- Take comprehensive site photographs for before, during and after construction.
- Ensure that each individual resident/landowner/stakeholder requirement is documented, pertaining to the area to be disturbed, special features, vegetation to be disturbed, rehabilitation requirements (contractors must state to residents/stakeholders that indigenous vegetation species will be put

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back, however, should residents/stakeholder require non-indigenous species to be replaced, these are to be documented before being affected) prior to any disturbance.

- Provide a detailed, site-specific method statement for rehabilitation, which must be approved by JW Engineer and EO.
- Ensure that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting.
- Ensure that incidents register is kept in the site office.
- Ensure that a register of all public complaints is maintained.
- Ensure that all employees, including those of sub-contractors receive Environmental Induction before the commencement of construction in order that they can constructively contribute towards the successful implementation of the EMP (i.e., ensure their staff are appropriately trained as to the environmental obligations).
- Ensure that all disturbed areas are rehabilitated and at least 85% healthy grass/ground cover has established, that rehabilitation is maintained, the sites are free of erosion, waste and pollution of any kind including rubble and spills, and free of weeds and alien invasive species.
- Appoint an Environmental Liaison Officer (ELO) prior Construction for Environmental Authorised Projects.
- Appoint SHE Officer prior Construction for unauthorized projects i.e., the SHE Officer with Environmental Management experience or be trained on Environmental legislation.
- Provide accurate and factual information pertaining to the projects, communications, and discussions at all times.
- Is responsible for NEMA Duty of Care, and Polluter pays principle.

4.4 Environmental Liaison Officer (ELO)/ SHE Officer shall:

- Ensure that the project team is involved in all aspects of project planning that can influence environmental conditions on the site.
- Be permanently on site during the construction phase to oversee the Contractor's internal compliance with the EMP requirements and ensuring that the environmental specifications are adhered to.

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- Assist with day-to-day monitoring of the construction activities. Ensure that any issues raised by the EO will be routed to the SHE Officer for the contractors' attention.
- The ELO/ SHE Officer shall be permanently on site during the construction phase to oversee the Contractor's internal compliance with the EMP requirements and ensuring that the environmental specifications are adhered to.
- Be responsible for keeping detailed records of all site activities that may pertain to the environment and include all these aspects in an environmental register.
- Maintain site documentation and records related to environmental management (EMP, authorisations, permits, way-eaves, method statements, audit reports, monitoring results, receipts for waste removal, environmental file, etc.)
- The ELO/SHE Officer must keep a register of complaints from any community members on environmental issues.
- The ELO /SHE Officer will be required to keep a record of all on-site environmentally related incidents and how these incidents were dealt with.
- Ensure daily implementation of the EMP conditions, and monitoring of the contractor's compliance with EMP conditions, using checklists and visual inspections.
- Provide location details for possible site camp locations to JW environmental section and await approval from this section before establishing.
- Inform JW environmental section when actual work is about to commence.
- Inform JW environmental section of pending completion activities and intention to de-establish, prior.
- Ensure proper rehabilitation is undertaken before site closure.

4.5 Resident Engineer (RE)/ Site Agent shall:

- Liaise with the Contractor and Environmental Officer (EO) on environmental matters, as well as any pertinent engineering matters where these may have environmental consequences.
- Oversee the general compliance of the Contractor with the EMP and other pertinent site specifications.

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- Familiarise him/herself with the EMP specifications and further monitor the Contractor's compliance with the Environmental Specifications daily through the Site Diary and enforce compliance.
- Ensure that Monthly Audits reach the contractor before Monthly Progress Meeting.
- Ensure proper rehabilitation is undertaken before site closure.

4.6 Project Engineer /Inspectors (PE/PI) shall:

- Ensure that there is a sufficient budget for complying with all EMP conditions at the tender stage.
- Ensure sufficient budget is provided for rehabilitation/ Reinstatement.
- Ensure proper rehabilitation is undertaken before site closure.
- Ensure of all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
- Ensure that Contractor(s) are made aware of all stipulations within the EMP.
- Ensure that the EMP is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
- Be fully conversant with the EIA for the project, the EMP, the conditions of the Environmental Authorisation (if applicable), and all relevant environmental legislation.
- Ensure compliance monitoring of contractors on a day-to-day basis.
- Ensure adherence and implementation of the tender requirements.
- Ensure reference of specific non-compliance/non-conformance issues to the responsible units and/or contractors.

4.7 Environmental Officers shall:

- Be responsible for informing the contractors of any decisions that are taken concerning environmental management during the project phase.
- This would also include informing the contractors of the necessary corrective actions to be taken, issuing stop work orders and rehabilitation and remediation instructions if necessary.
- Liaise with environmental authorities where necessary.
- Review all the environmental documents submitted by the Contractor, including sign off.

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- Review all the environmental documents from the Contractor, including sign off.
- Conduct environmental monthly audits of all contractors' work on site where necessary
- Maintain site documentation of related to environmental management (EMP, Method statements, audit reports, monitoring results, receipts of waste removal etc.). Documents to be maintained on the relevant site Documents Control Systems.
- Inspect and report on environmental incidents and check corrective actions.
- Conduct environmental incidents enquiries.
- Review and sign off method statements prepared by Contractors.
- Ensure that an environmental compliance monitoring strategy/framework is implemented.

4.8 Environmental Control Officer (ECO)

The role of the ECO shall be to:

- Act as site 'custodian' for the implementation, integration, and maintenance of the EMPr in accordance with the contractual requirements.
- Ensure successful implementation of the EMPr; and
- Ensure that the Contractor, his employees and/or Subcontractors receive the appropriate environmental awareness training prior to commencing activities.

The responsibilities of the ECO will be to:

- Liaise with the JW Environmental Section and Project Engineer on the level of compliance with the EMPr achieved by the Contractor on a regular basis for the duration of the contract.
- Advise the Project Engineer on the interpretation and enforcement of the Environmental Specifications (ES), including evaluation of non-compliances.
- Enforce compliance with the EA and EMP through audit report and checklist
- Supply environmental information as and when required.
- Review and approve Method Statements produced by the Contractor, in conjunction with the PM and EO.
- Monitor any basic physical changes to the environment because of the construction works according to an audit schedule.

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- Attend regular site meetings and project steering committee meetings.
- Undertake regular monthly audits of the construction works and to generate monthly audit reports. These reports are to be forwarded to the JW EO who will communicate the results and conclusions with the principal Contractor.
- Submit audit reports to the authority as per the requirement of issued Environmental Authorisation.
- Communicate frequently and openly with the Contractor and the Project Engineer to ensure effective, proactive environmental management, with the overall objective of preventing or reducing negative environmental impacts and/or enhancing positive environmental impacts.
- Advise the Project Engineer on remedial actions for the protection of the environment in the event of any accidents or emergencies during construction, and to advise on appropriate clean-up activities.
- Review complaints received and made instructions as necessary; and
- Identify and make recommendations for minor amendments to the EMPr as and when required.

4.9 Environmental Representative (Environmental Rep) shall:

- Review the effectiveness of environmental measures in the workspace/construction environment for which he/she was appointed.
- Identify potential impacts in the workplace.
- Investigate environmental incidents and identify root causes.
- Investigate Environmental Complaints.
- Conduct Awareness training.
- Participate in Environmental inspections.
- Ensure compliance with JW EMP and other environmental management related legislations.
- Ensure Proper Rehabilitation is conducted.
- Attend site SHE meetings where Environmental issues are addressed.
- Guide Construction crew/team on environmental requirements as per JW EMP.
- Assist in day-to-day monitoring of construction activities.

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- Assist in implementation of ISO 14001:2015 standard.
- Assist the SHE Officer/EO with preparation of audits /inspections.

5. CONTENTS FOR CONTRACTOR'S ENVIRONMENTAL FILE

The following documents must be submitted by the contractor in the Environmental file before Construction commences on site. The file must be submitted to the Environmental Section prior construction for approval. The Contractor should achieve a minimum score of 80% for the file to be approved (**Refer to Annexure B: Environmental File Specification).**

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6. ENVIRONMENTAL SPECIFICATIONS

Table 2: Environmental Management and Mitigation Measures that must be implemented during the Design Phase and Construction Phase

Design Phase Measures						
Aspects	**ID**	**Mitigation Measure/Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods**	**Performance indicators**
Project Planning/Design	**1**	• Proposed project is submitted to Environmental Section for screening (Project scope/layout/Maps), • CAPEX and Ops must ensure that there is budget allocated for environmental management throughout the project life cycle i.e., planned project and Directives.	Johannesburg Water (CAPEX/Ops)	Before project commences	• Screening report • Tender document	Keep the records of the project screening report and scope of work as per Directives
Authorisation	**2**	• Appoint Consulting Company • Ensure that all required licences and permits have been obtained before the start of construction. • Ensure that ECO and/or ELO is appointed as per the authorisation and EMP requirement during project execution (as when and required).	Johannesburg Water (CAPEX/ Environmental Section)	Before construction commences	Keep record of all permits, licences and authorisations	Keep record of all permits, licences and authorisations
Project Handover	**3**	• The scope of a project is outlined by CAPEX Engineer during the handover meeting. • Environmental Management Requirements are outlined during the handover meeting.	Johannesburg Water (CAPEX/ Environmental Section)	Before construction commences	Meeting invite EA/GA/WUL/ Screening report	Keep record of all permits, licences and authorisations
Environmental Awareness Training/Inductions	**4**	• Environmental awareness training is given to the Project Team Leaders • Environmental File Specification provided to the Contractor. • JW Environmental Management Plan and other procedures are provided to the Contractor.	Johannesburg Water (CAPEX/ Environmental Section)	Before construction commences	Meeting invite	Meeting records

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Environmental File & Evaluation	**5**	• Contractor submits environmental file for approval prior work commences on site. • Construction activities/work (including site establishment) should ONLY commence when file is approved.	Appointed Contractor/Environmental Section	Before construction commences	Environmental evaluation report.	Approval/ rejection letter records
Construction Phase Measures						
Aspects	**ID**	**Mitigation Measure/Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods**	**Performance indicators**
Site camp establishment	**1**	• Invite the Environmental Officer for the site inspection of proposed site camp prior establishment. • Submit a method statement for Site Camp establishment for approval by JW Environmental Officer/ECO prior commencement of works. • Establish a suitably fenced Site Camp at the start of the contract, which will allow for site offices, vehicle, equipment, material, and waste storage areas to be consolidated as much as possible. Locate the Site Camp at a position approved by the JW EO, at least 100m from watercourses and in an area which is not ecologically sensitive. • Provide water and/or washing facilities at the Site Camp for personnel. • Lim it construction and lay down areas to areas within the development footprint. • Ensure that environmentally friendly on-site sanitation options are selected, and these facilities are properly managed and maintained. • Designated eating areas shall be provided on site. • These eating areas shall be clearly demarcated and shall be provided with bins with lids.	All Contractors	Before commencement of Project	• Visual inspection • Site establishment checklist/Method statement	Method statements approved by CAPEX and the Environmental Officer • Position of Site Camp approved by ECO • Security and access to Site Camp controlled • Clear demarcation of no-go areas as agreed with JW EO. • Detailed site layout plan • Environmental file approval letter.

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		• Staff will be prohibited from consuming meals anywhere other than at these eating areas and that noise is limited. • All eating areas shall include provision for a water and smoking area.				
Environmental Awareness Training	**2**	• Provide environmental awareness training to all personnel on site at the start of their employment. Training should include discussion of: • Potential impact of construction waste and activities on the environment. • Suitable disposal of construction waste and litter. • Key measures in the EMPr relevant to worker's activities. • How incidences and suggestions for improvement can be reported. • Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names.	All Contractors	• Before workers start working onsite • Before new activities are undertaken	• Check training attendance register • Observe whether activities are executed in line with EMPr requirements	• Proportion of workers that completed. • Environmental training Compliance of workers with EMP
Plant Search and Rescue/Vegetation clearing	**3**	• From information gathered during the plant marking exercise, establish the size. • Requirements for the plant rescue team workforce, and the methodology to be employed during the rescue to maximise the likelihood of success; Document and motivate which species found on site are considered to be conservation worthy. • Follow a multi-pronged approach to maximise the likelihood of success wherever feasible. In addition to transplanting of whole plants, seed can be collected and sown in situ in suitable habitats and/or in an off-site nursery. • Any plants not suitable for transplantation must be considered for transplanting to existing conservation	All Contractors	Before commencement of activities	Visual Inspection/ inspection by Botanist/Ecologist	• Incidents of harm coming to fauna/ flora. • Number of incidents of disturbance of vegetation outside construction site boundary; and • Size of area cleared relative to

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		areas nearby. This could involve growing these plants on in an off-site nursery for a period of time. • Depending on the conservation worthy species found, the location of suitable existing conservation areas nearby and the location of the off-site nursery, the most appropriate plant rescue options must be detailed in the search and rescue plan, and could be a combination of the following options: • All required permits must be obtained from the appropriate authority covering plants to be affected by the plant rescue operation prior to the removal of the plants. • Demarcate the area for construction prior to each phase and prevent access by construction personnel outside of this area. • Appoint a suitably qualified botanist to undertake search and rescue of key plant species in the development footprint where necessary (Where is applicable. Clearly demarcate sensitive areas, including buffers, with appropriate signage. • Do not allow personnel to enter calcrete vegetation areas. • Do not allow personnel to pick or destroy plants outside of the construction footprint. • Limit clearing to those areas within the footprint of construction for each phase. • Restrict construction vehicles to designated roadways. • Do not allow the temporary storage of building material within sensitive areas. **Aftercare and monitoring**				development footprint • Size of area disturbed outside of construction site boundary. • Areas of development footprint must be clearly demarcated

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		• Record numbers and diversity of propagated plants and the health of the same, until they can be planted out; • Aftercare of transplanted plants to be done in accordance with the plant search and rescue plan by an appropriate agent (e.g., staff from the commercial nursery or an appropriately trained onsite Contractor), including watering and alien plant control requirements. If done correctly, the frequency of input will decrease with time. • Record numbers and diversity of transplanted plants and the health of the same. • Monitoring must be undertaken as per requirements of the plant search and rescue plan approved by GDARD, including monitoring of alien plants and maintenance of a photographic record; and • Provide a detailed record (including photographic record) that indicates the success of the plant rescue operation. Records of corrective action taken to improve management of transplanted plants, where relevant, must also be completed. **Applicable Legislation** • National Environmental Management Act: Biodiversity Act (Act 10 of 2004) including Threatened or Protected Species Regulations. • National Environmental Management Act (Act 107 of 1998). • Gauteng Nature Conservation Bill, 2014/Transvaal Nature Conservation Ordinance 12 of 1983; and • National Forests Act (Act 30 of 1998).				

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Excavation	**4**	• The process of excavation and back filling must be carried out as a sequential process following one another as quickly as possible. • Excavations must only remain open for a minimum period of time and during this time they must be clearly demarcated. If excavations place the public at risk these sites must be fenced. • Where possible, close excavations immediately after pipe is laid. • The residents directly affected by open trenches must be notified of the dangers. This will be done during the site-specific phase. • Danger tape shall not be utilised to prevent personnel from open excavations, orange nets should be used for all open excavations on site. Construction vehicles should avoid creating new roads, use existing roads. • Wet exposed surfaces using a water cart, bowser or use a biodegradable and environmentally friendly soil binder to prevent dust emissions. • Dewater excavations regularly and channel water to areas of grass cover. If dewatering is near/within a watercourse and is to be discharged to a watercourse, ensure a silt fence/net and sandbags are used to reduce silt loads. • Topsoil must be cleared (considered to be the upper 150mm of soil surface) and retained as it contains most inorganic matter and nutrients. Topsoil must be kept separate from subsoil and stored in windrows parallel to excavations. • Harvested grass should be retained and used as a mulch to combat erosion.	All Contractors	Throughout construction	Visual inspection	• Daily site inspection. • Damage to the environment (sensitive environment)

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		• Soil should be exposed for the minimum time possible once cleared of indigenous or invasive vegetation. • Avoid prolonged exposure of soils to wind and water erosion when clearing and grubbing. • The stockpiled topsoil (which will be left standing for more than 1 month) must be covered with suitable fabric, and / seeded, to prevent erosion and weed invasion. • Stockpiled topsoil must be covered with suitable fabric to prevent erosion and weed invasion. • No vehicles are allowed to access onto the stockpiles after they have been placed. • Topsoil and subsoil must be kept separate throughout construction and rehabilitation. • A marsh wire or snow netting shall be erected around the exposed excavations to warn the public. • The contractor must rip and rehabilitate temporal roads after project completion. • The Contractor shall be in possession of an emergency oil and chemical spill kit, drip trays and bioremediation substances/enzymes that must be complete and available on site at all times.				
Topsoil and subsoil	**5**	• The contractor should remove 150mm of topsoil and stockpile at a height of not more than 1m. • Topsoil should be temporarily stockpiled, separately from (clay) subsoil and rocky material, when areas are cleared. If mixed with clay sub-soil the usefulness of the topsoil for rehabilitation of the site will be lost. • Stockpiled topsoil should not be compacted and should be replaced as the final soil layer. No	All Contractors	During Vegetation clearance	Visual inspection	• Incident of incorrect storage and harvesting. • Manifestation of alien invasive plants. • Incident of erosions.

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		vehicles are allowed access onto the stockpiles after they have been placed. • Stockpiled soil should be protected by erosion-control berms if exposed for a period of greater than 14 days during the wet season and seeded. • Topsoil must be hydro seeded during shut down in December. • Topsoil stripped from different sites must be stockpiled separately and clearly identified as such. • Topsoil obtained from sites with different soil types must not be mixed. • Topsoil stockpiles must not be contaminated with oil, diesel, petrol, waste or any other foreign matter, which may inhibit the later growth of vegetation and micro-organisms in the soil. • Soil must not be stockpiled on drainage lines or near watercourses without prior consent from the Project Manager. • Soil should be exposed for the minimum time possible once cleared of invasive vegetation, that is the timing of clearing and grubbing should be co-ordinated as much as possible to avoid prolonged exposure of soils to wind and water erosion. • Stockpiled topsoil must be either vegetated with indigenous grasses or covered with a suitable fabric to prevent erosion and invasion by weeds. • Limited vehicular access is allowed across rocky outcrops and ridges. • All cut and fill surfaces need to be stabilized with appropriate material or measures when major civil works are complete. • Erosion and donga crossings must be dealt with as river crossings. Appropriate soil erosion and control				

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		procedures must be applied to all embankments that are disturbed and destabilized as per the Authorisation • All equipment must be inspected regularly for oil or fuel leaks before it is operated. Leakages must be repaired on mobile equipment or containment trays placed underneath immobile equipment until such leakage has been repaired. • Soil contaminated with oil must be appropriately treated and disposed of at a permitted landfill site or the soil can be regenerated using bio-remediation methods. • Runoff must be reduced by channelling water into existing surface drainage system.				
Protection of archaeological and heritage resources	**6**	• Alert the construction workforce of the potential existence of artefacts at the site. • Empower staff to stop works on (chance) discovery of artefacts at the site. • Cease construction on (chance) discovery of archaeological sites of heritage importance or redirect machinery away from finds until an archaeologist is able to make a site inspection and establish the importance of the find and make recommendations for preservation and/or record keeping. • Report the presence of graves or human remains, fragments of fossil bone, ostrich egg and stone fragments to HWC. • Obtain a permit for the removal of artefacts from the site if any are discovered during construction.	All Contractors/Johannesburg Water	• Before Construction commences • During earthworks	Visual inspection	• Discovery of possible archaeological material • Rescue and reporting of identified material when discovered
Protection of paleontological resources	**7**	• Identify a stand-by palaeontologist to inspect fossils if they are discovered during construction activities.	Johannesburg Water	Prior commencement	Visual inspection	• Discovery of possible

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		• Empower staff to stop works on (chance) discovery of fossils at the site. • Alert the construction workforce of the potential existence of fossils at the site. • Cease construction on (chance) discovery of fossils and artefacts of paleontological importance or direct machinery away from finds until the identified palaeontologist is able to make a site inspection and establish the importance of the find and make recommendations for preservation, collection or record keeping.	All Contractors	During earthworks		archaeological material. • Rescue and reporting of identified material when discovered.
Concrete / cement Work/Batching plant	**8**	• Use Ready-Mix concrete rather than batching where possible. • Ensure that no cement truck delivery chutes are cleaned on site. Cleaning operations are to take place off site at a location where wastewater can be disposed of in the correct manner. If this is not possible a suitable washing facility is to be developed on site in consultation with the ECO. • Concrete must be mixed only in an area demarcated for this purpose, ideally on an impervious surface (e.g., cement mixing pit). • Batching operations to take place in a designated area, which will be kept clean at all times. • All concrete spilled outside this area, must be promptly removed by the Contractor and taken to a permitted waste disposal site. • After all concrete mixing is complete; all waste concrete must be removed from the batching area and disposed of at an approved dumpsite. • Ensure separation of clean and dirty water from batching plant.	All Contractors	Throughout construction	Visual inspection and JW EO/ECO approval.	• Number of incidents of batching outside works footprint. • Contamination of water and soil; and • Visible litter / waste on site.

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		• Storm water must not be allowed to flow through the batching area. Water laden with cement must be collected in a retention area for evaporation and not allowed to escape the batching area. • Operators must wear suitable safety clothing. • Wastewater from batching operations to be suitably disposed of. • Waste concrete and cement sludge to be removed on a regular basis (to prevent overflowing) and to be disposed of at a suitable facility. • Unused cement bags will be stored in an area not exposed to the weather and packed neatly to prevent hardening or leakage of cement. • Used cement bags will be stored so as to prevent windblown dust and potential water contamination. Used bags will be disposed of adequately at a licenced waste disposal facility. • Limit concrete batching to single sites where possible. • Concrete transportation will not result in spillage. • Cleaning of equipment and flushing of mixers will not result in pollution, with all contaminated wash water entering the wastewater collection system. • To prevent spillage onto roads, ready mix trucks will rinse off the delivery shoot into a suitable sump prior to leaving the site. The Contractor shall ensure such designated concrete wash bay area's/ sumps are created and that all concrete trucks delivering concrete to site first empty and clean their shoots at this point before leaving the site. The dried waste product shall be handled as construction rubble.				

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		• Suitable screening and containment will be in place to prevent windblown contamination from cement storage, mixing, loading and batching operations. • All contaminated water and fines from exposed aggregate finishes will be collected and stored in sumps and will be adequately disposed of. • All visible remains of excess concrete will be physically removed on completion of the plastering or concrete pouring and disposed of in an acceptable manner. • Any spilled concrete to be cleaned up immediately. • In practice all wastes arising from construction activities are to be handled; transported and disposed of in accordance with the relevant regulations. All efforts should be made to minimise, reclaim or recycle waste, and failing that, dispose of it in a manner licensed by the government for that purpose.				
Water Management	**9**	• Con serve water wherever possible (e.g., ensure that areas are not watered excessively, and all leaking pipes are replaced and repaired immediately). • Adequate erosion, runoff and sedimentation prevention, control and mitigation measures must be instituted at all sensitive areas, such as embankments, slopes, river crossings/watercourses/drainage lines, wetlands, when excavations or disturbance occurs within these areas, within the buffers, beds, and banks. • These control measures must include use of silt fences/traps, sandbags, retention of vegetation, berms, immediate replacement of vegetation. Additionally, reno mattresses, riprap, stone pitching,	All Contractors	Throughout construction/post construction	Visual inspection	• Incidence of storm water contamination. • Visible leaks/ water wastage. • And Visible surface erosion.

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		gabions, use of geotextiles) e.g., biojute must be used at the direction of the JW Engineer. • Adequate sedimentation control measures must be instituted at any river crossings when excavations or disturbance of a riverbanks or riverbeds takes place. • Adequate sedimentation control measures must be implemented where excavations or disturbance of drainage lines of a wetland may take place. • All fuel, chemical, oil, etc. spills must be confined to areas where the drainage of water can be controlled. Use appropriate structures and methods to confine spillages such as the construction of berms and pans, or through the application of surface treatments that neutralise the toxic effects prior to the entry into a water course. • The drip trays and spill kits must be used to contain oil from spilling into the water. Ensure adequate drip trays are available. • During construction through a wetland or watercourse, the majority of the flow of the wetland should be allowed to pass downstream. • Vehicular traffic across wetland and watercourse areas must be avoided. • No dumping of foreign material in streams, rivers and/or wetland areas is allowed. • The wetland area and/or river must not be drained, filled or altered in any way including alteration of a bed and/or, banks, without prior consent from the DWS. The necessary licenses must be obtained in terms of Section 21 and 22 of the National Water Act, 36 of 1998 from DWS. • No fires or open flames are allowed in the vicinity of the wetland, especially during the dry season.				

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		• No swimming, washing (including vehicles and equipment), fishing or related activity is permitted in a wetland or river. • Disturbances to nesting, breeding and roaming sites of animals in or adjacent to wetland areas must be minimized. • Portable Water shall be the last resort info dust suppression on site.				
Air Pollution	**10**	• Speed limits must be implemented in all areas, including public roads and private property to limit the levels of dust pollution. • Dust must be suppressed on access roads and construction sites during dry periods by the regular application of water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that must not result in the generation of run-off. • Where possible the use of potable water should be minimised for dust suppression purposes, preferably recycled or reused water. • The site-specific investigation will quantify the impact of dust on nearby wetlands, rivers and dams in terms of sedimentation. Mitigation measures identified during the site-specific study must be implemented. • The Contractor must notify the principal of all schools within 50m of the site of proposed activities. The principal must in turn ensure that children with allergies and respiratory ailments take the necessary precautionary measures during the construction period. The Contractor must ensure that construction activities do not disturb school	All Contractors	Throughout construction	Visual inspection	• Visible air pollution.

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		activities e.g., dust clouds may reduce visibility affecting sports activities. • Waste must be disposed of, as soon as possible at a municipal transfer station, skip or on a permitted landfill site. Waste must not be allowed to stand on site to decay, resulting in malodours. • Noise control measures must be implemented. All noise levels must be controlled at the source. All employees must be given the necessary ear protection gear. IAP's must be informed of the excessive noise factors. • The Contractor must inform all adjacent landowners of any after-hour construction activities and any other activity that could cause a nuisance e.g., the application of chemicals to the work surface. Normal working hours must be clearly indicated to adjacent landowners. • No loud music is allowed on site and in construction camps. • No fires are allowed if smoke from such fires will cause a nuisance to IAPs.				
Social and cultural	**11**	• Access by non-construction people onto any construction sites must be restricted. The Contractors activities and movement of staff must be restricted to designated construction areas only. • The Contractors crew must be easily identifiable due to clothing, identification cards or other methods. • Rapid migration of job seekers could lead to squatting and social conflict with resident communities and increase in social pathologies if not properly addressed. The Contractor must ensure that signs indicating the availability of jobs are installed.	All Contractors	Throughout construction	Visual inspection	• Community complaints. • Complaints register. • Daily environmental inspection

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		• Criteria for selection and appointment (by the Contractor) of construction labour must be established to allow for preferential employment of local communities. The Local Authority must be actively involved in the process of appointing temporary labourers. • Sub-Contractors and their employees must comply with all the requirements of this document and supporting documents e.g., the Contract document that applies to the Contractor. Absence of specific reference to the sub-contractor in any specification does not imply that the sub-contractor is not bound by this document. • No member of the construction workforce is allowed to wander around private property, except within the immediate surroundings of the site. • The Contractor must provide suitable sanitation facilities for site staff. Sanitation provided during the construction phase should be managed so that it does not cause environmental health problems. The use of the surrounding veld for toilet purposes is not permitted under any circumstance. • The Contractor must arrange for all his employees and those of his sub-contractors to be informed of the findings of the environmental report before the commencement of construction to ensure: • A basic understanding of the key environmental features of the work site and environments, and • Familiarity with the requirements of this document and the site-specific report. • Supervisory staff of the Contractor or his sub-contractors must not direct any person to undertake any activities which would place such person in				

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		contravention of the specifications of this document endanger his/her life or cause him/her to damage the environment. • The demand for construction materials and supplies will have an effect on the local economy. This impact can be optimised by sourcing and purchasing materials locally and regionally wherever possible, insofar as the material complies with the design specification. • The Contractor must maintain a detailed complaints register. This must be forwarded, together with solutions, to the authorities when requested.				
Aesthetics	**12**	• Scenic Quality • Damage to the natural environment must be minimized. • The contractor may not remove any trees. If trees are in the way of the pipe route or with the development sites, the contractor must inform the environmental section who will then liaise with city parks for permission or recommendation. • Trees and tall woody shrubs must be protected from damage to provide a natural visual shield. Excavated material must not be placed on such plants and movement across them must not be allowed, as far as practical. • The clearing of all sites must be kept to a minimum and surrounding vegetation must, as far as possible, be left intact as a natural shield. • No painting or marking of natural features must be allowed. • Above-ground Structures (reservoirs, water hammer tanks, valve chambers, pump stations etc.)	All Contractors	Throughout construction	• Visual inspection. • Way-leaves	• Daily inspection • Environmental incident.

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		• All above ground structures should be located in areas where the visual impact from roads, houses etc. is minimised. • All above ground structures could be treated or painted to blend in with the natural environment. • Cut and fill areas, river and stream crossings and other soil stabilisation works must be constructed to blend in with the natural environment. • Natural outcrops, rocky ridges and other natural linear features must not be bisected. Vegetation on such features must, as far as possible, not be cut unless absolutely necessary for construction. • Excavated material must be flattened (not compacted) or removed from site. No heaps of spoil material must be left on site once the Contractor has moved to a new construction site. • Any complaints from IAP's regarding the appearance of the construction site must be recorded and addressed promptly by the Contractor.				
Fauna and Flora	**13**	**Flora** • All suitable and rare flora and seeds must be rescued and removed from the site. They must be suitably stored, for future use in rehabilitation. • The felling and/or cutting of trees and clearing of bush must be minimised. • Bush must only be cleared to provide essential access for construction purposes. • The spread of alien vegetation must be minimized. • Any incident of unauthorised removal of plant material, as well as accidental damage to priority plants, must be documented by the Contractor. • Woody vegetative matter stripped during construction must either be spread randomly	All Contractors	Throughout construction	• Visual inspection • Way-leave from City Parks. • Biodiversity permit from Gauteng Department of Rural and Development	• Environmental incident register • Daily inspection • Number of environmental incidents. • Fauna and flora removal and relocation register

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		throughout the surrounding veld to provide biomass for other micro-organisms and habitats for small mammals and birds, or it may be stockpiled for later redistribution over the reinstated top soiled surface. No vegetative matter must be burnt or removed for firewood other than those removed during the grubbing and clearing phase. Such vegetation can be made available to the local inhabitants to be used as firewood. • No tree outside the footprint of the Works area must be damaged. **Fauna** • No species of animal may be poached, snared, hunted, captured, or wilfully damaged or destroyed. • Snakes and other reptiles that may be encountered on the construction site must not be killed unless the animal endangers the life of an employee. • Anthills and/or termite nests that occur must not be disturbed unless it is unavoidable for construction purposes. • Disturbances to nesting sites of birds must be minimized. • The Contractor must ensure that the work site is kept clean and free from rubbish, which could attract pests.				
Infrastructure	**14**	• The relevant authorities must be notified of any interruptions of services, especially the Local Municipality, National Road Agency, Transnet, TELKOM, and ESKOM. In addition, care must be taken to avoid damaging major and minor pipelines and other services. • The integrity of property fences must be maintained.	All Contractors	Throughout construction	• Visual inspection • Wayleaves from different entities.	• Incident register. • Permit/ Way-leave register • Complaints register.

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		• No telephone lines must be dropped during the construction operations, except where prior agreement by relevant parties is obtained. All crossings must be protected, raised or relocated as necessary. • All complaints and/or problems related to impacts on man-made facilities and activities must be promptly addressed by the Contractor and documented. • Proper storage facilities should be provided for the storage of oils, grease, fuels, chemicals and hazardous materials. • The Contractor must ensure that accidental spillage does not pollute soil and water resources. • Fuel stock reconciliation must be done on all underground tanks to ensure no loss of oil, which could pollute groundwater resources. • Cement must be stored and mixed on an impermeable surface. • The Contractor shall ensure that existing services (e.g., roads, pipelines, and power lines and telephone services) are not damaged or disrupted unless required by the contract and with the permission of the RE. • The Contractor shall be responsible for the repair and reinstatement of any existing infrastructure that is damaged or services which are interrupted. • A time limit for the repairs may be stipulated by the RE in consultation with the Contractor.				
Blasting	**15**	• Blasting must not endanger public or private property. • Noise mufflers and/or soft explosives must be used to minimize the impact on animals.	All Contractors	Throughout construction	Visual inspection/ Engineer report	• Incident register. • Complaints register.

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		• All the provisions of the Explosives Act, 26 of 1956 and the Minerals Act, 50 of 1991 must be complied with. • The Contractor must take measures to limit fly rock. • Certificate of competence. In file • Blasting permit must be obtained from the South African police station issued in terms of section 9 of explosive Act, Act 26 of 1956) prior blasting. • Method statement for drilling and blasting (NB: Submitted for acceptance before any works) in file • Provide the MSDS's for the chemicals are to be used. • Proof of notification to the affected community. • The Appropriate PPE.				• Permit register.
Workshops, storage areas and materials handling	**16**	• These areas shall be chosen so as to cause the least impact on the biophysical and social elements of the area. • The siting of workshops, maintenance and refuelling sites and materials storage areas shall not be in the vicinity of sensitive sites e.g., wetlands, cultivated fields or drainage lines, or where local landowners can be disturbed. • Storm water shall be diverted around the storage area. Storm water falling on the storage area shall be discharged if it meets the required water quality standards. • Proper storage facilities, placed on an impermeable surface, shall be provided for the storage of oils, grease, fuels, chemicals, and other hazardous materials to be used during the construction phase of the project. If fuel is required on site, it shall be stored in a secure area in a steel tank supplied and	All Contractors	Throughout Construction	• Visual inspection • Method statement for handling hazardous substances. • MSDS	• Hazardous substances register. • MSDS file • Spill register • Incident register.

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		maintained by the fuel suppliers. Leakage of fuel shall be avoided. • An adequate bund wall, 110% of volume, shall be provided for fuel and diesel areas to accommodate any spillage or overflow from these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil. • In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or container and Material Safety Data Sheets (MSDS's) will be made available for all hazardous chemicals. Before containers or storage facilities are erected, emergency procedures in the event of misuse or spillage that may negatively affect an individual or the environment will be in place. • The storage facilities (including any tanks) shall be surrounded by a bund wall, in order to ensure that accidental spillage does not pollute local soil or water resources. • The storage areas shall not be utilised for accommodation purposes and shall be access controlled. • The storage area shall be kept tidy, and the area shall be rehabilitated after use. • An inventory of any hazardous chemicals/substances (including that within equipment) kept on site, along with a description of possible ill effects and treatment of health-related afflictions resulting from accidents, shall be kept in the storage area as well as by the appropriate manager. These areas shall be securely fenced.				

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		• Gas welding cylinders and LPG cylinders shall be stored in a secure, well-ventilated area. • A notice board with the contact details of the responsible party shall be displayed at the gate to the storage area. • The contractor shall ensure that any delivery drivers are informed of all procedures and restrictions required to comply with the EMP. Someone with an adequate understanding of the CEMP shall supervise drivers during delivery and off-loading. • All vehicles and machinery will be inspected for any leaks or malfunctions regularly. Vehicle servicing or repairs is prohibited from site, unless in an emergency. • Drip trays shall be inspected and emptied daily and serviced when necessary. In particular drip trays shall be closely monitored during rain events to ensure that they do not overflow. The contents must be disposed of at a recognised site. • All repairs done on machinery using hydrocarbons as fuels or lubricants shall have a drip tray placed strategically to avoid incidental spillage. • Workers shall be made aware of the health risks associated with any hazardous substances used (e.g., smoking near refuelling depots), and shall be provided with appropriate protective clothing / equipment in case of spillages or accidents. • Cement and other potential environmental pollutants shall be stored and mixed on plastic sheeting or ready-mix trucks shall be used. There shall be no opportunity for environmental contamination.				

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		• Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and remediate to the satisfaction of the EO. • The Contractor shall be in possession of an emergency spill kit that must be always complete and available on site.				
Waste Management	**17**	Methods for waste management and waste minimisation shall be implemented from the outset of the contract as per the Waste Management Plan to be submitted to Client. All personnel shall be instructed to dispose of all waste in the proper manner. A waste avoidance and minimisation approach will be encouraged for the duration of the project. The following steps in order will be applied. • Prevention – avoid and minimise waste • Recycle – reuse and recover all general waste • Treat – treatment to reduce toxicity reduce waste quantities • Dispose – waste removal into a registered landfill facility **Solid waste** Waste with the potential for market re-use will be stored in separate containers, this includes, scrap metal, used tyres and paper. This waste will be recycled wherever possible. Solid waste shall be temporarily stored in tip – poof metal drums or waste skips at an approved area on site for collection and disposal. This area shall be away from drainage lines or water courses. • All general waste drums or skips will be appropriately labelled GENERAL WASTE	All Contractors	Throughout Construction	• Visual inspection/Environmental inspection checklist. • Legal Documents: Transport certificate obtained from GDARD for transporting general or hazardous waste. • Transport certificate obtained from City of Johannesburg for transporting general waste within COJ. • Waste manifest/	• Littering • Soil contamination • Water pollution.

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		• A refuse control system shall be established for the collection and removal of refuse to the satisfaction of Client and ECO. • No waste shall be burned at the site offices or anywhere else on the site. • All building rubble shall be a) removed from the site and disposed of at an appropriate dumping site, or b) temporarily stored in a clearly demarcated area on site for future use. • All waste shall be disposed at an appropriate waste disposal facility. **Litter** • No littering by construction workers shall be allowed. During the construction period, the facilities shall be maintained in a neat and tidy condition and the site shall be kept free of litter. • Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. • Littering, discarding or burying of any materials shall not be allowed on site. **Hazardous waste** • Hazardous waste shall be temporarily stored in tip – poof metal drums or waste skips at an approved area on site for collection and disposal. This area shall be away from drainage lines or water courses. • All hazardous waste drums or skips will be appropriately labelled.			waste disposal certificate/ weighbridge slip.	

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		• Hazardous waste must not be temporary stored on site for a period exceeding 90 days as per the National Environmental Management Waste Act (Act 59 of 2008) as amended in 2014) (Schedule 19 (2)). **HAZARDOUS WASTE.** • Hazardous waste such as bitumen, tar and oil shall be disposed of at a registered waste disposal facility. Special care shall be taken to avoid spillage of tar products such as tar prime or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating water. • All used filter materials shall be stored in a secure bin for disposal off site. Any contaminated soil shall be removed and replaced with clean soil. Soil contaminated by oils and lubricants shall be collected and disposed of at a facility designated by the local authority to accept contaminated materials. • Used oil, lubricants, and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and returned to the supplier. Water and oil shall be separated in an oil trap. Oils collected in this manner shall be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at an approved hazardous waste disposal site. Oil collected by a mobile servicing unit shall be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company. • Sludge should be managed in accordance with the Sludge Guideline 2010.				

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		• Sludge should be kept only at the drying bed and no sludge should be stored at a permeable ground or natural ground. • Hazardous waste shall be disposed of at a registered hazardous waste disposal site, disposal certificates shall be kept in the site file for record. **Medical Waste** • All medical waste will be contained in the special bins provided. All sharp needles must be separated from other medical waste, • All outdated and disused medicines will be disposed of as a hazardous medical waste or returned to the supplier for disposal. (Tablets and syrups will be crushed and/or dissolved before disposal as hazardous waste), • Medical waste used on personnel coming for treatment at the clinic are to be placed on a demarcated container storage room, • The Occupational Health Nurse (OHN) will notify a service provider for removal of the medical waste prior exceeding 90 days. • The service provider to provide Waste Manifest as well as the Safe Disposal Certificate, to the OHN who will maintain the copies of the waste manifest and safe disposal certificate. • The OHN will arrange for an approved hazardous waste disposal company to collect and dispose of this medical waste. The OHN is responsible for and authorised to keep all records in connection herewith (disposal certificates).				

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Ablution facilities	**18**	• Provide ablution facilities (i.e., chemical toilets) for all site staff at a ratio of 1 toilet per 15 workers (absolute minimum 1:25). • Secure all temporary/portable toilets to the ground within the Site Camp to the satisfaction of JW EO/ECO to prevent them toppling due to wind or any other cause. • Maintain toilets in a hygienic state (i.e., toilet dispensers to be provided, toilets to be cleaned and serviced regularly (by registered appropriate waste contractor), and toilets to be emptied before long weekends and builders' holidays). • Remove/ appoint an appropriate supplier to remove accumulations of chemicals and treated sewage from the site and dispose of at an approved waste disposal site or sewage plant. • Ensure that no spillages occur when the toilets are cleaned or emptied. Repeated incidents of spillage of chemicals and or waste (i.e., more than one incident), will require toilets to be placed on a solid base with a sump. • Ablution facilities must be located at least 50m from any watercourse. • Ablution facilities shall be provided on site. • The positioning of the ablution facilities shall be done in consultation with Client and shall be placed so that it cannot contaminate the natural streams and rivers. One toilet shall be provided per 10 staff members on site. Toilets shall be positioned within walking distance of wherever employees are employed on the site. Toilets shall be provided with locks and doors shall be secured to prevent the toilets from blowing over.	All Contractors	Throughout construction	• Visual inspection • Records of waste manifest/disposal certificates/ weighbridge slip	• Incidence of staff not using Facilities • Incidence of pollution

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		• The toilets shall be placed outside of areas susceptible to flooding. • Chemical toilets shall be serviced regularly by an authorised service provider and removed to a registered wastewater treatment works and disposal certificates shall be obtained from the waste disposal facility for each disposal and retained on site. • Polluted run-off must be discharged in the local sewerage main and not overland or into public streams. In instances where a sewerage main is not available, polluted run-off will be collected in sub-surface tanks and a reputable effluent removal contractor will be contracted to dispose of the waste in an environmentally acceptable manner. Official documentation shall be obtained from the waste disposal facility for each disposal and retained on site. • Toilets situated close to the site boundaries or within sight of residential areas shall be hidden behind screens or other cover as approved by the Engineer. • Discharge of waste from toilets into the environment and burial of waste is strictly prohibited. • Only flushable toilets should be utilised on site. • If the Ablution facilities are to be connected to the Municipal sewer line, method statement and a letter for municipal tax and rates should be submitted to JW Environmental section and responsible Depot for approval. • A letter or agreement for disposing waste must be obtained from the applicable WWTW; this must be provided by service provider. Waste manifests, disposal certificates and service certificates are				

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		required; these must be provided by service provider. • The contractor shall not appoint service providers who do not have registration certificates with GDARD and CoJ for transporting hazardous (and general waste), and copies of permits for landfills, and agreement letter from WWTW, to be used for disposals. The contractors themselves are encouraged to register as general and hazardous waste transporters, and open accounts with Pikitup, so disposal slips may be obtained.				
Access road and traffic control	**19**	**Access Roads** • The Contractor and the affected landowner must collaborate on the planning and construction of new access routes and the repair or upgrading of existing routes. • Access to the site must be controlled such that only vehicles and persons directly associated with the work gains access to the site. • Temporary access roads must not be opened until required and must be restored to its former state as soon as the road is no longer needed**.** **Traffic Control** • All reasonable precautions must be taken during construction to avoid severely interrupting the traffic flow on existing roads, especially during peak periods. • Before any work can start the Local Traffic, Department must be consulted about measures to be taken regarding pedestrian and vehicular traffic control and obtain proper road signage's	All Contractors	Throughout construction	• Method statement for access road and traffic control. • Way-leave	• Daily Inspection checklist. • Environmental incident. • Incident register.

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Electrical	**20**	• Measures must be taken during thunderstorms to protect workers and equipment from lightning strikes. • All tall structures must be properly earthed and protected against lightning strikes.	All Contractors	Throughout construction	• Permit • OHS approval letter • Wayleave	• Approval letter • Electrical certificate
Development Footprint	**21**	• The development footprints and disturbed areas surrounding the proposed project infrastructure should be kept at minimum as possible and the areas cleared of natural vegetation and topsoil must be kept to a minimum. • The extent of all development footprint areas and permanent/ temporary structures must be limited to what is essential. • As far as possible, existing roads are to be utilised, to limit cumulative impacts from roads and traffic. • The height of any temporary structures such as topsoil stockpiles should be kept as low as possible below 1m.	All Contractors	Throughout construction	• Agreement letter. • Wayleave	• Incident register. • Complaints register.
Fire Prevention	**22**	• The Contractor must take all the necessary precautions to protect the materials on site and to avoid veld fires. • No fires or open flames are allowed on site unless directly used for construction purposes, • Review all SANS standards relating to fire precautions and fire control namely, SANS 0131-3 Section 8 and SANS 089-1 or as amended. • The Contractor must have fire-fighting equipment and a first aid box available on site and on all vehicles working on site. • All waste bins must be kept away from fuel tank installations.	All Contractors	Throughout construction	• Visual inspection • Emergency Response Plan.	• Fire extinguisher inspection checklist. • Incident register • Mock drill report.

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		• All fuel tanks must be installed above ground, depending on the volume of stored fuel, for easy detection of fuel leaks. • Any welding or other sources of heating of materials must be done in a controlled environment, wherever possible and under appropriate supervision, in such a manner as to minimise the risk of veld fires and/or injury to staff. • Fires lit for comfort (warmth) must be actively discouraged by the Contractor, due to the risk of veld fires and the risk to adjacent properties. Also, no waste material must be burnt.				
Noise Pollution	**23**	• Temporary noise pollution due to construction works should be controlled by proper maintenance of equipment and vehicles and tuning of engines and mufflers. Construction works should be completed in as short a period as possible by assigning qualified engineers and foremen. • It is the responsibility of the Contractor to monitor for the mitigation of such impacts. Noise problems should be reduced to normally acceptable levels by incorporating low-noise equipment in the design and/or locating such mechanical equipment in properly acoustically lined buildings or enclosures. In the presence of adequate buffer zones between the facility and residential areas, noise control measures must be minimized.	All Contractors	Throughout Construction	Random noise measurements	• Results of random noise measurements • Number of registered complaints
Complaints	**24**	Maintain complaints register for all complaints. The register must list: • Complainant name and contact details. • Date complaint was lodged. • Person who recorded the complaint. • Nature of the complaint.	All Contractors	Throughout construction	Complaints register	• Availability of register on site • Designated person to maintain register

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		• Actions taken to investigate the complaint and • outcome of the investigation. • Action taken to remedy the situation. • Date on which feedback was provided to complainant.				• Complaints logged • Complaints followed up and Closed out.
Housekeeping	**25**	• All construction and operational areas must be kept in a neat and orderly condition at all times. • An efficient removal system of waste and rubble must be ensured during all development phases. • All operational facilities, including vehicles, should be actively maintained. • Any areas for material storage, waste sorting and other potentially intrusive activities must be screened from view as far as considered feasible. • Regularly inspect all construction machinery and holding tanks for leaks or damages. • Place generators on drip trays. • Repair any defects as soon as possible. In the case of leaks, ensure that the leaking water or effluent is captured and not released into the environment. • Service and refuel equipment that uses hydrocarbon fuels, oils, lubricants, and other hazardous chemicals at the designated area at the Site Camp only under conditions approved by JW EO/ECO • Ensure that absorbent pads (or equivalent) and/ or drip trays are available to collect any oil, fluid, etc. in the case of a breakdown or emergency repair outside the designated area. Keep a copy of fuels and hazardous substance inventory on site. • Keep spill containment and clean-up equipment at all work sites and for all polluting materials used at the site.	All Contractors	Throughout	Visual inspection of site camp/ construction site	Regular inspection reports by SHE Officer and JW EO

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		• Prevent discharge of any hazardous substances or pollutants, such as cements, concrete, chemicals, and other contaminated wastewater and fuels into the ground, surface, or storm water systems on site. • Control litter and keep construction areas as clean and neat as possible.				
Transportation and refuelling	**26**	• Undertake regular maintenance of vehicles and machinery to identify and repair minor leaks and prevent equipment failures. • Undertake any on-site refuelling and maintenance of vehicles/machinery in designated areas. Line these areas with an impermeable surface and install oil traps. • Ensure that oils and lubricants used for maintenance of equipment in the field are correctly contained. • Use appropriately sized drip trays for all refuelling and/or repairs done on machinery – ensure these are strategically placed to capture any spillage of fuel, oil, etc. • Use drip trays under all equipment and plants that are parked overnight or for long periods. • Store and handle fuels, oils and chemicals so as to avoid the risk of spillage, i.e., in waterproof and impervious	All Contractors	Throughout Construction	Visual inspection of vehicles, barges, machinery and refuelling / maintenance areas	• Incidence of non-compliance • Incidence of leaks and spills • Cost of cleaning up spills
Safety and Security	**27**	• Do not allow any open fires on the site. • Do not allow smoking on the site except within designated areas. Suitable fire-fighting equipment must be readily available in these areas. • Equip all fuel stores and waste storage areas with fire extinguishers.	All Contractors	Throughout construction	• Inspect attendance register for training sessions • Inspect fire extinguishers	• Number of fire incidents • Certified extinguishers in appropriate locations

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		• Ensure that all personnel on site are aware of the location of fire-fighting equipment on the site and how the equipment is operated. • Suitably maintain fire-fighting equipment. • Ensure that emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, etc.) are established prior to commencing construction. • Make all emergency procedures available, including responsible personnel, contact details of emergency services, etc. to all the relevant personnel. Clearly demarcate emergency procedures at the relevant locations around the site. • Secure the Site Camp, particularly to restrict • Unauthorised access to fuels and other hazardous substances. • Provide suitable emergency and safety signage on site and demarcate any areas which may pose a safety risk (including hazardous substances, deep excavations, etc.). • Advise the ECO of any emergencies on site, together with a record of action taken.	All Contractors	Before and during construction	and certificates Visual inspection	Number of safety / emergency incidents.
Response to environmental pollution	**28**	• In the event of environmental pollution, e.g., through spillages, immediately stop the activity causing the problem. • Maintain relevant Material Safety Data Sheets (MSDS) at the site for all potentially hazardous substances (as defined in the regulations for hazardous chemical substances). In the event of an emergency, procedures detailed in the MSDS shall be followed. Clean up any spills immediately, through containment and removal of free product and appropriate disposal of contaminated soils.	All Contractors	Throughout construction	• Maintain register of pollution events and response • Following resumption of activities, frequently inspect repaired	• Number of incidents • Time activities stopped • Number of recurring Incidents • Availability and 65completeness of register

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		• Immediately remediate and rehabilitate areas in the event of a spill of an environmentally hazardous substance. • Only resume activity once the problem has been stopped or (in the case of spillages) the pollutant can be captured without reaching the environment. Repair faulty equipment as soon as possible. • Treat hydrocarbon spills, e.g., during refuelling, with adequate absorbent material, which then needs to be disposed of at a suitable landfill. • Ensure a quantity of appropriate remedial agent, capable of containing and/or remediating a hydrocarbon spill is available on site at all times in case of an emergency spill. The material shall be capable of handling a spill of at least 200l. • Report all fuel, oil or hydraulic fluid spills to the JW EO/ECO so that appropriate clean-up measures can be implemented. • Report all incidents within 24 hours to JW environmental section. • All environmental incidents must be investigated within seven (7) working days.			equipment to ensure proper functioning	
Storm Water Management	**28**	**Objective** • To minimise erosion of soil from site during construction. • To minimise deposition of soil into drainage. • Minimise loss of vegetation cover due to construction related activities. **Mitigation Measures** • Identify and demarcate construction areas for general construction work and restrict construction activity to these areas. Prevent unnecessary	All Contractors	Throughout Construction	• Visual inspection. • Storm water management Plan. • Way-leave from JRA	• Daily inspection checklist. • Incident register.

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		destructive activity within construction areas (prevent over-excavations) • Stockpile topsoil for re-use in rehabilitation phase. Maintain stockpile shape and protect from erosion. All stockpiles must be positioned at least 50 m away from drainage lines and wetlands. • Erosion control measures: Run-off control and attenuation on slopes (sandbags, logs), silt fences, storm water channels and catch-pits, shade nets, soil binding, geofabrics, hydro seeding or mulching over cleared areas. • Control depth of excavations and stability of cut faces/sidewalls. • Compile a comprehensive storm water management plan as part of the final design of the project and implement during construction and operation.				
Re-vegetation, Rehabilitation, Reinstatement	**29**	**Objective** To ensure re-vegetation and rehabilitation of disturbed areas is undertaken **Legislation and Standards** Conservation of Agricultural Resources Act (Act 43 of 1983 Environment Conservation Act (Act 73 of 1989 National Forestry Act (Act 84 of 1998 National Environmental Management Act 107 of 1998 and Gauteng Nature Conservation Bill, 2014. **Mitigation measures** In order to meet this goal, the following objective, actions, and monitoring requirements are relevant: • Disturbed areas must be rehabilitated/re-vegetated with appropriate natural vegetation and/or local	All Contractors	Throughout Construction	• Rehabilitation Plan • JW EMP • Visual inspection • Ecologist Specialist report • Environmental Authorisation/ GA • Practical and completion certificate.	• Daily inspection checklist. • Rehabilitation report • Waste management collection report (Waste Disposal Certificate).

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		seed mix. Re-use native/indigenous plant species removed from disturbance areas in the rehabilitation phase as per the re-vegetation and rehabilitation management plan. • Alien/non-native species must not be used. If these are requested/ required by stakeholders, then this must be documented by contractor. • Re-vegetated areas may have to be protected from wind erosion and maintained until an acceptable plant cover has been achieved. • On-going alien plant monitoring and removal within the disturbed project footprint (where the initial clearing for construction took place) must be undertaken on all areas of natural vegetation on an annual basis. • All temporary facilities, equipment and waste materials must be removed from site and appropriately disposed of. • All temporary access road must be rehabilitated to their original condition • Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion. • On-going inspection of rehabilitated areas to determine effectiveness of rehabilitation measures implemented. • On-going alien plant monitoring and removal should be undertaken as per the approved Rehabilitation/Re-vegetation plan. **Management and Mitigation Requirement** • Conduct a detailed search of at the area. As a minimum, this should take place during the			• Community Happy Letters.	

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		spring and summer months prior to impoundment so positive identification of flowering plants can be made. This should be done taking due cognisance of specialist studies already undertaken as part of the EIA process; • Allow time for additional searches if these are deemed necessary, based on progress and diversity of plant species found; • Identify and physically mark all conservation worthy plants found on the ground; and • Capture markers and reference in a retrievable system, so that these can be located again for transplanting (e.g., using a combination of aerial photography, GPS, and GIS, as appropriate).				
Practical and Final completion inspection	**30**	• Ensure that practical inspection is conducted before the Contractor hands over the project back to JW in order to ascertain if the reinstatement or rehabilitation has been done accordingly. • The snag list is to be compiled and accepted by all parties (JW CAPEX Representatives, JW environmental section as applicable, and appointed Contractor) All responsible personnel including Environmental representative sign both practical and final completion letter.	CAPEX/ OHSE& DM/ All Contractors	During the final stage of project	• Meeting invite • Visual inspection	• Meeting invite • Attendance register • Snag list • Signed practical and final completion inspection letter.
Final close out report	**31**	• Conduct final audit on site. • EO must ensure that audit reports are signed by RE/Engineer and Contractor. • Environmental File is returned to JW, after rehabilitation has been deemed successful.	OHSE & DM	During the final stage of project.	• Final audit report. • Signing of Audit reports.	• Final Audit report. • Signed Audit report. • Environmental file.

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Table 3: Environmental Management and Mitigation Measures that must be implemented during the Operational Phase

Operational Phase Measures						
Aspects	**ID**	**Mitigation Measure/Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods**	**Performance indicators**
Waste Management	**1**	Sanitation Facilities • Ablution facilities shall be provided on site. • The positioning of the ablution facilities shall be done in consultation with Client and shall be placed so that it cannot contaminate the natural streams and rivers. One toilet shall be provided per 15 staff members on site. Toilets shall be positioned within walking distance of wherever employees are employed on the site. Toilets shall be provided with locks and doors shall be secured to prevent the toilets from blowing over. • The toilets shall be placed outside of areas susceptible to flooding. • Chemical toilets shall be serviced regularly by an authorised service provider and removed to a registered wastewater treatment works and disposal certificates shall be obtained from the waste disposal facility for each disposal and retained on site. • Polluted run-off must be discharged in the local sewerage main and not overland or into public streams. In instances where a sewerage main is not available, polluted run-off will be collected in sub-surface tanks and a reputable effluent removal contractor will be contracted to dispose of the waste in an environmentally acceptable manner. Official documentation shall be obtained from the waste	Johannesburg Water	During operation and maintenance activities	• Visual inspection of Waste collection and disposal areas. • Visual inspection of site. • Check waste disposal slips. • Monitor activities against JW Waste Management Plan. • Waste Inventory Register.	• Presence of litter • Availability of waste bins and skips. • Degree to which rubbish bins and skips are filled • Total volume of general and hazardous waste storage capacity • Total volume of general and hazardous waste stored on site • Degree to which different waste is separated. • Frequency of waste collection. • Total volume of recycled and reused waste.

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		disposal facility for each disposal and retained on site. • Any cooking on Site shall be done on well-maintained gas cookers with fire extinguishers present. No cooking shall be permitted to occur on open fires. • Toilets situated close to the site boundaries or within sight of residential areas shall be hidden behind screens or other cover as approved by the Engineer. • No spillage shall occur when the toilets are cleaned or emptied and the contents shall be properly stored and removed from site. • Discharge of waste from toilets into the environment and burial of waste is strictly prohibited. • All building rubble and rubble from the demolished structures, solid and liquid waste must be disposed of as necessary at an appropriately licensed refuse facility. • Ensure that no refuse wastes are burnt on the premises or on surrounding premises. No fires will be allowed on site. **Contaminated water** •Workshops, refuelling depots and washing areas shall be bunded. •Any wastewater or spilled fuel collected within bunded areas around the refuelling area shall be disposed of as hazardous waste •Wastewater containing hydrocarbons, paints oil etc. shall be treated as hazardous waste				
Protection of Vegetation	**2**	• Limit the footprint of the maintenance and operational activities to the minimum to minimise environmental damage.	Johannesburg Water	• During operation and maintenance activities/.	Visual inspection	• Incidents of vegetation damage.

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		• Designate vegetated areas outside the development footprint as “No go” areas. • Limit the off-road driving within the Johannesburg Water Sites. • Protected or endangered species of plants shall not be removed unless they are interfering with a structure. • All trees and vegetation cleared from the site shall be cut into manageable lengths. • Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root system are removed. • Stumps shall be treated with herbicide. • Protected or endangered species of plants shall not be removed unless they are interfering with a structure. • Where such species have to be removed due to interference with a structure, the necessary permission and permits shall be obtained from Provincial Department of Agriculture and Rural Development. • All protected species not to be removed must be clearly marked and such areas fenced off if required. • The use of herbicides shall only be allowed after a proper investigation into the necessity, the type to be used, the long-term effects and the effectiveness of the agent. • No scalping shall be allowed on any part of Johannesburg Water Sites.		• When is necessary?		• Number of incidents of disturbance of vegetation outside site boundary.
Alien invasive/weeds control	**3**	• Some of the areas of JW area are covered with moderate to very dense invasive alien shrubs and trees. Clearing of such vegetation will be necessary	Johannesburg Water	During operation and maintenance activities	• Visual inspection.	• Daily inspections register. • Incident register.

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		to gain access. However, clearing of this vegetation from the entire project area as far as possible will reduce the re-establishment rate of this vegetation over time, and will thus not only benefit the environment put also the proposed project and potential future phases of the project in the long term. • The type of invasive, however, will require regular follow-up eradication of seedlings after clearing, as extensive seedbanks of these species are present underneath present infestations. • Wood from alien vegetation can be used. However, care must be taken not to leave any of the leaf- or seed material on the site where the vegetation was cleared. Rather, identify a particular area that no longer has any indigenous vegetation, demarcate that area and dump excess material of alien species there. • Once the material is sufficiently dry, it should be burned to destroy any regenerating capacity of stems and roots as well as seeds. • Only registered PCO with Certificate for competency to handle the hazardous substances (e.g., Herbicides) is allowed to use herbicide. • Only environmentally friendly herbicide is allowed within JW sites. • MSDS for the herbicides must be kept in the storage area. • Method Statement for applying and handling herbicides and Risk Assessment for applying and handling herbicides. • Appropriate PPE for handling herbicides. • Herbicides stored only in a designated storage.			• Monitoring against Vegetation Management Plan. • PCO certificate.	

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		• Empty containers of herbicides disposed of accordingly to the registered hazardous landfill site. • Proof of disposal provided to JW Environmental Section.				
Sludge Management	**4**	• The sludge must be managed according to the sludge guideline. • All agreements or Contract must be placed in the file. • The sludge must be kept on a designated bunded and concrete lined drying bed.	Johannesburg Water/Bulk Waste	During operations activities	• Visual inspection according to Sludge SOP. • Monitoring against Sludge Guideline. • Monitoring against WUL.	• Sludge test report • Complaints register. • Sludge spill register. • Environmental Officers Internal WUL Audit Report.
Workshop and storage Area	**5**	• The siting of workshops, maintenance and refuelling sites and materials storage areas shall not be in the vicinity of sensitive sites e.g., wetlands, cultivated fields or drainage lines, or where local landowners can be disturbed. • Storm water shall be diverted around the storage area. Storm water falling on the storage area shall be discharged if it meets the required water quality standards. • Proper storage facilities, placed on an impermeable surface, shall be provided for the storage of oils, grease, fuels, chemicals, and other hazardous materials to be used during the construction phase of the project. If fuel is required on site, it shall be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers. Leakage of fuel shall be avoided.	Johannesburg Water	During operations and maintenance activities	• Visual inspection • SOP for handling hazardous substances. • MSDS register	• Workshop and storage register. • MSDS register. • Incident register.

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		• An adequate bund walls, 110% of volume, shall be provided for fuel and diesel areas to accommodate any spillage or overflow from these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil. • In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or container and Material Safety Data Sheets (MSDS's) will be made available for all hazardous chemicals. Before containers or storage facilities are erected, emergency procedures in the event of misuse or spillage that may negatively affect an individual or the environment will be in place. • The storage facilities (including any tanks) shall be surrounded by a bund wall, in order to ensure that accidental spillage does not pollute local soil or water resources. • The storage areas shall not be utilised for accommodation purposes and shall be access controlled. • The storage area shall be kept tidy, and the area shall be rehabilitated after use. • An inventory of any hazardous chemicals/substances (including that within equipment) kept on site, along with a description of possible ill effects and treatment of health-related afflictions resulting from accidents, shall be kept in the storage area as well as by the appropriate manager. These areas shall be securely fenced. • Gas welding cylinders and LPG cylinders shall be stored in a secure, well-ventilated area.				

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		• A notice board with the contact details of the responsible party shall be displayed at the gate to the storage area. • All vehicles and machinery will be inspected for any leaks or malfunctions regularly. Vehicle servicing or repairs is prohibited from site, unless in an emergency. • Drip trays shall be inspected and emptied daily and serviced when necessary. In particular drip trays shall be closely monitored during rain events to ensure that they do not overflow. The contents must be disposed of at a recognised site. • All repairs done on machinery using hydrocarbons as fuels or lubricants shall have a drip tray placed strategically to avoid incidental spillage. • Workers shall be made aware of the health risks associated with any hazardous substances used (e.g., smoking near refuelling depots), and shall be provided with appropriate protective clothing / equipment in case of spillages or accidents. • Cement shall be mixed on a plank, mental plate or a plank only or ready-mix trucks shall be used, and other potential environmental pollutants shall be stored at the designated area. There shall be no opportunity for environmental contamination. • Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and remediate to the satisfaction of the EO. • The site shall be in possession of an emergency spill kit that must be complete and available at all times on site.				
Complaints	**6**	• Maintain complaints register for all complaints. The register must list:	Johannesburg Water	During operations and maintenance activities	• Complaints register.	• Availability of register on site

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		• Complainant name and contact details. • Date complaint was lodged. • Person who recorded the complaint. • Nature of the complaint. • Actions taken to investigate the complaint and outcome of the investigation. • Action taken to remedy the situation. • Date on which feedback was provided to complainant.			• GDARD complaints reference number.	• Designated person to maintain register • Complaints logged • Complaints followed up and closed out.
Collection of water sample	**7**	• Water sampling shall be undertaken at the selected sampling points as per the WUL. • Any incident or non-compliance with the WUL parameters or DWS Water Quality Guidelines shall be reported accordingly and investigated • Unused sampling bottle shall be disposed of accordingly.	Johannesburg Water/CDYNA	During operation activities	• Visual inspection. • Online Lab reports	• Daily water sample report. • Incident register.
Environmental Incident reporting and Emergency Response and Preparedness	**8**	• NEMA Section 30 and 30A emergency incidents and situations must be reported to GDARD or DEA immediately after as an incident or situation occurs. NWA Section 20 emergency must be reported to DWS, mostly by Operations Department. This can be done via phone, fax, or email. JW must implement measures to contain the incident or situation immediately. Thereafter the Emergency Incident Report (EIR) or Emergency Situation Report (ESR) must be submitted to the authorities ASAP. The reports must provide as much information as possible, if not; the reports can be updated later as the investigation progresses. Not reporting an incident could result in the authorities issuing a directive or a compliance notice to the responsible person.	Johannesburg Water Sites	During operation and maintenance activities.	• Visual inspection. • Flash report/ Incident investigation report. • Section 30A Annexure A. • JW Environmental Emergency Preparedn	• Incident register • Bioremediation report. • Section 30A Directive. • Corrective Action Plan

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		• Important Note: For Section 30A Emergency Situation, an oral or written directive must be obtained from GDARD or DEA before works can be undertaken in the watercourse to avoid undertaking listed activities without obtaining EA. • Johannesburg Water takes responsibility in order to effectively respond to emergency incidences such as fire, hydrocarbon and sewer spills or leakages, disturbance of wildlife and archaeological artefacts. The SHE Rep must conduct daily inspections to ensure that the required equipment needed to handle environmental incidents/ emergencies are readily available and in working condition. Quick response to an incident prevents escalation to an emergency:			ess and Response Procedure.	
9. Water Management • Water is a scarce resource and water shall be conserved wherever possible. • Improved and protected watercourses to Class C classification which is moderately modified in terms of determined class of water resource and resource quality objectives of chapter 3 (Part 2) of National Water Act (Act 36 of 1998). • Demand reduction/ Alternative sources. • Building a water sensitive city. • Well managed and maintained water infrastructure networks**.**						
Water Usage	**9.1**	• The site must be kept tidy and hygienic at all times with special reference to sanitation & water management. • Maintain a monthly water usage. • Reporting of water pipe burst and damaged meters	Johannesburg Water Sites	During operation	• Visual inspection • Meter readings	• Records of Monthly water Usage.
Reduce water demand	**9.2**	• Implement effective demand-side management practices while exploring investment into smart infrastructure and alternative supplies to increase levels of net water savings.	Johannesburg Water (Network)	During operation	• Monthly Monitoring • Monthly water	• Records of percentage reduction on non-revenue water. • Records of Percentage

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		• Establish Task Team with different law enforcement agencies to develop and implement solution for infrastructure abuse problem. • Promote the implementation of Sustainable Urban Drainage System practice.			management report	reduction of Rand Water system input volume.
Incentivise water saving interventions across domestic and economic sector users.	**9.3**	• Implementation of command-and-control base mechanism that promote water saving (CoJ By-laws). • Implementation of incentives base mechanism • Develop partnerships beyond the City to encourage water savings. • Expand current CoJ drought policy to build greater resilience of the water system. • Integrate water conservation requirements in conditions of planning approval. • Develop an awareness and communications campaign using available technology.	Johannesburg Water	CoJ/Operations	• Monthly water management report	• Records of reduction in annual water consumption per capita • Water from alternative sources as % of total water supply
Rehabilitation/ Reinstatement	**10**	• Clean up and remove any spills and contaminated soil in the appropriate manner. • Ensure that no discarded materials are buried on site or on any other land not designated for this purpose. • Rehabilitate any disturbed areas as soon as maintenance or construction in the area is complete. • If disturbed areas are left to rehabilitate naturally, they must be frequently monitored and interventions put in place immediately should it become necessary. Special attention must be given to the potential for soil erosion and the associated environmental degradation. It is also essential to undertake alien vegetation control and management.	Johannesburg Water	During operation and maintenance activities	• EO compliance monitoring. • Visual inspection. • Compliance inspection against rehabilitation plan.	• Inspection report. • Audit report by External Auditor. • Photos before and after.

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					• JW EMP.	

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6.1 Method Statement

The objective is to ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk. The environmental specifications are required to be underpinned by a series of Method statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMPr will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to Johannesburg Water Environmental Section and ECO.

Method Statement is defined as “a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plan, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager and Environmental Officers are able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications”. The Method Statement must cover applicable details with regard to:

- Construction procedures
- Materials and equipment to be used
- Getting the equipment to and from site
- How the equipment/material will be moved while on-site
- How and where material will be stored
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur
- Timing and location of activities
- Compliance/non-compliance with the Specifications, and
- Any other information deemed necessary by the Johannesburg Water.

The Contractor may not commence the activity covered by the Method Statement until it has been approved by the Site Manager, except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract.

Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved. The EO and ECO should monitor the construction activities to ensure that these are undertaken in accordance with the approved Method Statement.

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6.2 Monitoring

- Regular inspections of the site by EO/SHE and Environmental Reps
- Immediate reporting of ineffective sediment control systems.
- Public complaints register must be developed and maintained on site.

6.2.1 Monitoring Program

OBJECTIVE: Monitor the performance of the control strategies employed against environmental objectives and standards

A monitoring programme must be in place not only to ensure conformance with the EMP, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the environmental authorisation (once issued). Where this is not clearly dictated, Johannesburg Water will determine and stipulate the frequency of monitoring required in consultation with the relevant authority. The contractor project manager will work with the site manager of the contractor to ensure that monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to routinely monitor the implementation of the specified environmental specifications, in order to:

- Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications.
- Ensure adequate and appropriate interventions to address non-compliance.
- Ensure adequate and appropriate interventions to address environmental degradation.
- Provide a mechanism for the lodging and resolution of public complaints.
- Ensure appropriate and adequate record keeping related to environmental compliance.
- Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, to enhance the efficacy of environmental management on site.
- Aid communication and feedback to authorities and stakeholders.

6.2.2 Method of Monitoring

The Environmental Officer will ensure compliance with the EMP and will conduct monitoring activities. The EO will undertake site inspections monthly or as specified in the environmental authorisation once issued.

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6.2.3 Monitoring Reports

Environmental Monthly reports will be compiled by the EO monthly and must be submitted to Environmental Specialist. The report should include details of the activities undertaken in the reporting period, any non-conformances or incidences recorded, corrective action required and details of these non-conformances or incidents which have been closed out.

A document handling system must be established to ensure accurate updating of EMP documents, and availability of all documents required for the effective functioning of the EMP. The complied environmental file must be ISO14001:2015 conformant as per JW environmental file specification (Annexure B). Supplementary EMP documentation could include:

- Method Statements.
- Environmental Action Plan
- Environmental File Site instructions.
- Emergency preparedness and response procedures.
- Record of environmental incidents.
- Non-conformance register
- Training records.
- Site inspection reports.
- Waste Register
- Water Usage Register
- Fauna and Flora Register
- Hazardous chemical Inventory list
- Monitoring reports.
- Auditing reports; and
- Public complaints register (single register for maintained for overall site).

Table 4: Monitoring Programme

ISSUE	FREQUENCIES OF MONITORING	RESPONSIBLE PERSON
WATER		
Prevention of water pollution Prevention of stagnant water on site. Proper functioning of sanitation facilities	Weekly in rainy season Weekly in rainy season Weekly	Contractor's Representative (CR)/ Johannesburg Water

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ISSUE	FREQUENCIES OF MONITORING	RESPONSIBLE PERSON
SOIL		
Surface or gully erosion on site Soil contamination with oils If small, clean up. If large, appoint a suitable contractor for clean-up.	Weekly in rainy season Monthly Immediately	CR/JW CR/JW CR/JW
Air		
Control domestic fires. Heavy vehicle emission control. Dust control of access roads. Wetting when required.	Weekly Monthly Weekly inspection	CR/ JW CR/JW CR
WASTE		
Efficiency of domestic waste collection. Prevention of burning of solid/liquid wastes on site. Proper collection and containment of liquid wastes (petroleum, oils, paints, resins & cooking oils) The recycling and/or disposal thereof. The collection and disposal of construction waste (concrete, wood, steel) Collection of hazardous waste.	Weekly Weekly Monthly Biweekly Monthly Biweekly	CR/JW CR/JW CR/JW CR CR/JW CR/JW
WILDLIFE		
Weed Control Control of illegal hunting or snaring of game, birds, or other wild animals.	On-going On-going	CR/JW CR/JW
SOCIAL		
Inspect overall appearance of site.	Weekly	CR

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ISSUE	FREQUENCIES OF MONITORING	RESPONSIBLE PERSON
(Paint work, cleanliness & housekeeping) Resolve complaints Monitor behaviour of labourers	Daily Daily	CR/JW CR/JW
SAFETY		
Inspect road signs, pedestrian, and vehicle behaviour	At least once a week	CR/JW

6.3 Internal Audits and Reporting

Typically, an audit analyses the results obtained from monitoring, assesses whether objectives and targets have been met and whether there are variances from the stipulated EMP and legal requirements. In addition, the audit assesses whether EMP implementation has been undertaken according to planned arrangements and that the EMP itself is being appropriately updated. The audit should confirm that identified corrective actions have been undertaken and then assess the effectiveness of such actions. The timing of audits should be included in the implementation schedule in the EMP.

The key steps in a successful audit are:

- Establish audit procedures.
- Determine the frequency of audits.
- Ensure that the auditors are competent, in that they must be able to undertake the audit objectively and competently. Audits may be undertaken by internal or external parties, although certain I&AP requirements may define a need for external auditors.
- Maintain records of audits.

A procedure is to be developed by the project management team for conducting EMP audits, and should incorporate processes for scheduling and reporting, as well as the timing and frequency of the audits. This procedure should also address responsibilities and required resources. The EO is usually responsible for the maintenance of the environmental audit information that is required prior, during and

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after an audit. Internal audits must be undertaken by Johannesburg Water Environmental Section on monthly basis.

6.3.1 Monthly compliance rating

A monthly compliance rating will be calculated for each Principal Contractor as per a formula determined by Johannesburg Water SOC Ltd focussing on or incorporating outcomes of assurance (e.g., monthly audit), operational assessments and other requirements, as necessary. Johannesburg Water SOC Ltd reserves the right to adjust the monthly compliance calculation formula as and when required – each revision of the monthly compliance calculation formula will be communicated to the Principal Contractor before implementation (**Each Principal Contractor is required to maintain a minimum compliance rating of 93% (Ninety-Three Percent).**

Table 5: Compliance Rating Protocol

Classification	Scoring	Classification description
Good	**93 – 100%**	Substantial compliance
Average	**80-92%**	Compliance status needs to be improved
Poor	**61-79%**	Methods to ensure compliance require substantial improvement
Very poor	<60%	Methods to ensure compliance failed completely - no system in place

6.3.2 Work Stoppage

Work stoppages will be identified for 2 (two) types of work stoppages to be implemented:

- Overall work stoppage – the Principal Contractor and its Contractors are not allowed to continue with any type of construction / site work up until the work stoppage has been closed-out.
- Activity work stoppage – The Principal Contractor and its Contractors are not allowed to continue with the specific activity / task / job up until the work stoppage has been closed-out (**Overall work stoppages will be issued where non-conformances are identified against the criteria in Annexure C).**

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6.4 Environmental Awareness Plan

OBJECTIVE: Ensure all operation personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm (Environmental Awareness Plan).

To achieve effective environmental management, it is important that Contractors and site employees are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMP. Johannesburg Water is responsible for informing its employees and contractors (transportation contractor) of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. Johannesburg Water's obligations in this regard include the following:

- Employees must have a basic understanding of the key environmental features of the depot and its surrounding environment.
- Ensuring that a copy of the EMP is readily available on-site and that all site staff is aware of the location and has access to the document.
- Employees must be familiar with the requirements of the EMP and the environmental specifications as they apply to the operation of the facility.
- Ensuring that, prior to commencing any new site works, all employees have attended an Environmental Awareness Training course. The course must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- Awareness of any other environmental matters, which are deemed to be necessary by the depot manager.
- Ensure that construction workers have received basic training in environmental management, including the storage and handling of hazardous substances, minimise of disturbance to sensitive areas (wetland), management of waste and prevention of water pollution
- Records must be kept of those that have completed the relevant training.
- Training should be done either in a written or verbal format but must be in an appropriate format and language for the receiving audience

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- Refresher sessions must be held to ensure the operating staffs are aware of their environmental obligations.

Therefore, prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present onsite, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr. This training and awareness will be achieved in the following ways:

6.4.1 Environmental Awareness and Training

Environmental Awareness and Training must be undertaken by the Environmental Officer or SHE/ELO and must take the form of an on-site talk and demonstration by the Environmental Officer before the commencement of construction activities on site. A record of attendance of this training must be maintained by the Environmental Liaison Officer/SHE Officer on site.

6.4.2 Formal Environmental Training

NB: JW must ensure that there is a budget allocated for environmental formal training in CAPEX projects for the skills development of contractor staff, development of community where project is being undertaken. The principal Contractor shall identify short courses and include them on the training matrix that can be done on site during project duration. The following are some of the trainings that can be done on site:

- ISO14001:2015 Environmental Management System Awareness
- Handling of beehives
- Snake awareness and handling
- Environmental legal Liability.
- Waste Management
- Environmental Site Representative
- Recycling
- Grass cutting training

The principal Contractor must ensure that they are appointing a registered company that meet all the requirements and before appointment of service provider, the files shall be submitted to Environmental Section for evaluation.

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6.4.3 Induction Training

Environmental induction training must be presented to all persons who are to work on the site, be it for short or long durations. Contractors or Engineers staff, site staff, sub-contractors, or visitors to site. This induction training should include discussing Johannesburg Water's environmental policy and values, the function of the EMP and the importance and reasons for compliance to these. The induction training must highlight overall dos and don'ts on site and clarify the repercussions of not complying with these. The reporting procedure must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the SHE officer on site.

6.4.4 Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis (at least once a month) where the foreman/site supervision manager, environmental and safety representative and all employees on site hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

6.5 Erosion Management Plan

The objective to control soil erosion from an ecological perspective is:

- To reduce the effects of raindrop splash erosion on exposed soil surfaces.
- To keep rainwater on the soil surface for as long as possible to increase the infiltration rate and reduce surface runoff.
- To reduce the speed of surface runoff to reduce the erosion effect of the soil surface.
- To provide methods to retain soil, debris, seed banks and organic matter being carried away by runoff.
- To improve water retention of the area (Coetzee, 2005).

a) Areas with a high soil erosion potential on the site

Areas identified as being of high soil erosion potential on the site include:

- Any areas without vegetation cover

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- Excavated areas
- Steep areas
- Areas which undergo overland flow of water.
- Areas close to water
- Irrigated areas
- Compacted areas
- Rivers
- Drainage lines
- Any areas where developments cause water flow to accelerate on a soil surface.

If any erosion features are present as a result of the activities mentioned above the ELO must:

Assess the situation.

- Take photographs of the soil degradation.
- Determine the cause of the soil erosion.
- Inform and show the relevant contractors the soil degradation.
- Inform the contractor that rehabilitation must take place and that the contractor is to implement a rehabilitation method statement and management plan.
- Monitor that the contractor is taking action to stop the erosion and assist them where needed.
- The progress of the rehabilitation must be monitored weekly and recorded in the site diary.
- All actions with regards to the incidents must be reported on in the monthly Audit report.
- If the erosion incident has not been addressed by the contractor within 14 days of you reporting it, the Johannesburg Water ‘s Environmental Section must be informed.

The contractor/ developer (with the EO’s consultation) must:

- Select a system to treat the erosion
- Design the treatment system
- Implement the system
- Monitor the area to see if the system functions like it should, if it the system fails adapt or adjust the system to ensure erosion is controlled.

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- Monitoring must continue until the area has been stabilized

b) General Erosion

The civil works contractor may use the following instruments to combat erosion when necessary:

- Reno matrices
- Slope attenuation
- Shade catches nets
- Mulching
- Hydro-seeding or transplanting
- Re-vegetating
- Tilling (roughing the surface)

c) Erosion Management control measures

- Areas susceptible to erosion must be protected by appropriate measures and repair of any damage caused by erosion due to construction activities must be undertaken as soon as possible.
- Minimise erosion and sedimentation into water courses through effective stabilisation (gabions and reno-mattresses) and re-vegetation of disturbed riverbanks (Refer to rehabilitation specifications and erosion control measures below).
- Stabilisation of sandy, dispersive slopes or slopes steeper than 1:3 will be required. Ensure that bare soil is covered, and hydro seeded to reduce topsoil loss.
- Ensure that all soil surfaces are protected by vegetation or a covering to avoid the surface being eroded by wind or water.
- Ensure that heavy machinery don't compact areas that are not meant to be compacted as this will result in compacted hydrophobic, water repellent soils which increase the erosion potential of the area.

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d) Surface water control measures

- Prevent the concentration or flow of surface water or storm water down cut or fill slopes or along pipeline routes or roads and ensure measures to prevent erosion are in place prior to construction.
- Storm water and any runoff generated by hard surfaces should be discharged into retention swales or areas with rock riprap.
- These areas should be grassed with indigenous vegetation.
- These energy dissipation structures should be placed in a manner that flows are managed prior to being discharged back into the natural water courses, thus not only preventing erosion, but also supporting the maintenance of natural base flows within these systems, i.e., hydrological regime (water quantity and quality) is maintained.
- Mitigate against siltation and sedimentation using the above-mentioned structures and ensure that all structures do not cause erosion.
- Ensure that all storm water control features have soft engineered areas that attenuate flows, allowing for water to percolate into the local aquifers.
- Minimise and restrict site clearing to areas required for construction purposes only and restrict disturbance to adjacent undisturbed natural vegetation.
- Vegetation clearing should occur in parallel with the construction progress to minimize erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.
- Minimise the diversion of flows into different catchments.
- If implementing dust control measures, prevent over-wetting, saturation and run-off that may cause erosion and sedimentation.
- Water course (stream) crossings should not trap any run-off, thereby creating inundated areas, but allow for free-flowing water courses.

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e) Environmental Incident/Accident

All environmental related incidents should be reported to environmental section. The ELO should compile and keep an Incidents and Accidents Register on the file/book in which all environmental related incidents and accidents are recorded, e.g., chemical spills, fires, accidents involving workers and vehicles, etc.

The following information must be recorded in the Incidents Register:

- The name and contact details of the persons involved
- The person recording the incident
- The date and time of incident
- The nature, extent, and cause of the accident
- The name and contact details of any persons notified of the incident
- The actions taken to deal with the incident and whether the accident has been sufficiently
- Dealt with additional steps required to prevent recurrence of the incident.

7. RECORD KEEPING, COMPLIANCE AND PENALTIES

Various records will be kept on site for monitoring purposes these include but not limited to:

- Copy of Environmental Management Plan
- Approved Environmental Method Statements
- Environmental Authorisation
- Environmental induction attendance register
- Hazardous chemicals register
- Waste disposals register and disposal certificates
- Oil/fuel spill register

Records of non-compliance shall also be kept on record and will include the nature and magnitude of the non-compliance in a register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. External complaints received regarding activities on the construction site pertaining to the environment shall be recorded in public complaints register and

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the response noted with the date and action taken. This record shall be submitted with the monthly reports and a verbal report given at the monthly site meetings. A score of 90% is required for the Monthly Audit undertaken by the Johannesburg Water 's Environmental Officers.

8. DECOMMISSIONING

Objective

- To avoid and or minimise the potential environmental and social impacts associated with the decommissioning phase

Mitigation Measures

Mitigation measures as detailed in the construction phase on the EMP regarding impacts on flora, fauna, habitats, and wetlands would be applicable to this phase.

- Rehabilitation to be undertaken in terms of specifications outlined in the Rehabilitation section of this EMP as well as in terms of any specific requirements applicable at the time.
- Johannesburg Water EO will need to supervise and monitor all decommissioning activities as per the snag list.
- All disturbed areas should be rehabilitated closer to its original state and more.

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Retainable Annexure A (Ref: Annexure 5 of JW 6.4): Acknowledgement of EMP specification by the Contractor.

Environmental Requirement for Contractors and Suppliers working for Johannesburg Capital Expenditure (CAPEX) projects	**Unique no**	**JWEMP:122017**
	Revision no	**00**

I, the undersigned, hereby acknowledge that I have obtained copies of the following listed documentation and confirm that I fully understand the contents thereof and the consequences of non-compliance. The Contractor furthermore reiterates its commitment to compliance of the requirements contained within the following provided documentation:

Name of the Contractor	
Vendor Number	
Project Number	
Scope of Work	

Declaration by Capital Expenditure Projects Contractor

- I undertake to adhere to the requirements as set out in:
  - Johannesburg Water Environmental Management Plan and Waste Management Plan
  - Environmental requirements for Contractors working on Capital Expenditure Projects
- I undertake to comply with all applicable environmental legal and other requirements.
- Undertake to comply with Johannesburg Water 's environmental standards, policies, and procedures where applicable.
- I pledge to inform all staff of their role in managing environmental impacts on site.
- I am fully aware that incidents must be reported within 24 hours of occurrence.
- I pledge to always implement environmental best practice on site during the contract.
- I pledge that all non-conformances issued to us will be addressed promptly.

DISCLAIMER
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2.Should the contractor deviate from the conditions and requirements of the EMP and/or Environmental Authorisation (if applicable), the contractor is liable for non-compliances, rectification and associated fines thereof
3. This EMP does not exempt the Contractor from complying with other relevant legislations related to the construction activities.

I ……. hereby acknowledge that I have obtained copies of Johannesburg Water Environmental Management Plan and Waste Management Plan and confirm that I fully understand the contents thereof and the consequences of non-compliance. The Contractor furthermore reiterates their commitments to compliance of the requirements contained within the following provided documentations and conform to all above mentioned requirements.

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

Contractor Reperesentative Name: Designation:	Signature:	Date:
JW Project Engineer/Manger (Witness) Name:	Signature:	Date:

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Annexure B: Contractors Environmental File Evaluation Form

	CONTRACTORS ENVIRONMENTAL FILE EVALUATION FORM		
	A minimum score of 80% is required on all sections for the approval of the submitted Environmental file System. Failure to achieve the required score will result in non-approval of the Environmental file, and the project will not commence prior file approval.		
ENVIRONMENTAL SYSTEM EVALUATION OUTCOME			
AVERAGE SCORE OBTAINED			**0.00%**
		APPROVED/REJECTED	
EVALUATED BY:	**REVIEWED BY:**	**APPROVED/REJECTED BY:**	**ACKNOWLEDGED BY:**
DESIGNATION:	**DESIGNATION:**	**DESIGNATION:**	**DESIGNATION:**
SIGNATURE:	**SIGNATURE:**	**SIGNATURE:**	**SIGNATURE:**
DATE:	**DATE:**	**DATE:**	**DATE:**

PROJECT DETAILS			
Contract Number			
Project Title			
Name of Contractor			
Is the project screened?	YES/NO	IF NO	Construction activities/work (including site establishment) should ONLY commence when after the project is Screened

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Specialist Studies/Report				
Environmental Authorisation (If applicable)				
Water Use Licence /General Authorisation (If applicable)				

SCORE ANALYSIS		
	Satisfactory (Approved)	Requirements have been met
0.00%	Unsatisfactory (Not Approved)	Requires substantial improvement / partially achieved

ENVIRONMENTAL REQUIRED DOCUMENTS		
1	Copy EMP and signed acknowledgement letter for JW EMP	0
2	SHE/ELO appointment letter	0
3	Contractor Environmental Induction presentation	0
3	Environmental Toolbox talk and copy of attendance register template	0
5	Environmental Objective (Site specific)	0
6	Environmental Policy Statement	0
7	**Registers**	0
3	Legal Register (Site specific)	0
9	Environmental Aspect and Impact register (site specific)	0
10	Permit register	0
11	Non-Conformance Register	0
12	Waste register template	0
13	Complaint register	0
14	Incident register	0

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15	Method statement register	0
16	Hazardous substances register	0
17	Daily Environmental checklist/ weekly checklist and spill kit checklist	0
18	Spill kit checklist	0
19	**Method statements or procedures**	0
20	Document control procedure	0
21	Storm water management plan/ Erosion control	0
22	Alien invasive and weeds control plan	0
23	Hazardous Management Plan/ Procedure (i.e., handling of hazardous substances)	0
24	Method statement for the activities to be undertake/ (include environmental aspects on the technical MS)	0
25	Waste management plan/ Method statement for waste management	0
26	Incident report template (Flash report/Investigation report)	0
3	Emergency Response Plan	0
28	Training Matrix	0
29	Dust Management Plan or Method Statement for dust suppression	0
30	Contractor Audit procedure/template	0
31	Rehabilitation Plan or Method Statement for Rehabilitation/Reinstatement	0
TOTAL		**0**

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Annexure C: Environmental Work instruction

ENVIRONMENTAL MANAGEMENT (EM) SITE INSTRUCTION Document No: JW- EMS-HO—R014	

1. All JW rules and regulation including JW Environmental Management Plan and other applicable legislation, standard and by-laws must be adhered to at all times.
2. Copies of Environmental Authorisation, Water Use License/General Authorization, Rehabilitation plan, EMP shall be kept on site **(where applicable).**
3. All JW sites must have waste bins, drip trays, spill kit and designated hazardous storage **(where applicable).**
4. Only registered Waste Service providers who comply with National Environmental Management Waste Act and Municipal By-laws shall be appointed.
5. No burning or burying of waste is allowed on site.
6. The conservation of water and the use of energy efficiently shall be implemented in all JW sites.
7. The letter from City Parks for occupying the open space shall be received and kept in the file and if the land belongs to the private owner, the copy of an agreement letter shall be kept in the file **(where applicable).**
8. The photos are taken before and during and after the project **(where applicable).**
9. The Environmental file must be approved before the commencement of works on site **(where applicable).**
10. The Environmental file will be kept on site all the times and shall be made available to competent authority and JW environmental representative **(where applicable).**
11. Rehabilitation/ reinstatement of the site must be done as per the JW EMP, rehabilitation method statement.
12. The hazardous waste must only be stored not more than 90 days on site as per the legislation.
13. Only asbestos registered service providers shall be appointed to handle and dispose asbestos to registered landfill site.
14. No mixing of general and hazardous waste will be allowed.
15. No cutting of trees is allowed on site without permit.
16. If archaeological artefacts or anything of heritage importance are found at JW sites/ servitude Environmental Section must be informed.
17. Everyone working within JW sites shall familiarize with the EMP requirements and other applicable JW environmental procedures.
18. All the environmental incidents shall be reported within 24 hours to JW environmental Section.

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19. Ensure that all JW employees and its service providers or suppliers receive environmental induction.
20. All work must be carried out under close supervision by the competent persons.
21. Repetitive findings or non-compliances shall be avoided.
22. Topsoil stockpile shall be protected by erosions control berms if it is exposed to a period of 14 days during wet season (where applicable).
23. Only 150mm of topsoil shall be removed and stockpile at a height of not more than 1m.
24. All hazardous material must be stored on a bunded and ventilated storage, and MSDS must be available for all of them.
25. No painting or marking of natural features is allowed on site.
26. Pollution of the environment shall be prevented all the times.
27. No leaking mobile plant is allowed on site.
28. Dust control measures shall be implemented on site (where applicable).
29. No sewer spillage shall spill into the storm water or the watercourse.
30. All environmental related incidents and/or emergencies shall be investigated within 48 hours from the date of notice.
31. Killing of fauna and/or Avifauna is prohibited.
32. Alien invasive and weeds must be eradicated.
33. Fumigation shall be done by trained personnel that is registered with DAFF.
34. No smoking is allowed in restricted areas. All such areas are posted appropriately.
35. Personal protective equipment is required to be worn at all times in production areas.
36. Maintain good housekeeping in your work area.
37. Keep fire lanes, roadways, walkways, and aisles free and clear of material.
38. The use of unsafe or defective equipment or tools is not permitted.
39. A contractor or subcontractor shall leave no unused materials on site. At the completion of a project the contractor shall remove all unused material and all waste shall be properly disposed of at a registered landfill site.
40. Any contractor or subcontractor found to be in violation of any EH&S rules can be ejected or escorted off premises if deemed necessary.
41. This file shall be kept on site and will be available at all times to the JW Reps and authorities (upon request).

ACKNOWLEDGEMENT BY MANAGER/CONTRACTOR

I, _____ the Manager/Contractor, do hereby declare that my site/company

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ENVIRONMENTAL MANAGEMENT PLAN

_____ _____acknowledges having read and understood the conditions contained in this document and furthermore, the employees agree to abide by these conditions.

CONTRACTOR/FACILITY REP.	SIGNATURE	DATE

ENVIRONMENTAL SITE INSTRUCTION		Document No: **JW- EMS-HO—R014**	
Name of Contractor/Facility			
Responsible Manager/ Engineer			
Project No. ***(where applicable):***	Date Issued:	Date of Inspection:	
Environmental Representative:		Designation:	
Should the responsible persons fail to comply with any term of this instruction, JW may demand compliance in writing from the defaulting party. Should the defaulting party fail to comply within the stipulated time frames, JW shall take the necessary steps to remedy the situation.		**PROJECT DESCRIPTION**	
Reference No. of Non-Conformances		**Action Required**	
EM-1.			
EM-2.			

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EM-3.	
EM-4.	
EM-5.	
EM-6.	
EM-7.	
EM-8.	
EM-9.	
EM-10.	

Received & Acknowledged by	**Signature**	**Date**
Responsible Manager/Contractor		
Responsible Consultant ***(where applicable)***		
JW Environmental Representative		
JW Project Inspector / Engineer ***(where applicable)***		
Contractor SHE/EL Officer ***(where applicable)***		

COMMENTS BY RESPONSIBLE MANAGER/ENGINEER:	**Target date for corrections**	
	Accepted/Acknowledged by Manager/Contractor	

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COMMENTS BY CONTRACTOR *(WHERE APPLICABLE)*:	Follow up comments by JW Environmental Representative

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Annexure D: Johannesburg Water General Surface Rehabilitation Specification

Johannesburg Water General Surface Rehabilitation Specification

Doc No: JW-EMS-CAPEX-T040
Effective Date:14/9/2021

No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Rehabilitation Plan	m2	0	10.05	1	1	0
2	Rehabilitation of disturbed area/s including roads (prepare the ground/level profiling,soil surfaces including	m2	0	22.05	1	1	0
2	Replacement/import of topsoil (if required)	m2	0	22.05	1	1	0
3	Planting of grass/hydroseeding (Including hydro seeding seed mix ratio).	m2	0	22.05	1	1	0
4	Maintainance for 3 month (weed removal, replanting, soil conditioner, erosion repairs ect.)	m2	0	17.4	1	1	0
5	Rehabilitation close-out report	m2	0	10.05	1	1	0
6	Bioremediation (process to be determined if required)	m2	0	22.05	1	1	0
					Sub Total 1		0

1	Preliminary and General	0	weighting factor 2		0
			1		
2	Contingencies		0		0
			Subtotal 2		0.00
			VAT (15%)		0.00
			Grand Total		0

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	OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION	
Johannesburg Water	TENDER NUMBER:	JW
	PROJECT LOCATION:	NORTHERN WASTEWATER TREATMENT WORKS
	PROJECT DESCRIPTION:	SUPPLY, DELIVERY AND OFFLOADING OF HELICAL GEARBOX UNITS FOR NORTHERN WASTEWATER TREATMENT WORKS

Returnable Annexure A: Acknowledgement of SHE Specification & Annexures

DECLARATION BY CONTRACTOR

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

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

We furthermore commit to:

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

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

Name of tenderer	
Name of Authorized person	
Authorized Signature*	

Signature must be as per form T2.12 as applicable

	OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION	
Johannesburg Water	PROJECT NUMBER:	JW
	PROJECT LOCATION:	NORTHERN WASTEWATER TREATMENT WORKS
	PROJECT DESCR:	SUPPLY, DELIVERY AND OFFLOADING OF HELICAL GEARBOX UNITS FOR NORTHERN WASTEWATER TREATMENT WORKS

VOLUME 2

Occupational Health & Safety Specification

JW

SUPPLY, DELIVERY AND OFFLOADING OF HELICAL GEARBOX UNITS FOR NORTHERN WASTEWATER TREATMENT WORKS

	OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION	
Johannesburg Water	PROJECT NUMBER:	JW
	PROJECT LOCATION:	NORTHERN WASTEWATER TREATMENT WORKS
	PROJECT DESCR:	SUPPLY, DELIVERY AND OFFLOADING OF HELICAL GEARBOX UNITS FOR NORTHERN WASTEWATER TREATMENT WORKS

General Notification

This document forms an integral part of the Contract Specification and, in particular, shall constitute the Client's (Johannesburg Water SOC Ltd.) Occupational Health, Safety & Environmental (SHE) Specification, as required by the Construction Regulations, 2014, as promulgated under the Occupational Health and Safety Act (Act no. 85 of 1993). The Specification shall furthermore be applied for the management of Mandatories performing activities for or on behalf of Johannesburg Water SOC Ltd, irrespective whether the contract work constitutes construction work or not.

The Contract Specification is contained in Volume 1 of the contract documents in Part 3: Scope of Work.

Acknowledgements

This Occupational Health, Safety & Environmental (SHE) Specification was developed by the internal OHS Department for the sole use by Johannesburg Water SOC Ltd. The issue date of this SHE Specification is September 2016.

Prepared by: OHS Department PO Box 61542 Marshalltown 2107 Tel: +27 11 688 1476	**PRINCIPAL CONTRACTOR:**	
	CEO (16.1 APPOINTEE):	
	TELEPHONE NUMBER:	
	FAX NUMBER	
	E-MAIL ADDRESS:	
	SIGNATURE:	

ABBREVIATIONS

Abbreviation	Description
CR	Construction Regulations
COID	Compensation for Occupational Injuries and Diseases
DoL	Department of Labour

GAR	General Administrative Regulations
GMR	General Machinery Regulations
GSR	General Safety Regulations
HCS	Hazardous Chemical Substances
HIRA	Hazard Identification and Risk Assessment
JW	Johannesburg Water (SOC) Ltd
MSDS	Material Safety Data Sheet
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
PER	Pressure Equipment Regulations
SANS	South African National Standards
SABS	South African Bureau Standard
SHE	Safety, Health & Environment
SOC	State Owned Company

DEFINITIONS

Word / Phrase	Definition
"WCL 1", "WCL 2" and "WCL 22"	Means the prescribed forms for reporting of incidents and occupational diseases referred to in the Compensation for Occupational Injuries and Diseases Act.
Competent Person	A person who has in respect of the work or task to be performed the required knowledge, training, experience and, where applicable, qualifications specific to that work or task: provided that where appropriate, qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 2000 (Act 67 of 2000).
Construction work	Any work in connection with: a) The construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure b) the construction, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system or any similar civil engineering structure; or the moving of earth, clearing of land, the making of an excavation, piling, or any similar type of work
Contractor (inclusive of Principal Contractor)	Any organization, person, entity performing activities for or on behalf of Johannesburg Water SOC Ltd.
Corrective Action	Action to eliminate the cause of a detected nonconformity or other undesirable situation.
Employee	Any person who is employed by or works for an employer and who receives or is entitled to receive any remuneration or who works under the direction or supervision of an employer or any other person
Employer	Any person who employs or provides work for any person and remunerates that person or expressly or tacitly undertakes to remunerate him, but excludes a labour broker as defined in section I (1) of the Labour Relations Act, 1956 (Act No. 28 of 1956)
Hazard	Means a source of or exposure to danger.

Hazard identification	The identification and documenting of existing or expected hazards to the health and safety of persons, which are normally associated with the type of construction work being executed or to be executed.
Incident	Means an incident as contemplated in section 24 (1) of the OHS Act 85 of 1993.
Machinery	means any article or combination of articles assembled, arranged or connected and which is used or intended to be used for converting any form of energy to performing work, or which is used or intended to be used, whether incidental thereto or not, for developing, receiving, storing, containing, confining, transforming, transmitting, transferring or controlling any form of energy
Mandatory	Includes an agent, a contractor or a subcontractor for work, but without derogating from his status in his own right as an employer or a user
Medical surveillance	Means a planned programme or periodic examination (which may include clinical examinations, biological monitoring or medical tests) of employees by an occupational health practitioner or, in prescribed cases, by an occupational medicine practitioner.
Method Statement	A document detailing the key activities to be performed in order to reduce as reasonably as practicable the hazards identified in any risk assessment.
Principal Contractor	Any employer who performs work and is appointed by the Client to be in overall control and management of the contract work (inclusive of Mandatories).
SHE File	A file or other record in permanent form, containing the information required as contemplated in the S.H.E Specification Document and legal requirements applicable to work activities.
SHE Plan	A documented plan which seeks to address all hazards identified means and ways to control and eliminate such to ensure compliance to the S.H.E Specification.
Workplace	Any physical location in which work related activities are performed under the control of the organization.

1. Introduction

In terms of Section 37 of the Occupational Health and Safety Act (Act no. 85 of 1993), Johannesburg Water SOC Ltd is required to control persons/organizations conducting activities for or on their behalf (Mandatories) and the Construction Regulations promulgated under the Occupational Health and Safety Act (Act no. 85 of 1993), is requiring Johannesburg Water SOC) Ltd. to compile an occupational health and safety specification for any intended project classified as construction work and to provide the specification to prospective tenderers / Mandatories.

The dual objective of this specification is to ensure that the Mandatories and Principal Contractors (herein after called Principal Contractor (including Mandatories)) entering into a contractual agreement/relationship with Johannesburg Water SOC Ltd. achieves and maintains an acceptable level of occupational health, safety and environmental performance whilst conducting activities to perform the contract work.

This document forms an integral part of the Contract Specification and, in particular, shall be the OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL (SHE) SPECIFICATION FOR CONSTRUCTION WORK. The Contract Specification is contained in Volume 1 of the contract documents. The principal and other contractors shall ensure that this specification is included with any contract/s that they may have with other contractors and/or suppliers that are engaged for the provision of labour, goods or services for this project. The Principal Contractor and its Contractors shall furthermore implement any reasonable practicable means to ensure compliance to this Occupational Health, Safety and Environmental (SHE) Specification and any other applicable legislation on their organization and/or activities performed by or for them. This SHE Specification will be read in conjunction, where issued and applicable, with the Environmental Specification issued for listed activities requiring environmental authorization by a relevant authority.

Compliance with this SHE specification does not absolve the Principal Contractor from complying with any other applicable minimum legal requirement and the Principal Contractor remains responsible for the sustainable integrity of the environment and the health and safety of its employees, mandatories as well as any persons affected by activities conducted for or on behalf of Johannesburg Water SOC Ltd (SOC) Ltd..

1.1 Johannesburg Water SOC Ltd's commitment to Occupational Health, Safety & Environmental (SHE) Management

Johannesburg Water SOC Ltd is committed to responsible occupational health, safety and environmental management. This commitment is essential to protect the environment, employees, Mandatories, visitors and provide a work environment conducive to health and safety. Principal Contractors and their Contractors shall demonstrate their commitment and concern by:

- Ensuring that decisions and practices affecting occupational health, safety and environmental performance are consistent with the issued SHE specification;
- Ensuring adequate resources are made available for the effective implementation of occupational health, safety and environmental control and mitigation measures;
- Participating in hazard identification and risk assessments and design safety reviews;
- Communicating occupational health, safety and environmental management processes, strategies and control measures with all levels of employees, contractor and/or visitors;
- Ensuring visible leadership at all sites;
- Promoting and enforcing the use of correct types of Personal Protective Equipment (PPE);
- Reporting and investigation of incidents and accidents and ensuring actions are identified and implemented to prevent similar types of incidents reoccurring;
- Participating in Client audits and meetings and ensuring required actions are implemented within reasonable time frames on the site/project;
- Recognizing and commending safe work practices and coaching employees who require guidance;
- Applying and enforcing consequence management from deviations and transgressions of/from compliance to this SHE Specification noted and/or observed, where applicable;
- Carrying out safety observations, implement corrective and preventative actions and giving immediate feedback;
- Encouraging employee participation in the formulation of work instructions and safety rules.

1.2 Scope of Occupational Health, Safety and Environmental (SHE) Specification

The scope of this Occupational Health, Safety and Environmental (SHE) Specification is to address the reasonable and foreseeable aspects of occupational health, safety and environmental management, which will be affected by the contract work.

The specification will provide the requirements that the Principal Contractor and other Contractors shall comply with in order to reduce the risks associated with the contract work, and that may lead to incidents causing injury and/or ill health or degradation of the environment, to a level as low as reasonably practicable and possible.

In particular, Johannesburg Water SOC Ltd will ensure that it shall not appoint any Principal Contractor unless it is reasonably satisfied that the contractor which it intends to appoint has the necessary competencies and resources to carry out the work safely.

1.3 Omissions from SHE Specification

Where any omission from the SHE Specification is identified, applicable legal requirements will constitute the minimum standard for compliance to the relevant omission. The responsibility will be on the Principal Contractor to provide assurance to Johannesburg Water SOC Ltd on compliance to the applicable legal requirements related to the activity / task / process.

1.4 Change management

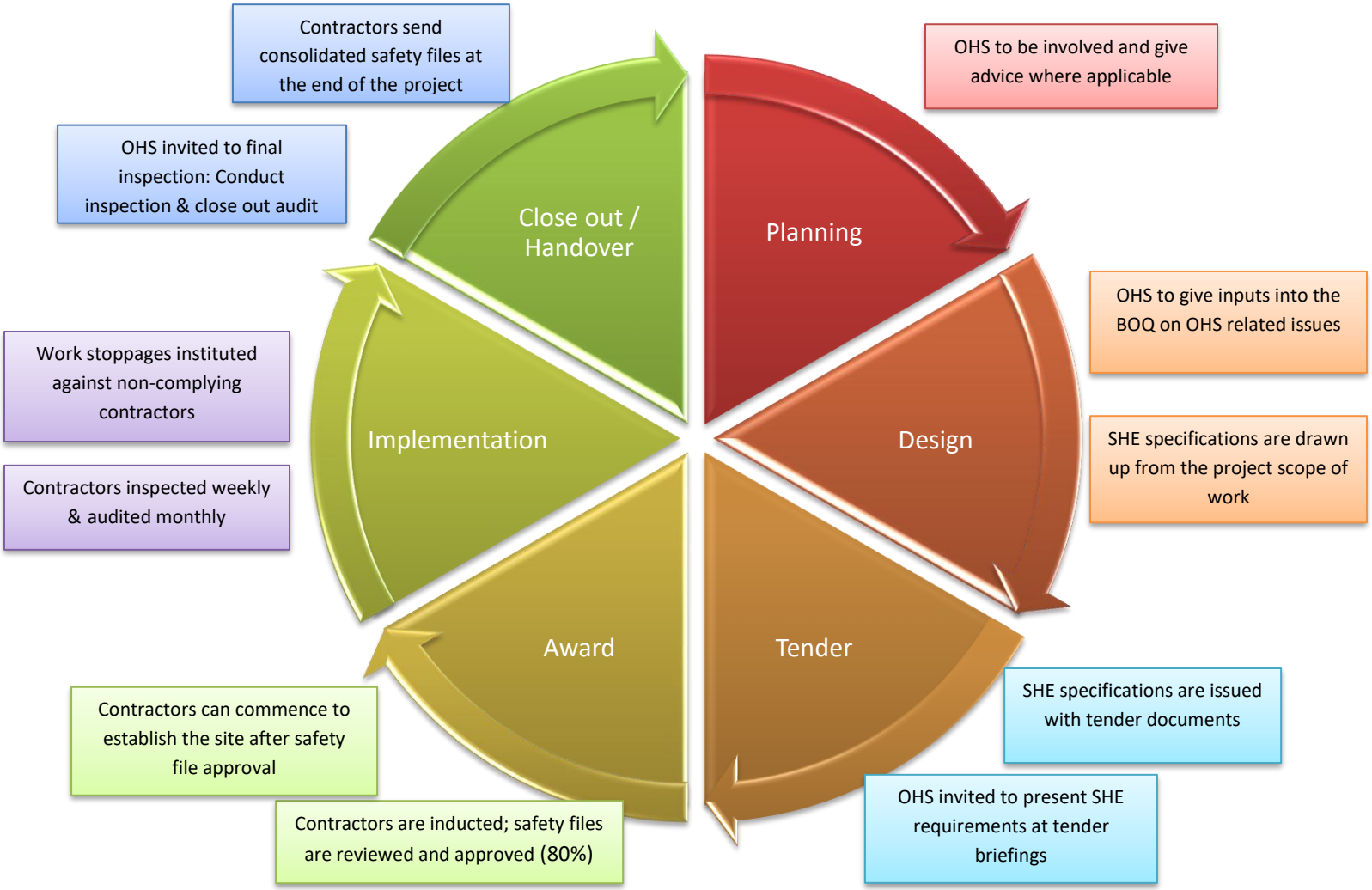
Whenever Johannesburg Water SOC Ltd identifies the need to change or review the SHE Specification, approved changes and revisions will be communicated to the Principal Contractor. A cost analysis on the implementation of the

proposed changes / revisions will be calculated through a collaborative processes between Johannesburg Water SOC Ltd and the Principal Contractor – where the approved changes and/or revisions has no cost implication for the Principal Contractor the Principal Contractor will be required to accept the approved changes / revisions and ensure implementation within the SHE Plan / File framework.

2 Overview of contractor management process

The contractor management process consists of the following phases:

- Tender briefing and tender documentation;
- Competency evaluation of Principal Contractors (integrated into Supply Chain Management processes);
- Appointed contractor to attend SHE system induction;
- Preparation of SHE File by Principal Contractor;
- Evaluation of SHE File;
- Principal Contractor engagement phase;
- Project close-out and submission of consolidated Health & Safety File.


Contractors send consolidated safety files at the end of the project
OHS to be involved and give advice where applicable
OHS invited to final inspection: Conduct inspection & close out audit
Close out / Handover
Planning
OHS to give inputs into the BOQ on OHS related issues
Work stoppages instituted against non-complying contractors
Implementation
Design
SHE specifications are drawn up from the project scope of work
Contractors inspected weekly & audited monthly
Award
Tender
SHE specifications are issued with tender documents
Contractors can commence to establish the site after safety file approval
OHS invited to present SHE requirements at tender briefings
Contractors are inducted; safety files are reviewed and approved (80%)

2. SHE DOCUMENTATION

2.1 Safety file

The Principal Contractor will prepare a SHE File containing the processes / procedures and templates to be applied during the project period for the scope of work. The Principal Contractor will be evaluated during the contract period against the submitted SHE File.

Ata minimum the SHE File will contain the following documentation:

- Notification of construction work to the relevant Department of Labour (stamped on each page / no faxed copies);
- Scope of work to be performed;
- Personnel list (Principal Contractor employees);
- OH&S / SHE Policy and other Policies;
- Updated copy of the Occupational Health and Safety Act (Act no. 85 of 1993) and its Regulations; COID Act.
- Proof of valid registration and good standing with the Compensation Commissioner or another licensed Insurer;
- SHE Plan agreed with Johannesburg Water SOC Ltd.
- Approved risk assessments, review and monitoring plans and safe work procedures (method statements);
- A list of contractors (sub-contractors) including copies of the agreements between the parties and the type of work being done by each contractor;
- All written designations and appointments for project scope of work (CV and competency copies);
- Management structure (inclusive of OH&S responsibility & meeting structure);
- Induction training and site SHE rules;
- Occupational health and safety training matrix / plan;
- Arrangements with contractors and/or mandatories;
- Description of security measures;
- The following registers (as applicable to contract scope of work):
    - Accident and/or incident notifications, investigation & control register;
    - Occupational health and safety representatives inspection register;
    - Template for entry into confined space;
    - Toolbox talks pro-forma;
    - Fall protection inspections template;
    - First-aid box content template;
    - Record of first-aid treatment template;
    - Fire equipment inspection and maintenance template;
    - Ladder inspection template;
    - Machine safety inspections template (including machine guards, lock-outs etcetera);
    - Inspection templates for lifting machines and –tackle (including daily inspections by drivers/operators);
    - Inspection templates of scaffolding;
    - Inspections templates of structures;
    - Templates of issuing of Personal Protective Equipment;
    - Monthly reporting and recording of statistics templates;
    - Keeping of any other record in terms of applicable legislation falling within the scope of SHE Legislation applicable to the project and the Principal Contractor / Contractor's activities and organization.
- Emergency preparedness and response programmes;
- Medical examination tests
- Vaccination records

2.2 Principal contractor appointment

- The principal contractor will be appointed in terms of Construction Regulations 2014, Reg 5(1) k
- All responsibilities imposed on the contractor by the Regulations will be applicable
- The duties will include:
  a) Prepare a site specific SHE file based on client SHE specification and project scope.
  b) Have an updated Letter of Good standing.
  c) Ensure the necessary legal appointment letters are compiled and signed by affected parties.
  d) Ensure SHE file submitted before work commences to Johannesburg Water for evaluation and approval.
  e) Must ensure an organizational medical programme for its employees is in place. This must address pre-employment, periodic examination, and exit examinations.
  f) Ensure all employees undergo medical examination and are declared fit for the job they are employed for by a Medical Practitioner.
  g) All employees undergo his control undergo company specific induction and Johannesburg water induction.
  h) Ensure before work commences employees are trained on the health and safety risks associated with the work they are conducting.
  i) Ensure employees are trained on company procedures, policies, method statements and informed of the Johannesburg Water SHE requirements as per the specification.
  j) Ensure legislative requirements are complied with during the duration of the contract and ensure that their employees comply also.
  k) Sign the 37 (2) Agreement between Johannesburg Water and themselves before any work commences and kept on their SHE file.
  l) Ensure that 37(2) Agreement(s) are signed between themselves and their sub-contractors.
  m) Ensure that sub-contractors have valid Compensation Commissioner Letter of Good Standing.
  n) Have a disciplinary procedure to address those found to be transgressing requirements of SHE specification, SHE plan, site rules or any other OHS act and its Regulation requirement.
  o) Prevent any employee or visitor who is under the influence of any alcohol or drugs (in state of intoxication) from being allowed to site.
  p) Ensure the safety of employees who are taking legal medication.
  q) Must hand over a consolidated SHE file at the end of the contract.
  r) Stop his/her employees who are doing unsafe acts or who are creating an unsafe environment.
  s) Investigate all incidents and report to Johannesburg water and ensure all reportable incidents as per the legislative requirement are complied with.
  t) Ensure work is supervised by competent personnel and that work is done by competent employees.
  u) Ensure pre-task risk assessment is done by a competent person and that employees are informed of the pre-task risks and the risk control measures.
  v) Ensure tool box talks are conducted to communicate SHE issues in connection to the work being done and any other aspects.
  w) Ensue that appointed personnel as per the SHE file are executing their duties as per the legal appointment.
  x) Ensure first aid kit is made available in case of any emergency.
  y) Ensure that housekeeping is maintained in good condition and that materials are store/stacked properly is designated areas.
  z) Have sufficient waste receptacles and ensure the correct disposal of the different wastes.
  aa) Proof of hazardous waste disposal to be requested from disposal site and to be kept inside SHE file.
  bb) Take reasonable steps to ensure that each appointed sub-contractor health and safety plan is implemented and maintained on the site and SHE File documentation is up to date.
  cc) Stop any work from being executed which is not in accordance with the client's health and safety specification and the principal contractor's health and safety plan for the site or which poses a threat to the health and safety of persons.
  dd) Must maintain an up to date list of all the sub-contractors on site accountable to the principal contractor, the agreements between the parties and the type of work being done; and
  ee) Ensure that all his or her employees have a valid medical certificate of fitness.

2.3 37.2 Agreement

- Johannesburg Water will enter into a 37(2) Agreement with all the appointed contractors
- A copy of the 37(2) Agreement must be kept in the SHE file of the contractor at all times.
- It is the responsibility of the contractor to ensure that there are 37(2) agreements between themselves and all their appointed sub-contractors.

2.4 SHE Plan

- The contractor shall prepare a SHE plan to address and manage all applicable sources of risk that are identified during the execution of the project. The SHE plan shall incorporate the requirements as listed in the SHE specification.
- A copy of the SHE plan shall be submitted together with SHE file for review and approval.
- It is the contractor responsibility to ensure they sub-contractor compiles a SHE plan that in line with the SHE specification requirement of Johannesburg Water.

2.5 Legislative framework

All contractors shall comply with legislation pertaining to this contract, including but not limited to:

- Constitution of the Republic of South Africa
- Occupational Health and Safety Act and its associated Regulations
- National Environmental Management Framework Legislation
- National Road Traffic Act
- Applicable South African National Standards (SANS)
- Compensation of Occupational Injuries and Diseases Act (COID)
- Local by-laws and provincial ordinances

2.6 SHE Policy

A SHE policy is a statement of intent and a commitment by the organization Chief Executive or Managing Director (OHS Act 16(1) appointee) in relation to requirements applicable to their Safety, Health and Environmental legal obligation, relevant SHE roles and responsibilities, and contractual obligations to the Client.
The contractor and their sub-contractor companies shall each have a documented SHE Policy authorized by their Chief Executive/Managing Director (OHS Act Section 16 (1) Appointee). The SHE Policy must meet the following minimum requirements;

- Organizational Mission and Goal.
- State the overall SHE objectives within the project.
- Show commitment to the prevention of injuries and ill-health.
- Show commitment to the protection of environment and the conservation of natural resources.
- Must be reviewed at predetermined intervals, or when there is change in work process, serious incident occurs.
- The SHE Policy must be in line with OHSAS 18001 and ISO 14001 requirements and guidance documentation.
- Must be authorized by contractor CEO.

2.7 Appointments and competencies

- The contractor and its appointed sub-contractor must make the relevant legislative and non-statutory appointments, which must be maintained valid for the entire contract duration.
- All appointees shall be suitably trained and certified competent for the responsibilities they are assigned for.
- Copies of all relevant appointments and the relevant competence certificates must be kept in the relevant SHE file.

2.8 Supervision of construction work

- The principal contractor shall ensure that the construction manager and construction health and safety officer are appointed for a ***single site*** on a full time basis.
- JW should be informed in writing of the absence of the above-mentioned on site.

Appointment index

Appointment	Legislative Ref	Competency requirements (Min)
Alternate Construction Manager	CR 8.1	N.Dip Eng + 4yrs exp
Assistant Construction Manager	CR 8.2	N.Dip Eng + 4yrs exp
Assistant Construction Supervisor	CR 8.8	-
Bulk mixing plant	CR 20	Certificate
Confined Space Supervisor	GSR 5	Certificate + Proven experience
Construction Manager	CR 8.1	N.Dip Eng + 4yrs exp Full time on site
Construction Health , Safety & Environmental Officer	CR 8.5 & JW Requirement	N.Dip Safety + 2yrs exp; OR N.Dip Enviro + 3yrs exp; OR NEBOSH / SAMTRAC + 4yrs exp Register with SACPCMP Full time on site Experience in enviro / certificate
Construction supervisor	CR 8.7	3 yrs experience
Construction vehicle & mobile plant supervisor	CR 23.1	Certificate
Electrical installation and appliances inspector	CR 24	
Emergency, security and fire coordinator	CR 29	Certificate
Excavation supervisor (including piling)	CR 13	3yrs exp / N.Dip building
Fall protection supervisor	CR 10.1	Certificate
First-aiders	GSR 3	Certificate
Fire fighting equipment inspector	CR 29	Certificate
General Machinery Supervisor	GMR 2.1/7	GCC (GMR 2.1)/ 3yrs exp (GMR 2.7)
Temporary work supervisor (Formwork)	CR 12.2	N.Dip building + 4yrs exp
Hazardous chemical substances supervisor	HCS Regs	Certificate
Incident investigator	GAR 9.2	Certificate
Ladder inspector	GSR 13A	-
Lifting machines and equipment inspector	DMR 18.5	Certificate + 3yrs experience
Materials hoist inspector	CR 19.8	Certificate
Occupational health and safety committee	OHS Act 19	-
Occupational health and safety representatives	OHS Act 17	Certificate

Risk assessor	CR 9.1	Certificate
Stacking and storage supervisor	CR 28	Certificate
Structures supervisor	CR 11.2	N.Dip building + 4yrs exp
Suspended platform supervisor	CR 17.1	Certificate
Welding supervisor	GSR 9	Certificate

2.9 Insurances

- The principal contractor and all his appointed contractors shall be registered with an appropriate compensation commissioner and have available a valid letter of good standing at all times.
- The obligation lies with the contractor to ensure that the Letter of Good Standing remains valid throughout the entire duration of the project.
- A copy of the said letter must be filed in all SHE files and made available during inspections and audits.

2.10 Costing for SHE

The contractor is responsible for ensuring that SHE costing is taken into consideration for the entire project/contract as this will ensure they comply with the SHE legislative requirements.

2.11 Sub-contractors

- Whenever the Principal Contractor appoints contractors or sub-contractors, it is a requirement that an Occupational Health and Safety Act (Act no. 85 of 1993) Section 37(2) agreement (i.e. Agreement with Mandatory) is entered into between the Principal Contractor and Contractors.
- The Principal Contractor will ensure that all appointed contractors comply with the Johannesburg Water SOC Ltd SHE Specification requirements.
- The Principal Contractor will establish a procedure on sub-contractor management and assurance on compliance to the established procedure will be provided to Johannesburg Water SOC Ltd on a monthly basis.
- Principal Contractors are required to formally notify Johannesburg Water SOC Ltd before appointing subcontractors.
- Johannesburg Water SOC Ltd shall approve all specialist subcontractors to be appointed and/or engaged by the Principal Contractor.

The Principal Contractor shall:

- Ensure prior to work commencing on the site that every contractor is registered and in good standing with the compensation fund or with a licensed compensation insurer as contemplated in the Compensation for Occupational Injuries and Diseases Act, 1993;
- Appoint each contractor in writing for the part of the project on the construction site;
- Take reasonable steps to ensure that each contractor's health and safety plan is implemented and maintained on the construction site;
- Ensure that the periodic site audits and document verification are conducted at intervals mutually agreed upon between the principal contractor and any contractor, but at least once every 30 days;
- Stop any contractor from executing construction work which is not in accordance with the client's health and safety specifications and the principal contractor's health and safety plan for the site or which poses a threat to the health and safety of persons;
- Include and make available a comprehensive and updated list of all the contractors on site accountable to the principal contractor, the agreements between the parties and the type of work being done; and
- Ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3.

2.12 Notification of construction work

- The Principal Contractor shall, before carrying out any work, notify the relevant Department of Labour of the intention to carry out construction work and use the form (*Annexure 2 in the Construction Regulations 2014*) for this purpose.
- Only a certified copy stamped (each page) by the Department of Labour will be acceptable. No faxed or emailed notifications will be accepted.
- No work shall commence before the Principal Contractor has submitted notification of construction work to the relevant Department of Labour.
- Johannesburg Water SOC Ltd will not approve the SHE File if no original stamped / certified copy of the notification of construction work has been done.

2.13 Construction work permit

- There will be a requirement for a construction work permit for this based on the number of days on site.
- The permit can only be applied for after a contractor has been appointed, and the process will take approximately 30 days or more if requirements are not met.
- The Client will appoint a PrCHSA (Professional Construction Health and Safety Agent) registered with the SACPCMP to oversee the permit application process, and the contractor will be required to provide supporting documents for the application of the permit.

3. ORGANISATIONAL STRUCTURE

- The contractor shall develop and submit together with SHE file an organizational organogram related to the contractor, listing all the levels of responsibility from the Chief Executive down to the supervisor(s) responsible for the project.
- The organogram diagram must list all relevant positions, names of appointees and legal appointments.
- The contractor is responsible for updating the organogram timeously when there are changes to the appointments.
- All appointed sub-contractors are also required to compile their own organograms.

4. COMMITMENT TO SHE

- Visible commitment is essential to providing a safe working environment.
- Managers, supervisors and employees at all levels must demonstrate their commitment by being proactively involved in the day to day SHE operations.
- Legislation requires that each employee takes reasonable care of themselves and their fellow workers

5. HIRA

Annexure 1: List of possible hazards emanating from projects and activities conducted for or on behalf of Johannesburg Water SOC Ltd includes an assessment of site specific health and safety hazards and risks and environmental aspects and impacts that have been identified by Johannesburg Water SOC Ltd as possibly applicable to the contract work for this project. It is by no means exhaustive and is offered as assistance to the tenderers and contractors.

Development of risk assessments

Every Contractor performing construction work shall, before the commencement of any construction work or work associated with the construction work, and during construction work, ensure that a risk assessment is undertaken by a competent person, appointed in writing, and the risk assessment shall form part of the SHE plan to be applied on the site. Risk assessments shall identify occupational health and safety hazards and risks and environmental aspects and impacts emanating from the activity to be performed by the Principal Contractor / Contractor.

The risk assessment (inclusive of impact assessment) shall include (at a minimum):

- Identification of the relevant Johannesburg Water SOC Ltd Project with regard to JW Number, Project name and area;
- Date on which risk assessments were conducted / reviewed;
- The identification of the risks / hazards and aspects / impacts to which persons may be exposed to per activity;
- The analysis and evaluation of the risks / hazards and aspects / impacts identified;
- Existing control measures and proposed corrective measures;
- A plan to review the risk assessments as the work progresses and changes are introduced;
- Identification of significant risks (e.g. high; exceeding 75%);
- A documented plan of Safe Working Procedures (SWP)', and its relevance to the risk assessment, inclusive of method statements, to mitigate, reduce or control the risks and hazards that have been identified;
- A plan to monitor the application of the Safe Working Procedures (SWP);
- Signature of appointed competent person conducting risk assessment; and
- Signature of approval by Principal Contractor management and employees involved in risk assessment.

Based on the risk assessments, the Principal Contractor must develop a set of site-specific occupational SHE rules that will be applied to regulate the health, safety and environmental hazards/aspects of the construction work.

The risk assessments, together with the site-specific occupational health and safety rules, must be submitted to Johannesburg Water SOC Ltd before mobilisation on site commences. These will be included in the SHE plan. The Contractor shall ensure through his risk management process the hierarchy of controls stipulated as follows, are implemented:

- ***Eliminate*** - The complete elimination of the hazard.
- ***Substitute*** - Replacing the material or process with a less hazardous one.
- ***Redesign*** - Redesign the equipment or work process.
- ***Separate*** - Isolating the hazard by guarding or enclosing it.
- ***Administrate*** - Providing control such as training, procedures etc.
- ***Personal Protective Equipment (PPE)*** - Use of appropriate and properly fitted PPE where other controls are not practical. (PPE as the last resort)

The Principal Contractor will be required to carry out the following three forms of risk assessment:

- Baseline risk assessment;
- Issue based risk assessment;
- Continuous risk assessments.

Baseline risk assessments

The Principal Contractor is required to develop a baseline risk assessment taking the resources, competency levels, nature and scale of their organization into consideration for submission during SHE File evaluation phase. The hazards and risks to which persons, plant, vehicles and facilities may be exposed during the construction should be identified and evaluated. The aspects and impacts resulting in environmental pollution or degradation should also be identified and evaluated. Measures to reduce or control these risks or hazards should be defined during this assessment. The effectiveness of the measures defined and the baseline risk assessment prepared shall be monitored and reviewed from time to time to ensure that it remains relevant and accurate.

Issue based risk assessments

The Contractor will be required to carry out separate risk assessments during construction of the project when methods and procedures are varied, for example when:

- Designs are amended;
- New machines are introduced;
- Plant is periodically cleaned and maintained;
- Plant is started-up or shut-down;
- Systems of work change or operations alter;

- Indents or near-misses occur; or
- Technological developments invalidate prior risk assessments.

Continuous risk assessments

The Occupational Health and Safety Act (Act no. 85 of 1993) specifically requires that employers shall provide and maintain working environments that are safe and without risk to health. The general awareness of hazards needs to be raised as work ethic to maintain a safe and risk free environment on an on-going basis. This is achieved by continuous risk assessments, a form of risk assessment that takes place as an integral part of day-to-day management. Examples of continuous risk assessments include:

- Maintaining general hazard awareness, and
- Pre-work risk assessments / Daily Safety Task Instructions.

Occupational health and safety risks or environmental impacts that are identified during the risk assessment process shall be communicated before the commencement of the said activity to every employee whose work is associated with the risk. Each employee shall sign to confirm understanding of the safety, health or environmental risks in the tasks.

Review of risk assessments

The Principal Contractor is required to review the hazards identified, the risk assessments and the Safe Work Procedures as the contract work develops and progresses and each time changes are made to the designs, plans and construction methods and/or processes. Revisions to the approved risk assessments and Safe Work Procedures will be presented at each production planning and progress meeting.

Risk assessments are to be reviewed whenever there is change on the scope of work, process, and accidents or when required by Johannesburg Water SOC Ltd

The Principal Contractor must provide Johannesburg Water SOC Ltd, other contractors and all other concerned or affected parties with copies of any changes, alterations or amendments to risk assessments and Safe Work Procedures within 14 days of such changes.

6. SAFE WORK PROCEDURES / METHOD STATEMENTS

Method statements or written safe work procedures shall be documented for all high risk activities:

- Design change or scope change/addition
- Change in job or task
- Introduction of new machinery, equipment or substance.

Method statements or written safe work procedures shall identify following:

- Tasks that are to be undertaken
- The hazards and associated risks of the task(s)
- The control measures for the task(s)
- The equipment and substances that are associated with task(s)
- Any training or qualification needed to do the task
- Personal protective equipment to be worn.

7. INCIDENT MANAGEMENT

7.1 Reporting of accidents and incidents

The Principal Contractor must report all incidents where an employee is injured on duty to the extent that he:

- Dies
- Becomes unconscious
- Loses a limb or part of a limb

- Is injured or becomes ill to such a degree that he is likely either to die or to suffer a permanent physical defect or likely to be unable for a period of at least 14 days either to work or continue with the activity for which he was usually employed

Or where -

- A major incident occurred
- The health or safety of any person was endangered
- Where a dangerous substance was spilled
- The uncontrolled release of any substance under pressure took place
- Machinery or any part of machinery fractured or failed resulting in flying, falling or uncontrolled moving objects
- Machinery ran out of control

to Johannesburg Water SOC Ltd within two days and to the Provincial Director of the Department of Labour within seven days from date of incident (Section 24 of the Occupational Health and Safety Act (Act no. 85 of 1993) and General Administrative Regulations), except that, where a person has died, has become unconscious for any reason or has lost a limb or part of a limb or may die or suffer a permanent physical defect, the incident must be reported to both Johannesburg Water SOC Ltd and the Provincial Director of the Department of Labour forthwith by telephone, telefax or e-mail.

- All other reports required by this specification must also be completed. Reporting of accidents / incidents to Johannesburg Water SOC Ltd will be on the prescribed format.
- The Principal Contractor is required to provide Johannesburg Water SOC Ltd with copies of all statutory reports required in terms of the Occupational Health and Safety Act (Act no. 85 of 1993) within 7 days of the incident occurring.
- The Principal Contractor is required to provide Johannesburg Water SOC Ltd with copies of all internal and external accident/incident investigation reports, within 7 days of the incident occurring.

7.2 Accident and incident investigation

- The Principal Contractor is responsible for the investigation of all accidents and/or incidents where employees and non-employees were injured to the extent that they had to receive medical treatment other than first aid.
- The results of the investigation are to be entered into the accident and/or incident register. The Principal Contractor is responsible for the investigation of all incidents, including those described in Section 24 (1) (b) and (c) of the Occupational Health and Safety Act (Act no. 85 of 1993) and for keeping a record of the results of the investigations including the steps taken to prevent similar accidents in future.
- The Principal Contractor is responsible for the investigation of all road traffic accidents, related to the construction activities, and for keeping a record of the results of the investigations including the steps taken to prevent similar accidents in future.
- Johannesburg Water SOC Ltd reserves the right to hold its own investigation into an incident or call for an independent external investigation.

7.3 Close out

- All incident investigation reports will be closed out once all the recommendations to prevent further incidents have been implemented.
- A copy of the investigation report must be handed to JW Safety Officer conducting the investigation.

8. MEDICAL SCREENING REQUIREMENTS

- The Principal Contractor shall ensure that a medical surveillance programme is implemented for all employees.

- An initial health evaluation shall be carried out by an occupational health practitioner immediately, before after a person commences employment, where any exposure exists or may exist, which comprises:
  - an evaluation of the employees medical and occupational history;
  - a physical examination; and
  - any other essential examination which in the opinion of the occupational health practitioner is desirable in order to enable the practitioner to do a proper evaluation.
- Medical surveillance and immunisation shall be done accredited at / by institutions or occupational health personnel, including, but not limited to:
  - Audiograms.
  - A cardio-respiratory examination / Lung function test;
  - Chest X-rays
  - Eye/ sight tests.
  - A general physical examination;
  - A review of previous medical history.
  - Glucose levels
  - Blood pressure

- An entry medical certificate shall be obtained for all workers prior to commencing with site activities from approved medical institution. Copies of all medical certificates shall be retained in the SHE File prior to site establishment and before an employee is allowed to come onto site.
- Specific attention shall be given to the physical and psychological fitness of people who will be required to work in elevated positions and operators of mobile machinery.
- An exit medical certificate shall be obtained for all workers at the end of the contract and for all workers who leave the employment of the Contractor before the end of the Project. Copies of all exit medical certificates shall be submitted to the Johannesburg Water SOC Ltd Project Specialist or Appointed OHS Agent.

9 EMERGENCY MANAGEMENT

The Principal Contractor must appoint a competent person to act as emergency controller and/or coordinator.

The Principal Contractor must conduct an emergency identification exercise and establish what emergencies could possibly develop. He must then develop detailed contingency plans and emergency procedures, taking into account any emergency plan that Johannesburg Water SOC Ltd may have in place.

In the event where a contractor incorporates the services of a 3rd party service provider for the provision of Emergency Response Services, the following criteria must be met:

- Identification of 3rd party emergency response services (organization & contact details);
- Notification of contractor to 3rd party emergency response service of incorporation of services into contractor's emergency response plan (written agreement / signed letter).

The Principal Contractor and the other contractors must hold regular practice drills of contingency plans and emergency procedures to test them and familiarise employees with them.

First-aid

The Principal Contractor must provide first-aid equipment (including a stretcher) and have qualified first-aider(s) on site as required by General Safety Regulations promulgated in terms of the Occupational Health and Safety Act (Act no. 85 of 1993).

The contingency plan of the Principal Contractor must include arrangements for the speedy and timeous transporting of injured and/or ill person(s) to a medical facility or of getting emergency medical aid to person(s) who may require it.

The Principal Contractor must have written arrangements in place with his other contractors regarding the responsibility of the other contractors towards their own injured and/or ill employees.

10 SHE TRAINING

All employees in jobs requiring training in terms of the Occupational Health and Safety Act (Act no 85 of 1993) and any other applicable legislative requirements are to be in possession of valid proof of training. Other occupational health, safety and environmental training requirements of the Occupational Health and Safety Act (Act no 85 of 1993) and Construction Regulations can include:

- General induction;
- Site and job specific induction, including visitors;
- Occupational health and safety representatives;
- Training of the legal and nominated appointees;
- Operators and drivers of construction vehicles and mobile plant;
- Basic fire prevention and protection;
- Basic first-aid;
- Storekeeping methods and safe stacking; and
- Emergency planning and coordination
- Incident investigation
- Risk Assessment
- Planned job observations (supervisors)

All operators, drivers and users of construction vehicles, mobile plant and other equipment are to be in possession of valid proof of training and, where applicable, valid licenses.

12.1 General Job training

The contractor is required to ensure that before an employee commences work their direct supervisor or line manager who is responsible for the employee has informed the employees of his scope of authority, hazards and risks associated with the work to be performed as well as the safety control measure(s). This will involve discussion in connection with ay work standard, job description or company policy or procedure.

12.2 Awareness and promotion

The Principal Contractor is required to have a promotion and awareness programme in place to create an occupational health and safety culture within employees. The following are some of the methods that may be used:

- Toolbox talks;
- Posters;
- Videos;
- Competitions;
- Suggestion schemes;
- Participative employee activities such as “occupational health and safety circles”.

The Principal Contractor is, at a minimum, required to provide awareness programmes to employees on the following:

- General Health and Safety Awareness
- Environmental Awareness;
- HIV / AIDS awareness.

12.3 General competence requirement

The Principal Contractor shall ensure that his personnel and other contractors' personnel are trained and competent to carry out work safely and without risk to health has been completed before work commences. The Principal Contractor shall ensure that follow-up and refresher training is conducted as the work progresses and whenever the scope or nature of the work changes.

A "**competent person**" in relation to construction work, means any person having the knowledge, training and experience specific to the work or task being performed: Provided that where appropriate qualifications and training are registered in terms of the provisions of the South African Qualifications Authority Act, 1995 (Act No. 58 of 1995), these qualifications and training shall be deemed to be the required qualifications and training. It is the responsibility of the Contractor to determine whether any appropriate qualifications and training are registered in terms of the provisions of the South African Qualifications Authority Act.

Records of all training must be kept in the SHE File. The contents of the file will be audited from time to time.

At a minimum, the Principal Contractor will provide training on Safe Work Procedures / Safe Operating Standards to personnel responsible for performing the related task. Records of training on Safe Work Procedures / Safe Operating Standards will be retained. Competence and skill levels by the employees responsible for performing the task on the implementation of the Safe Work Procedures / Safe Operating Standards will be measured through Planned Job Observations.

12.4 Site-specific induction training

The Principal Contractor will be required to develop a project specific induction-training course based on the baseline risk assessment for the contract work. He will ensure that all his employees and other contractors and their employees have received training on the submitted induction-training programme.

All employees of the principal and other contractors are to be in possession of proof (on person) that they have attended a site-specific occupational health and safety induction-training course.

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

Where the Principal Contractor is required to operate within Johannesburg Water SOC Ltd Depot's the Principal Contractor will ensure that all employees undergo the Johannesburg Water SOC Ltd induction.

11 PPE REQUIREMENTS

- The Principal Contractor is required to continuously identify the hazards in the workplace and deal with them. He must either remove them or, where impracticable take steps to protect workers and make it possible for them to work safely and without risk to health under the hazardous conditions.
- The Principal Contractor will establish a Personal Protective Equipment Policy and a Personal Protective Equipment study will be conducted to determine the types of Personal Protective Equipment (PPE) to be supplied related to the hazards and risks emanating from the tasks.
- Cognisance shall be given to the gender of individuals required to where PPE; size required by the employee and size issued.

- Personal protective equipment should, however, be the last resort and there should always first be an attempt to apply engineering and other solutions to mitigating hazardous situations before the issuing of personal protective equipment is considered.
- Where it is not possible to create an absolutely safe and healthy workplace the Principal Contractor is required to inform employees regarding this and issue, free of charge, suitable equipment to protect them from any hazards being present and that allows them to work safely and without risk to health in the hazardous environment.
- It is a further requirement that the Principal Contractor maintains the equipment, instructs and trains the employees in the use of the equipment and ensures that the employees use the prescribed equipment.
- Employees do not have the right to refuse to use and/or wear the equipment prescribed by the employer and, if it is impossible for an employee to use or wear the prescribed protective equipment through health or any other reason, the employee cannot be allowed to continue working under the hazardous condition(s) for which the equipment was prescribed. An alternative solution has to be found that may include relocating the employee.
- The Principal Contractor may not charge any fee for protective equipment prescribed by him but may charge for equipment under the following conditions:
  - Where the employee requests additional issue in excess of what is prescribed;
  - Where the employee has patently abused or neglected the equipment leading to early failure; and
  - Where the employee has lost the equipment.

All employees shall, as a minimum, be required to wear the following personal protective equipment on any of Johannesburg Water SOC Ltd's projects:

- Protective overalls;
- Protective footwear;
- Protective headwear; and
- Eye, face and ear protection.
- NO SHORTS OR DRESSES WILL BE ALLOWED ON SITE!!!

All Personal Protective Equipment will clearly display the branding components of the Principal Contractor's organization (e.g. Name of Organization, logo).

12 DISCIPLINARY PROCESSES

- The contractor is required to implement disciplinary process in order to enforce compliance with requirements.
- All sub-contractors are required to have the same.

13 SITE RULES

- The Principal Contractor must develop a set of site-specific OH&S rules that will be applied to regulate the Health and Safety Plan and associated aspects of the construction.
- When required for a site by law, visitors and non-employees upon entering the site shall be issued with the proper Personal Protective Equipment (PPE) as and when necessary.

Alcohol, Drugs and Other Intoxicating Substances

- The contractor shall ensure that all personnel under his authority do not at any time enter the site or perform any work whilst under the influence of alcohol, a drug, or any other intoxicating substance.

- Selling or possessing drugs, alcoholic beverages or any other intoxicating substance on the site is strictly prohibited.
- A drugs and alcohol testing program must be implemented. Persons entering the site must be randomly tested.
- Any person who tests positive for alcohol or drug consumption must be subject to disciplinary action and be dealt with in accordance with the contractor's drug and alcohol / substance abuse policy.
- Should the actions and / or demeanour of an employee suggest possible narcosis or drunkenness, the employee must be removed from the site. This may be done without testing. Note: All personnel involved in an incident / accident must immediately be subjected to an alcohol test and a drug test as part of the investigation.

Firearms, Ammunition and Offensive Weapons Firearms, ammunition, and offensive weapons of any kind are strictly prohibited. No person shall be permitted to enter the site carrying any such item

14 PUBLIC HEALTH AND SAFETY

The Principal Contractor is responsible for ensuring that non-employees affected by the construction work are made aware of the dangers likely to arise from the construction work as well as the precautionary measures to be observed to avoid or minimise those dangers. This includes:

- Non- employees entering the site for whatever reason;
- The surrounding community; and
- Passers-by the site.

- The Principal Contractor shall organize the site in such a manner that pedestrians and vehicles can move safely and without risks to health, including sufficient and suitable traffic routes and safe walkways with relevant signage.
- Appropriate signage must be posted to this effect and all employees on site must be instructed to ensure that non-employees are protected at all times.
- All non-employees entering the site must receive induction into the hazards and risks of the site and the control measures to be observed.
- The Principal Contractor shall recognize that the Community Liaison Officer (CLO) is the link between Johannesburg Water SOC Ltd and the community and provide all reasonable support to the Community Liaison Officer to ensure relevant responsibilities are fulfilled and positive relationships with the community are maintained.
- Where activities are performed close to public routes, the Principal Contractor will establish a traffic management plan incorporating the requirements of relevant by-laws. At a minimum, barricading, warning signage and flagmen will be provided to ensure the protection of workers from vehicles in transit. Where required, the Principal Contractor will interact with the local traffic department to establish minimum requirements to be implemented on public routes.

15 REFUSAL TO WORK

- Section 14 of the OHS Act states that employees shall carry out any lawful orders given to them, suggesting that they have the right to refuse to obey any unlawful order or work instruction.
- In terms of legal and JW requirements, if an employee has reasonable belief that the work to be carried out is likely to endanger themselves or other persons in any way, he/she has the right to refuse to work.
- An employee may also refuse to work in term of Section 29 of NEMA, if the work would result in imminent and serious threat to the environment.
- All contractors shall ensure that their employees are conversant with hazards associated with their work and work environment, and be aware of the precautionary measures to take.
- The contractor must ensure that all refusals to work are investigated promptly and resolved timeously.

16 SECURITY

The Principal Contractor must establish site access rules and implement and maintain these throughout the construction period. Access control must, amongst other, include the rule that non-employees will not be allowed on site unaccompanied.

The Principal Contractor must develop a set of security rules and procedures and maintain these throughout the construction period.

The Principal Contractor shall:

- Provide a guardhouse for security personnel. The guardhouse should be in good condition and at-least meet minimum requirements as per Environmental Regulations for Workplaces as promulgated under the Occupational Health and Safety Act (Act no. 85 of 1993).
- Supply an access card containing the name, surname, employee number and photograph for all appointed employees (full or part time) for the site.
- Ensure that no person enters the construction site without wearing the necessary Personal Protective Equipment (PPE).
- Ensure that no children are allowed on the construction site.
- Ensure that no family members are sleeping over on the construction site.
- Ensure that no pets are allowed on the construction site.

Visitors

- Visitors (including reps and suppliers) must be advised in advance of the mandatory Personal Protective Equipment (PPE) requirements for the site, and must arrive with all of this PPE.
- All visitors must sign in the visitors register and undergo a visitor induction briefing before entering the site.
- A visitor access card must be issued to each visitor on conclusion of the induction briefing. Whilst on site, visitors must be accompanied at all times by an appropriately senior employee who has been inducted fully.
- When leaving the site, each visitor must return his or her visitor access card to the security personnel posted at the entrance / exit.
- A visitor will not be permitted to leave the site until he or she produces the access card that was issued.
- Any request (typically made by a government official) to carry out a site inspection must be referred to the Project Manager / Engineer / Safety Agent.
- The contractor must not arrange any such inspection without prior approval from the Client's representatives

17 ACCOMMODATION ON SITE

No employees shall be accommodated on site.

18 WELFARE FACILITIES

The provision of toilets for each sex is required in terms of the National Building Regulations and Construction Regulation 28. Chemical toilets are allowed instead of the water borne sewerage type. Toilets have to be provided at a ratio of 1 toilet per 30 workers. The Principal Contractor shall provide flushing toilets on the construction premises.

- At least cold-water showers for each sex have to be provided at a ratio of 1 shower per 15 workers.
- Some form of screened off changing facility must be provided separately for each sex.
- Some form of eating facility sheltered from the sun, wind and rain must be provided.

The employer needs to provide his employees with the following:

- Potable water for drinking;
- Water and soap for hand washing

- Toilet paper

19 COMPLIANCE MONITORING

20.1 Inspections

- Contractors will be inspected at least once per week by the JW Project Inspectors.
- Feedback of the inspections will be issued immediately on work instructions, and a formal report sent within 7 days of conducting the inspection to all relevant stakeholders.
- Johannesburg Water SOC Ltd. reserves the right to conduct other ad-hoc assessments and inspections as deemed necessary.
- This may include, amongst other measures, site safety walks. Corrective actions will be identified by Johannesburg Water SOC Ltd. and the Principal Contractor's representative and implemented by the Principal Contractor (at no cost to Johannesburg Water SOC Ltd.) to ensure SHE Performance improvement.

20.2 Monthly audits

- Monthly audits will be conducted within periods not exceeding 30 days.
- The Principal Contractor is to conduct his own monthly internal audits and inspections to verify compliance with his own occupational health and safety plan and management system as well as compliance with the requirements of the Johannesburg Water SOC Ltd. SHE Specification.
- The Principal Contractor will also assess and inspect the compliance of other contractors under its control. Management members of the Principal Contractor will be involved in the internal assessments and inspections.

20.2.1 Monthly compliance rating

A monthly compliance rating will be calculated for each Principal Contractor as per a formula determined by Johannesburg Water SOC Ltd focussing on or incorporating outcomes of assurance (e.g. monthly audit), operational (e.g. behavioural based safety inspection) assessments and other requirements, as necessary. Johannesburg Water SOC Ltd reserves the right to adjust the monthly compliance calculation formula as and when required – each revision of the monthly compliance calculation formula will be communicated to the Principal Contractor before implementation.

Each Principal Contractor is required to maintain a minimum compliance rating of 93% (Ninety Three Percent).

Scoring	Classification	Classification description
93% -100%	Good	Substantial compliance
80% -92%	Average	Compliance status needs to be improved
60% - 79%	Poor	Methods to ensure compliance require substantial improvement - operations with substantial non-compliance risks
<60%	Very poor	Methods to ensure compliance failed completely - troubled operation with severe non-compliance risks

20.3 Work stoppages

Work stoppages will be identified for 2 (two) types of work stoppages to be implemented:

- Overall work stoppage – the Principal Contractor and its Contractors are not allowed to continue with any type of construction / site work up until the work stoppage has been closed-out;
- Activity work stoppage – The Principal Contractor and its Contractors are not allowed to continue with the specific activity / task / job up until the work stoppage has been closed-out.

Overall work stoppages will be issued where non-conformances are identified against the criteria in the following table.

NR	DESCRIPTION OF AUDIT NON-CONFORMANCE / NON-COMPLIANCE
1	**NOTIFICATION OF CONSTRUCTION WORK**
1.1	Local Department of Labour not notified of construction work before commencement of construction activities
1.2	Notification of construction work not stamped by local Department of Labour (no faxed copies)
1.3	Copy of notification of construction work not available on site
2	**PROOF OF REGISTRATION WITH COMPENSATION COMMISSIONER**
2.1	Proof of registration with Compensation Commissioner or other insurer not available
2.2	Registration with Compensation Commissioner or other insurer not valid and up-to-date
3	**POLICY COMMITMENT & SHE SPECIFICATION**
3.1	SHE Plan not compiled, approved by contractor management and available on site
4	**SECTION 37(2) AGREEMENT**
4.1	Signed section 37(2) Agreement not signed and available on site
5	**RISK ASSESSMENTS**
5.1	Risk assessments not developed/ not applicable to scope of work issued by Client
6	**CONSTRUCTION MANAGER**
6.1	No construction manager appointed / available on site
6.2	Appointed construction manager does not meet requirements
6.3	Proof of competency not available on-site
7	**SITE SAFETY OFFICER**
7.1	No safety officer appointed/ available on site
7.2	Safety officer does not meet requirements
8	**SHE FILE**
8.1	No file on site

Activity work stoppages will be issued where non-conformance are identified per activity where the health and safety of employees or the public is compromised.

20.4 Non-compliance management process

The following actions will be instituted where non-conformances are identified in terms of compliance to relevant legislative requirements and the Johannesburg Water SOC Ltd SHE Specification.

CRITERIA	ACTION TO BE INSTITUTED	RESPONSIBLE PARTY
Compliance rating: 93-100%	Non-conformance closure	Principal Contractor / Contractor
Compliance rating: 80-92%	Letter of compliance improvement to Principal Contractor	Johannesburg Water SOC Ltd
	Non-conformance closure	Principal Contractor / Contractor
Compliance rating: 60-79%	Non-compliance hearing	Johannesburg Water SOC Ltd
	Letter of commitment for performance improvement	Principal Contractor / Contractor
	Non-conformance closure	Principal Contractor / Contractor
Compliance rating: <60%	Non-compliance hearing	Johannesburg Water SOC Ltd
	Letter of commitment for performance improvement	Principal Contractor / Contractor
	Non-conformance closure	Principal Contractor / Contractor
	Supply Chain Management to be informed of non-compliance standing	Johannesburg Water SOC Ltd
3 x Work stoppages	Non-compliance hearing	Johannesburg Water SOC Ltd
	Letter of commitment for performance improvement	Principal Contractor / Contractor
	Non-conformance closure	Principal Contractor / Contractor
	Supply Chain Management to be informed of non-compliance standing	Johannesburg Water SOC Ltd
3 x Non-conformance to <93% monthly compliance rating	Non-compliance hearing	Johannesburg Water SOC Ltd
	Letter of commitment for performance improvement	Principal Contractor / Contractor
	Non-conformance closure	Principal Contractor / Contractor
	Supply Chain Management to be informed of non-compliance standing	Johannesburg Water SOC Ltd
3 x consecutive repeat findings	Non-compliance hearing	Johannesburg Water SOC Ltd
	Letter of commitment for performance improvement	Principal Contractor / Contractor
	Non-conformance closure	Principal Contractor / Contractor
	Escalation to SCMU & CAPEX	Johannesburg Water SOC Ltd

21 OPERATIONAL REQUIREMENTS

21.1 CONFINED SPACE ENTRY

- Enclosed space work necessitates a Confined Space Permit. This may only be obtained from the authorized person nominated in writing.
- The responsibility for safe procedure, both at the time of entry and during the entire operation of entering and working in confined spaces, rests with the Contractor.
- The Contractor shall be sure that adequate steps have been taken to eliminate or control hazards.
- Before working in an area that contains dust, the area is to be ventilated and hosed down to settle and dampen the dust.
- The Contractor shall provide all necessary equipment to manage confined spaces, including all necessary monitoring and rescue equipment (such as tripods, breathing equipment and the like).
- The Contractor shall ensure all persons working in a confined space or managing entry to a confined space are appropriately trained.
- Compulsory - Continuous monitoring, trained rescue teams, radio communication & adequate ventilation.

Pump sumps & valve chambers

Ventilation

- All available manholes or ventilation covers must be removed and the compartment ventilated for 10 (ten) to 15 (fifteen) minutes, using compressed air or a portable blower.
- Such ventilation must be continued while personnel are in the compartment.
- Ensure that exhaust fumes from blower do not enter the confined space.
- Before entering any sump or compartment, the atmosphere must be tested by the Principal Contractor's competent person (trained by the supplier of the gas monitoring equipment) by lowering the gas monitoring equipment to the bottom of the sump or compartment by means of a rope.
- A register must be kept indicating that the atmosphere has been tested and that the sump or compartment is fit to work in.
- The Principal Contractor's construction supervisor must check and co-sign this register each time he visits a site to ensure that the atmosphere is continuously being monitored.

Entering sump

- When entering a sump the person entering the sump must wear the safety harness, gas detector as well as a self-rescuer.
- A lifeline must be attached to the safety harness and a person on the surface must be in continuous contact with the person in the sump.
- At least one person on the surface must be trained in basic first aid and CPR and a first aid kit with resuscitation equipment must be available outside the entrance of the confined space for emergencies.
- Should the alarm sound when a person is in the confined space, the area must be evacuated immediately and the atmosphere re-tested and certified safe before re-entry into the confined space.
- In no circumstance shall any person remain within a sump for a period of more than one hour at a time.
- A five-minute rest on the surface must be taken after this period before re-entering.
- No naked lights, smoking or unprotected electrical apparatus which may cause sparks, shall be permitted in any sump or in their vicinity.

Safety equipment

- All teams must be issued with gas monitoring equipment and safety harnesses and self-rescuers where applicable.
- All employees must be trained in the use thereof.

21.2 BARRICADING

- Barricading plans are to be presented by the Principal Contractor for any major operations involving site works for approval by Johannesburg Water SOC Ltd. Where areas are unsafe, they should be enclosed with barricading. Examples are people working overhead, welding splatter etc.
- Where there is a risk of injury, the area should be barricaded off with secure solid barricades.
- Barricading for the prevention of access into areas with a potential risk of injury shall as a minimum be constructed of a handrail, knee-rail and appropriately supported as to prevent any person from falling into the restricted/risk area.
- Appropriate signage shall be affixed to the barricade indicating the risk associated (i.e. deep excavation, lifting operations etc.) and the responsible Supervisor and contact details shall be displayed. All barricading shall have a “No Entry” signs on all sides and at each change of direction. Signage shall be placed at 20 m intervals where lengths exceed. All signage shall be a minimum size of 290 mm x 290 mm.
- Danger tape shall not be utilised to prevent personnel from entering into areas.
- Where no risk exists of injury to personnel such as stacking and storage areas, the use of wire for hand and knee rails netting shall be acceptable to demarcate the area.
- All barricades will have a dedicated entrance where it is required that personnel enter the areas.
- Appropriate signage shall be placed at the entrance indicating which Contractor has right of entry.
- It is the Contractor’s responsibility to remove all redundant barricades directly after use. The Contractor’s Safety Officers will maintain a marked-up site plan indicating where barricades are erected.
- It will be a requirement that the contractor protects employees against contact with exposed rebar and poles by the installation of rebar-caps on all exposed areas where there is a potential that an employee could be injured.

21.3 SYMBOLIC SIGNGAGE

Contractors shall use mandatory and prescribed symbolic safety signs at their lay down and site areas. The display of the following signs is mandatory:

- “Radio-Active Material” symbolic signs at radioactive storage areas.
- “Eye Protection” symbolic signs shall be displayed at all grinding machines and at any area where it is mandatory to wear eye protection or where there is danger of an eye injury being sustained.
- “Ear Protection” symbolic signs shall be displayed at all areas where there is a danger of noise induced hearing loss being sustained.
- Every separate room of a workplace shall be consecutively numbered.
- All toilets or urinals shall be marked in a conspicuous place with painted or stencilled letters to indicate the sex for which they are intended.
- The location of every first aid box is to be clearly indicated by means of a sign.
- In any room, cabinet or enclosure where flammable substances are used or stored shall be fixed a suitable and conspicuous sign prohibiting smoking or the use of naked flames in the area.
- At the entrance to premises where machinery is used
- Restricted access on “Authorised Person Only” signs on entry. “No person shall enter the workplace or premises without the permission of the employer or user of the machinery”.
- At every place where machinery is used a notice (English & Pictograms) shall be posted.
- Explosive Power Tool shall have a sign warning people when it is in use.
- Electrical Control Gear. A notice shall be posted so as to warn against the re-closing of a switch of control gear whilst a person is working on such equipment.
- Emergency contact telephone numbers.
- Adequate scaffolding signs. (When applicable).
- Adequate fire fighting equipment signs.
- Speed limit signs.
- Warning notices at openings through which people may fall.

- Risk based signage depending on the task being performed e.g.:
  - "Men working above", "Men working below', "Road closed – detour", "Excavation in progress", "No walkway" etc.;
- No-entry signs to incomplete platforms

The Principal Contractor shall install a notification board indicating the following information at the site entrance:

- Johannesburg Water SOC Ltd project number;
- Principal Contractor identification details (name, telephone number)
- Name and contact details of Construction Supervisor;
- Name and contact details of site safety officer;
- Monthly compliance rating;
- Lost Time Injury Rate;

The Principal Contractor will ensure that information on the notification board is kept up-to-date.

21.4 USE AND STORAGE OF FLAMMABLES

The Principal Contractor to ensure that:

- No person is required or permitted to work in a place where there is the danger of fire or an explosion due to flammable vapours being present unless adequate precautions are taken;
- No flammable material is used or applied e.g. in spray painting, unless in a room or cabinet or other enclosure specially designed and constructed for the purpose unless there is no danger of fire or explosion due to the application of adequate ventilation;
- The workplace is effectively ventilated. Where this cannot be achieved:
  - Employees must wear suitable respiratory equipment
  - No smoking or other source of ignition is allowed in the area
  - The area is conspicuously demarcated as "flammable"
- Flammables stored on a construction site are stored in a well-ventilated, reasonably fire-resistant container, cage or room that is kept locked with access control measures in place. Sufficient fire fighting equipment is installed and fire prevention methods practiced. Proper housekeeping may achieve this;
- Flammables stored in a permanent flammable store are stored so that no fire or explosion is caused.
- Stored in a locked and well-ventilated reasonably fire resistant container, cage or room conspicuously demarcated as "Flammable Store – No Smoking or Naked Lights"
- The flammables store to be constructed of two-hour fire retardant walls and roof and separated from adjoining rooms or workplaces by means of a two-hour fire retardant fire wall
- Adequate and suitable fire fighting equipment installed around the flammables store and marked with the prescribed signs
- All electrical switches and fittings to be of a flameproof design
- Any work done with tools in a flammable store or work areas to be of a non-sparking nature
- No Class A combustibles such as paper, cardboard, wood, plastic, straw and the like to be stored together with flammables
- The flammable store to be designed and constructed such that in the event of spillage of liquids the store is able to contain the full quantity + 10% of the liquids stored
- A sign indicating the capacity of the store to be displayed on the door
- Only one day's quantity of flammable is to be kept in the workplace;
- Containers (including empty containers) to be kept closed to prevent fumes/vapours from escaping and accumulating in low lying areas;
- Metal containers to be bonded to earth whilst decanting to prevent build-up of static forces; and
- Welding and other flammable gases to be stored segregated according to the type of gas and empty and full cylinders.

21.5 HAZARDOUS CHEMICAL AGENTS

The Principal Contractor must ensure that:

- Employees receive the necessary information and training to be able to use and store hazardous chemical substances safely;
- Employees obey lawful instructions regarding:
  - The wearing and use of protective equipment
  - The use and storage of hazardous chemical substances
  - The prevention of the release of hazardous chemical substances
  - The wearing of exposure monitoring and measuring equipment
  - The cleaning up and disposal of materials containing hazardous chemical substances
  - Housekeeping, personal hygiene and the protection of the environment
- The risk assessments required in terms of Construction Regulation include employee exposure to hazardous chemical substances and that the necessary measures be taken to protect persons from being detrimentally affected by hazardous chemical substances present or used in the workplace;
- Suppliers provide the necessary information in the form of a material safety data sheet regarding a hazardous chemical substances required to ensure the safe use and storage of that substance;
- An up-to-date list is kept on site of hazardous chemical substances stored and used together with the material safety data sheet of the hazardous chemical substances;
- Hazardous chemical substances containers be clearly marked with the contents and main hazardous category e.g. “Flammable” or “Corrosive” and the reference number of the hazardous chemical substances on the list indicated above;
- Hazardous chemical substances, for example asbestos dust, are not cleared by using compressed air but should be vacuumed;
- No person eats or drinks in a hazardous chemical substances workplace; and
- Hazardous chemical substances waste is disposed of safely in terms of hazardous waste disposal requirements.
- MSDS’s to be in 16 point format- available on site

21.6 FIRE PREVENTION AND PROTECTION

The Principal Contractor must ensure that:

- The risk of fire is avoided;
- Sufficient and suitable storage for flammables is provided;
- Sources of ignition are removed wherever flammable or highly combustible material is present in the workplace, for example:
  - Notices prohibiting smoking are displayed and enforced
  - Welding and flame cutting is only allowed under controlled conditions that includes written hot work permits
  - Only spark-free hand and power tools are used
  - No grinding, cutting and shaping of ferrous metals is allowed using electrically driven power tools that produce sparks
  - Flameproof switches and fittings are to be used in the flammable atmosphere
  - Good housekeeping is maintained to prevent the accumulation of unnecessary combustibles
  - Adequate ventilation is maintained
  - Adequate and suitable fixed and portable fire fighting equipment is provided and maintained in good working order.
- Maintenance must include:
  - Regular inspection of fire equipment by a competent person appointed in writing and keeping a register
  - Annual inspection and service by an accredited service provider

- All employees are instructed in the use of the fire fighting equipment and know how to attempt to extinguish a fire;
- A sufficient number of employees are appointed and trained to act as an emergency team to deal with fires and other emergencies;
- Employees are informed regarding emergency evacuation procedures and escape routes;
- Emergency escape routes are kept clear at all times and clearly marked;
- Evacuation assembly points are demarcated;
- Evacuation is practiced to ensure that all persons are evacuated timeously;
- Roll call is held after evacuation to account for all personnel and ensure that no-one has been left behind; and
- A siren or alarm is fitted which is clearly audible to all persons on site.

21.7 STACKING AND STORAGE

The Principal Contractor must ensure that:

- A competent person is appointed in writing to supervise all stacking and storage on a construction site;
- Adequate storage areas are provided and demarcated;
- The storage areas are kept neat and under control;
- The base of any stack is level and capable of sustaining the weight exerted on it by the stack;
- The items in the lower layers can support the weight exerted by the top layers;
- Cartons and other containers that may become unstable due to wet conditions are kept dry;
- Pallets and containers are in good condition and no material is allowed to spill out;
- The height of any stack does not exceed 3 times the base unless stepped back at least half the depth of a single container at least every fifth tier or the approval of an inspector has been obtained to build the stacks higher with the aid of a machine. The operator of the machine must be protected against items falling from overhead off the stack and no items may overhang;
- The articles that make up a single tier are consistently of the same size, shape and mass;
- Structures for supporting stacks are structurally sound and able to support the mass of the stack;
- No articles are removed from the bottom of the stack first but from the top tier first;
- Anybody climbing onto a stack must do it in a safe manner, taking reasonable safety precautions, and ensuring that the stack is stable and capable of supporting him or her
- Stacks that are in danger of collapsing are broken down and restacked;
- Stability of stacks are not threatened by vehicles or other moving plant and machinery;
- Stacks are built in a header and stretcher fashion and that corners are securely bonded;
- Stacks are stepped back at least half the depth of a single container at least every fifth tier; and
- Persons climbing onto stacks do not approach unguarded moving machinery or electrical installations.
- Laydown area is allocated for Contractor-supplied items.
- At all times, the Contractor shall be responsible for the safe and adequate storage of all materials and equipment on site which he is to install, whether they are supplied by himself or others.
- The safe handling, unloading and loading of material receipts and dispatches at site or storage areas shall be the Contractors' responsibility.

The Contractor shall provide a suitable and adequate lock-up store for the storage of items of equipment and material, which would be damaged or pilfered if stored in the open. The Principal Contractor shall provide all facilities required for weather-proofing, dust proofing or vermin proofing.

The Contractor is responsible for the proper storage and maintenance of all equipment until issue of the Certificate of Practical Completion.

All equipment and materials will be stored on suitable wood poles or pallets which will not protrude more than a meter from any of the stored material. Safe access ways shall be maintained between all stored items preventing employees from having to climb over or under equipment to retrieve the necessary.

21.8 HOUSEKEEPING

The Principal Contractor to ensure that:

- Housekeeping is continuously implemented and maintained;
- Materials and equipment are properly stored;
- Scrap, waste and debris is removed regularly;
- Materials placed for use are placed safely and not allowed to accumulate or cause obstruction to the free-flow of pedestrians and vehicular traffic;
- Waste and debris not to be removed from heights by throwing but rather by chute or crane;
- Where practicable, construction sites are fenced off to prevent entry of unauthorised persons;
- Catch platforms or nets are erected over entry and exit ways or over places where persons are working to prevent them being struck by falling objects;
- An unimpeded work space is maintained for every employee;
- Every workplace is kept clean, orderly and free of tools, materials and the like that are not required for the work being done;
- As far as is practicable, every floor, walkway, stair, passage and gangway is kept in good state of repair, skid-free and free of obstruction, waste and materials;
- The walls and roof of every indoors workplace sound and leak-free; and
- Openings in floors, hatchways, stairways and open sides of floors or buildings are barricaded, fenced, boarded over or provided with protection to prevent persons from falling.

21.9 PUBLIC HEALTH AND SAFETY

The Principal Contractor is responsible for ensuring that non-employees affected by the construction work are made aware of the dangers likely to arise from the construction work as well as the precautionary measures to be observed to avoid or minimise those dangers. This includes:

- Non- employees entering the site for whatever reason;
- The surrounding community; and
- Passers-by the site.

- The Principal Contractor shall organize the site in such a manner that pedestrians and vehicles can move safely and without risks to health, including sufficient and suitable traffic routes and safe walkways with relevant signage.
- Appropriate signage must be posted to this effect and all employees on site must be instructed to ensure that non-employees are protected at all times. All non-employees entering the site must receive induction into the hazards and risks of the site and the control measures to be observed.
- The Principal Contractor shall recognize that the Community Liaison Officer (CLO) is the link between Johannesburg Water SOC Ltd and the community and provide all reasonable support to the Community Liaison Officer to ensure relevant responsibilities are fulfilled and positive relationships with the community are maintained.

21.10 TRAFFIC MANAGEMENT

- Where activities are performed close to public routes, the Principal Contractor will establish a traffic management plan incorporating the requirements of relevant by-laws.
- At a minimum, barricading, warning signage and flagmen will be provided to ensure the protection of workers from vehicles in transit.
- Where required, the Principal Contractor will interact with the local traffic department to establish minimum requirements to be implemented on public routes.

21.11 HAND TOOLS

The Principal Contractor must inspect all hand tools before it is brought onto the site.

- As far as possible all hand tools must be numbered and placed on register to be inspected monthly by a person designated to do so.
- Any tools found to be in an unsafe condition must immediately be removed from service and either discarded or rectified.
- No chisels with “mushroomed” heads must be used.
- No hammer shall be used with a cracked or damaged handle.
- All files must be fitted with handles.
- All trolleys, pushcarts, etc. used on site must be identifiable, placed on register and inspected at least once every month.
- Non-sparking tools must be used in areas where the risk of fire or explosion is present.
- No homemade hand tools are allowed on the project.
- All tools shall be attached to a suitable lanyard when utilised in elevated positions

21.12 PORTABLE ELECTRICAL EQUIPMENT

Portable electrical tools and equipment includes every unit that takes electrical power from a 15 ampere plug point and is moved around for use in the workplace for example; drills, saws, grindstones, portable lights, etcetera. Other electrical appliances such as fridges, hotplates, heaters, and etcetera must be inspected and maintained to the same standards as portable electrical tools and appliances.

The use, inspection and maintenance of portable electrical tools and equipment shall be as follows:

- Periodical inspections must be carried out by a competent person appointed in writing;
- Inspection results must be recorded in a register;
- Only competent authorised persons are allowed to use portable electrical tools and equipment; and
- The correct protective equipment must be worn or used whilst operating portable electrical tools and equipment.

This equipment:

- Must be maintained in good condition at all times to prevent an electrical shock to the user;
- The main power source should incorporate an earth leakage protection device or receive power through a double wound transformer or be double insulated and clearly marked as such; and
- All equipment must be fitted with a switch to allow for safe and easy starting and stopping.

The following requirements apply to portable lights:

- Must be fitted with a robust non-hygroscopic non-conducting handle;
- Live metal parts or parts which may become live must be protected against contact;
- The lamp must be protected by a strong guard;
- The cable lead-in must withstand rough handling;
- Inspections must be undertaken that concentrate on plug, cord, switch and any obvious faults;
- A register be kept for each piece of equipment with findings of regular inspections undertaken to evaluate the condition of these lights; and
- When used in wet/damp/metal container conditions, the lamp must be protected.

21.13 LIFTING EQUIPMENT & MACHINERY

Lifting equipment must be designed and constructed in accordance with the manufactures/designers specifications as well as generally accepted technical standards and operated, used, inspected and maintained in accordance with the

manufactures requirements as well as that of the of Driven Machinery Regulations promulgated in terms of the Occupational Health and Safety Act (Act no 85 of 1993).

The Driven Machinery Regulations requires that:

- Lifting equipment is clearly and conspicuously marked with the maximum mass load (MML) that it is designed to carry safely. When the MML varies with the conditions of use a table showing the maximum mass load with respect to every variable condition shall be posted up by the user in a conspicuous, place easily visible to the operator and the table shall be used by the driver/operator;
- Each winch on a lifting machine must at all times have, at least, three full turns of rope on the drum when the winch has been run to its lowest limit;
- Lifting equipment shall be fitted with a brake or other device capable of holding the MML. This brake or device shall automatically prevent the downward movement of the load when the lifting power is interrupted;
- Lifting equipment shall be fitted with a load limiting device that automatically arrest the lift when the load reaches its highest safe position or when the mass of the load is greater than the MML;
- Every chain or rope on a lifting machine that forms an integral part of the machine must have a factor of safety as prescribed by the manufacturer of the machine. Where no standard is available the factor of safety must be:
    - chains – 4 (four)
    - steel wire ropes 5 (five)
    - fibre ropes- 10 (ten)
- Every hook or load attaching device must be designed to prevent the load from slipping off or disconnecting;
- Every lifting machine must be inspected and load tested by a competent person every time it has been dismantled and re-erected and every 12 months after that. The load test must be in accordance with the manufacturer's requirements or to 110% of the MML. In addition, all ropes, chains, hooks or other attaching devices, sheaves, brakes and safety devices forming an integral part of a lifting machine must be inspected every 6 months by a competent person;
- All maintenance, repairs, alterations and inspection results must be recorded in a log book and each lifting machine must have its own log book; and
- No person may be lifted by a lifting machine not designed for lifting persons unless in a cradle approved by the inspector of the Department of Labour.

General requirements for cranes and lifting equipment

All documentation must be provided to the Johannesburg Water SOC Ltd Project Engineer prior to mobilisation. Failure to do so and the resulting cost of any delays and/or remedial activities will be for the Contractor's account.

All crane operators must be authorised by the relevant Engineer before they may operate a crane or lifting machine. The Load charts must be displayed at the crane.

Daily pre-use inspections of the cranes must be done and be kept on the file. The inspections must be logged in a logbook. The area in which a lift is performed must always be barricaded to prevent employees from entering.

A crane or lifting machine must not be left unattended and the keys may never be left in the ignition when the operator is not present. Properly constructed out rigger pads must be used when soil is uneven or unstable. (Only sleepers or appropriately designed steel plate pads may be used for this purpose).

Only a competent rigger may direct a lift of any kind unless the following requirements are met. Rigger assistants used for performing lifting operations shall be limited to lifts with all of the following requirements:

- Lifts lower than 5 tons
- Easy lifts that does not require the load to be lifted over structures, equipment or machinery
- Equipment that is not critical
- Rigging configuration that requires the attachment of several parts of lifting equipment such as chain blocks to adjust the angle of loads.

- All safety devices on a crane or lifting machine must be functional.

Certification will be required for record purpose, and shall cover the following:

- A Brake or other device capable of holding the maximum mass should the power fail, or which is such that it shall automatically prevent the uncontrolled downward movement of the load when the raising effort is interrupted; and
- A Limiting device which shall automatically arrest the driving effort when:
- The Hook or Load attachment point of the Power Driven lifting machine reaches its highest safe position; and
- In the case of a Winch Operated lifting machine with a lifting capacity of 5000kg or more, the load is greater than the rated mass load of such machine.

The user shall ensure that every lifting machine is operated by an Operator specifically trained for a particular type of lifting machine; the user shall not require or permit a person to operate such lifting machine unless the operator is in possession of a certificate of training, issued by an accredited person or organisation.

No Crane shall be used at arrival on site before copies of all documentation have been handed over to the Johannesburg Water SOC Ltd and the Crane have been checked by a person duly authorised and signed off as acceptable. Copies of all documentation shall be kept in the SHE File at all times.

No Crane shall be used without a pre-use check and findings entered on an approved checklist. Before any cranes are established on site the following must be inspected and approved:

- Operator's licences
- Training certificates
- Medical fitness certificate.
- The cranes load test certificate.
- Rope test certificates including Mill / Destructive test.
- The lifting gear load test certificates.
- The load limiting device calibration certificate.
- Proof that the hooks have been measured for spreading.
- The service inspection history.
- Monthly comprehensive inspection certificate
- Operation and maintenance Manuals and crane condition.

<u>Cranes and Lifting Machines</u>

A contractor shall ensure that where tower cranes are used:

- Account is taken of the effects of wind forces on the structure;
- Account is taken of the bearing capacity of the ground on which the tower crane is to stand;
- The bases for the tower cranes and tracks for rail-mounted tower cranes are firm and level;
- The tower cranes are erected at a safe distance from excavations;
- There is sufficient clear space available for erection, operation and dismantling;
- The tower crane operators are competent to carry out the work safely; and
- The tower crane operators are physically and psychologically fit to work in such an environment by being in possession of a medical certificate of fitness."

No user shall use or permit any person to use a Jib-Crane with a lifting capacity of 5000kg or more at a minimum Jib radius, unless it is provided with:

- A load indicator that shall indicate to the operator of the Jib-Crane the mass of the load being lifted, provided that such a device shall not require manual adjustment from the application of the load, to the Jib-Crane, until the release of the load.
- A Limiting Device, which shall automatically arrest the driving effort whenever the load is lifted, is greater than the rated mass load of the Jib-Crane.

Mobile Crane near Power Lines

No mobile cranes are to be used near overhead power lines until the Johannesburg Water SOC Ltd representative has been notified and provided safe access conditions and a valid permit to work is obtained. Mobile cranes shall be effectively earthed when working in the vicinity of electrical wires. Assume that all electrical equipment and wires are live and avoid them.

Lifting tackle

The following requirements will apply to lifting tackle:

- Manufactured of sound material, well-constructed and free from patent defects;
- Clearly and conspicuously marked with an identity number;
- MML factor of safety:
  - Natural fibre ropes - 10(ten)
  - Man-made fibre ropes and woven webbing - 06(six)
  - Steel wire ropes – single rope - 06(six)
  - Steel wire ropes – combination slings - 08(eight)
  - Mild Steel chains - 05(five)
  - High tensile/alloy steel chains - 04(four)
- Steel wire ropes must be examined by a competent person every three months and the results recorded in a designated logbook. The ropes must be discarded (not used any further for lifting purposes) when wear and corrosion is evident.

21.14 LADDERS

The following requirements for ladders will apply:

- All ladders used on the site shall be constructed and used in compliance with the OH&S Act and Regulations.
- Ladders, which provide access to a working platform, shall extend one metre above the platform where it provides access, and shall be secured to prevent slipping.
- Timber ladders shall not be painted other than with clear preserving oils, clear varnishes or clear plastics.
- Ladders, which are in a damaged condition, shall not be used and shall be labelled accordingly and removed from the Premises.
- All Ladders shall be numbered, logged in a register, and inspected monthly.
- A ladder in use shall be held by an assistant and/or properly tied down in position.
- Only ladders that do not conduct electricity shall be used in live electrical sub-stations and switching rooms.
- Ladders shall be removed after use and stored in an appropriate facility as to not expose them unnecessarily to the elements or potential damage by surrounding activities.

21.18 Fall protection (Working in elevated positions)

A pre-emptive risk assessment will be required for any work to be carried out above **two metres** from the ground or any floor level. This work will be classified as “work in elevated positions”.

As far as is practicable, any person working in an elevated position will work from a platform, ladder or other device that is at least as safe as if he is working at ground level. Whilst working in this position he shall be wearing a single belt with lanyard to prevent the person falling from the platform, ladder or other device. This safety belt will be, as far as is possible, secured to a point away from the edge over which the person might fall and the lanyard must be of such a length and strength that the person will not be able to move over the edge.

Alternatively, any platform, slab, deck or surface forming an edge over which a person may fall may be fitted with suitable guard rails at two different heights as prescribed in the relevant South African National Standard for the design, erection, use and inspection of access scaffolding.

Where the requirement in the paragraph above is not practicable, the person will be provided with a full body harness that will be worn at all times and shall be attached above the wearer's head at all times. The lanyard must be fitted with a shock-absorbing device or the person must be attached to a fall arrest system (anchorage connector; body wear; and connecting device) approved by Johannesburg Water SOC Ltd.

Where the requirements in the paragraph above are not practicable, a suitable catch net must be erected.

Employees working in elevated positions must be trained to work without risk to their health and safety or to the health and safety of others and be declared medically and psychologically fit to perform work at elevated positions.
Where work on roofs is carried out, the risk assessment must take into account the possibility of persons falling through fragile material, i.e. skylights and openings in the roof.

Access scaffolding

Access scaffolding must be erected, used and maintained safely in accordance with Construction Regulations and relevant SA Bureau of Standards Code of Practice.

Detailed consideration must be given to all scaffolding to ensure that it is properly planned to meet the working requirements, designed to carry the necessary loadings and maintained in a sound condition. Sufficient material must be available to erect the scaffolding properly.

Scaffolding must only be erected, altered or dismantled by persons who have adequate training and experience and are competent in this type of work and under the continuous supervision of such a person.

21.19 Structures

Care should be taken not to damage existing structures around the plant.

21.20 Explosive powered tools

Every explosive powered tool must be:

- Provided with a guard around the muzzle to confine flying fragments or particles; and
- Must be fitted with a firing mechanism that will prevent the explosive powered tool from firing unless it is pushed against the surface and at the right angle. Where the explosive powered tool is fitted with an intermediate piston between the charge and the nail this requirement is waived.

The Principal Contractor or user must ensure that:

- Only the correct type of cartridge is used;
- The explosive powered tool is cleaned and inspected daily before use by an appointed competent person. The competent person will keep a register with the findings of his inspection and the details of cleaning, service and repairs;
- The safety devices are in good working order before the explosive powered tool is used;
- When the explosive powered tool is not being used it is stored in an unloaded condition together with the cartridges in a safe and secure place inaccessible to unauthorised persons;
- A warning notice is displayed at the point where the explosive powered tool is in use;
- The issue and return of cartridges must be by issue/returns register signed by both issuer and user and empty cartridge cases must be returned with unspent cartridges;
- Users and operators of the explosive powered tool have received the necessary training and has been authorised as competent to use/operate the explosive powered tool; and

- Users and operators must wear the prescribed personal protective equipment whilst using and/or operating the tool.

21.21 Electrical installations

The installation of temporary electricity for construction shall be in accordance with Construction Regulations and the Electrical Installation Regulations. The Principal Contractor must ensure that:

- Existing services are located and marked before construction commences and the markings maintained during construction;
- Electrical installations and -machinery are sufficiently robust to withstand normal working conditions on site;
- Temporary electrical installations must be inspected at least once a week by a competent person and a record of the inspections kept in the SHE File;
- Electrical machinery used on a construction site must be inspected daily before start-up by the competent driver/operator or any other competent person and a record of the inspections kept in the SHE File; and
- A competent person appointed in writing must control and be responsible for all temporary electrical installations.
- An employer or user shall provide free of charge and maintain in good condition such protective equipment as may be necessary to prevent incidents, for use by persons engaged in working on or in close proximity to live electrical machinery or dead electrical machinery which may become live.

21.21.1 Electrical control gear

- The contractor shall ensure that all electrical machinery are provided with controlling apparatus and protective devices which shall, as far as is reasonably practicable, be capable of automatically isolating the power supply in the event of a fault developing on such machinery.
- The contractor shall place a switch, circuit breaker or fuse in the neutral conductor of a polyphase alternating current or three-wire direct current distribution system unless such switch, circuit breaker or fuse is so arranged as to isolate all phase conductors and the neutral conductor simultaneously: Provided that this shall not include an isolating link on the neutral conductor installed for test purposes or to prevent circulating currents.
- The contractor shall, whenever reasonably practicable, provide switchgear with an interlocking device so arranged that the door or cover of the switch cannot be opened unless the switch is in the 'off position and cannot be switched on unless the door or cover is locked.
- The contractor shall mark or label all controlling apparatus permanently so as to identify the system or part of the system or the electrical machinery which it controls, and where such control apparatus is accessible from the front and the back these markings shall be on both the front and the back.
- The contractor shall post a notice at switchgear or control gear which has been switched off or locked out to enable persons to work on electrical machinery or other machinery operated by electricity and controlled by. Such switchgear or control gear, warning against reclosing such switchgear or control gear.

21.21.2 Work on disconnected electrical machinery

- Without derogating from any specific duty imposed on employers or users of machinery by the Act, an employer or user shall, whenever work is to be carried out on any electrical machinery which has been disconnected from all sources of electrical energy, but which is liable to acquire or to retain an electrical charge, as far as is practicable, cause precautions to be taken by earthing or other means to discharge the electrical energy to earth from such electrical machinery or any adjacent electrical machinery if there is danger there from before it is handled and to prevent any electrical machinery from being charged or made live while persons are working thereon

21.21.3 Electrical machinery in hazardous locations

- No person may use electrical machinery in locations where there is danger of fire or explosion owing to the presence, occurrence or development of explosive or flammable articles, or where explosive articles are manufactured, handled or stored, unless such electrical machinery, with regard to its construction relating to the classification of the hazardous locations in which it is to be used, meets the requirements of a safety standard incorporated for this purpose in these regulations under section 36 of the Act.
- Every user of electrical machinery shall be in possession of a certificate in a form acceptable to the chief inspector which has been issued by an approved inspection authority, in which it is certified that the electrical machinery has been manufactured and tested for the groups of dangerous articles in terms of the safety standard which has been incorporated in these regulations for this purpose under section 36 of the Act: Provided that in lieu of such certificate an inspector may approve permanent labeling on such machinery which contains all the relevant information.
- When diverse items of electrical machinery such as motors, cables and control apparatus are used together to form an electrical installation, the user shall ensure that the selection, arrangement, installation, protection, maintenance and working thereof results in no less a degree of safety than when the individual items of such machinery are used separately.
- The user shall use electrical machinery to which this regulation applies only under such conditions and in such surroundings as are prescribed in the safety standard incorporated in these regulations for this purpose under section 36
- No person shall effect repairs or adjustments to or otherwise work on electrical machinery under conditions (bullet 1) unless such machinery has been rendered dead and effective measures have been taken to ensure that such machinery remains dead.
- Wherever there is a possibility of the formation of static electricity under working conditions, the user shall earth all metallic structures, machine parts, pneumatic conveyor ducts and pipelines conveying flammable articles and the like, or take such other measures as may be necessary to effectively prevent the formation of electric sparks.
- The user shall cause all electrical machinery to which this regulation applies to be examined and tested at intervals not exceeding two years by a person who is competent to express an opinion on the safety thereof.
- The person carrying out the examination shall enter, sign and date the results of each such examination in a record book which shall be kept by the user for this purpose: Provided that where such machinery is subject to adverse climatic or physical conditions the frequency of such examinations shall be increased to intervals of no longer than one year or such shorter period as circumstances may necessitate.

21.21.9 Issuing of certificate of compliance

Only registered person may issue a certificate of compliance in the form of annexure 4 and which shall be accompanied by a test report in the format approved by the chief inspector, after having satisfied himself or herself by means of an inspection and testing that—

- a new electrical installation complies with the provisions of regulation 7 (1) of the Electrical Installation Regulations (EIR); or
- an electrical installation which existed prior to the publication of the current edition of the health and safety standard incorporated into these regulations in terms of regulation 7 (1) (EIR), complies with the general safety principles of such standard; or
- an electrical installation which existed prior the publication of the current edition of the health and safety standard incorporated into these regulations in terms of regulation 7 (1) and to which extensions or alterations have been affected, that–

    - ting part of the installation, complies with the general safety principles of such standard and is reasonable safe, and

- extensions or alterations affected comply with the provisions of regulation 7 (1) of the Electrical Installation Regulations (EIR).

- If at any time prior to issuing a certificate of compliance any fault or defect is detected in any part of the installation, the registered person shall refuse to issue such certificate: Provided that if such fault or defect in the opinion of the registered person constitutes an immediate danger to persons in the case where electricity is already supplied, he or she shall forthwith take steps to disconnect the supply to the circuit in which the fault or defect was detected and notify the chief inspector.

- Any person who undertakes to do electrical installation work shall ensure that a valid certificate of compliance is issued for that work.
- No person shall amend a certificate of compliance issued by a registered person.

21.22 Earthing

18. The contractor shall ensure that -

- roofs, gutters, downpipes and waste pipes on premises to which electrical energy is supplied to be earthed, except -
  - where the operating voltage does not exceed 50 V;
  - roofs made of non-conductive material or metal roofs covered by non-conductive material;
  - gutters, downpipes and waste pipes made of non-conductive material or gutters and downpipes attached to a metal roof which is covered by non-conductive material;
  - roofs, gutters, downpipes and waste pipes on premises which receive electricity by means of underground service connections:

Provided that the connection is to the conductive structures;

- all accessible metallic parts of electrical machinery that, though normally not forming part of an electrical circuit, may become live accidentally, to be protected by an insulating covering or to be otherwise enclosed or to be earthed and the resistance of the earth continuity path shall not exceed 0,2 ohm, except-
  - metal in earth-free situations, other than runs of metal wireway, and the close-fitting metal sheathing and armouring of cables;
  - short separate lengths of heavy-gauge metal wireway used for the mechanical protection of cables where such cables are not used in the secondary circuits of discharge luminaire installations;
  - short, unexposed separate lengths of metal wireway used for the mechanical protection of insulated wiring passing through walls, floors, partitions or ceilings;
  - metalwork of fixed electrical machinery where such metalwork is more than 2.4 m above the floor: Provided that this exception shall not apply where such metalwork is situated in any position likely to become damp, or in an elevator shaft, or near rotating machinery, or in contact with a wall, ceiling or other support constructed of or covered with conducting material;
  - metal parts of electrical machinery where such parts are enclosed or shrouded by insulating material so that such metal parts cannot be touched;
  - cleats, clips, saddles, clamps of other devices for fixing wireways and cables;
  - shades, reflectors and guards supported on lamp holders or discharge luminaires;
  - lamp caps;
  - metal parts of or screws in or through non-conducting materials which are separated by such materials from current-carrying parts and from earthed non-current-carrying parts in such a way that in normal use they cannot become live or come into contact with earthed parts.

21.23 Noise

Where noise is identified as a hazard the requirements of the NIHL regulations must be complied with and the following must be included / referred to in the Health and Safety Plan.

- Proof of training with regards to these regulations.
- That monitoring carried out by an AIA and done according to SABS 083.

- Medical surveillance programme is established and maintained for the necessary employees.
- Control of noise by means of:
    - Engineering methods considered
    - Admin control considered
    - Personal protective equipment considered/decided on
    - Describe how records are going to be kept for 40 years.

21.24 **Welding, flame cutting, soldering and similar operations**

1. No contractor shall require or permit welding or flame cutting operations to be undertaken, unless -
    - the person operating the equipment has been fully instructed in the safe operation and use of such equipment and in the hazards which may arise from its use;
    - effective protection is provided and used for the eyes and respiratory system and, where necessary, for the face, hands, feet, legs, body and clothing of persons performing such operations, as well as against heat, incandescent or flying particles or dangerous radiation;
    - leads and electrode holders are effectively insulated; and
    - the workplace is effectively partitioned off where practicable and where not practicable all other persons exposed to the hazards contemplated in bullet two are warned and provided with suitable protective equipment.

2. No contractor shall require or permit welding or flame cutting operations to be undertaken in a confined space, unless:
    - effective ventilation is provided and maintained; or
    - masks or hoods maintaining a supply of safe air for breathing are provided and used by the persons performing such operations.

3. No contractor shall require or permit electric welding to be undertaken in wet or damp places, inside metal vessels or in contact with large masses of metal, unless --
    - the insulation of the electrical leads is in a sound condition;
    - the electrode holder is completely insulated to prevent accidental contact with current-carrying parts;
    - the welder is completely insulated by means of boots, gloves or rubber mats; and
    - at least one other person who has been properly instructed to assist the welder in case of an emergency is and remains in attendance during operations: Provided that the provisions of this sub-regulation shall not apply to a welding process where the maximum voltage to earth does not exceed 50 volts.

4. No contractor shall require or permit welding, flame cutting, grinding, soldering or similar work to be undertaken in respect of any tube, tank, drum, vessel or similar object or container where such object or container --
    - is completely closed, unless a rise in internal pressure cannot render it dangerous; or
    - contains any substance which, under the action of heat, may --
        (i) ignite or explode; or
        (ii) react to form dangerous or poisonous substances,

unless a person who is competent to pronounce on the safety thereof has, after examination, certified in writing that any such danger has been removed by opening, ventilating or purging with water or steam, or by any other effective means.

(5) Where hot work involving welding, cutting, brazing or soldering operations is carried out at places, other than workplaces which have been specifically designated and equipped for such work, the employer shall take steps to ensure that proper and adequate fire precautions are taken.

22. Monthly reporting

- The Principal Contractor is required to provide Johannesburg Water SOC Ltd. with a monthly report in the format provided on the last working day of the month.
- The report will include the monthly man-hours, incidents, training, inductions, audits, etc

23. Project close out

- Upon completion of the project, the contractor is required to hand over a consolidated project file to the Client with all the working documents for retention.
- The documents shall be submitted in an electronic format, preferably a memory stick or a downloadable link
- The contractor shall also ensure that the site is left in a safe manner that cannot cause injury or harm to JW employees or third parties.

Returnable Annexure A: Acknowledgement of SHE Specification & Annexures

CONTRACTOR:	

I, the undersigned, hereby acknowledge that I have obtained copies of the following listed documentation and confirm that I fully understand the contents thereof and the consequences of non-compliance. The Contractor furthermore reiterates its commitment to compliance of the requirements contained within the following provided documentation:

- Johannesburg Water SOC Ltd, Safety, Health & Environmental (SHE) Specification, Volume 2;
- Annexure 1: List of possible hazards emanating from projects and activities conducted for or on behalf of Johannesburg Water SOC Ltd;

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

CONTRACT MANAGER			
NAME	DESIGNATION	DATE	SIGNATURE
CONTRACT SUPERVISOR			
NAME	DESIGNATION	DATE	SIGNATURE
WITNESS (1)			
NAME	DESIGNATION	DATE	SIGNATURE
WITNESS (2)			
NAME	DESIGNATION	DATE	SIGNATURE

BASELINE RISK ASSESSMENT

Johannesburg Water	OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT	
	PROJECT NUMBER:	JW
	PROJECT LOCATION:	NORTHERN WASTEWATER TREATMENT WORKS
	PROJECT DESCR:	SUPPLY, DELIVERY AND OFFLOADING OF HELICAL GEARBOX UNITS FOR NORTHERN WASTEWATER TREATMENT WORKS

ACTIVITY: TRANSPORTATION OF MATERIALS TO SITE

Task	Hazard	Risk	Consequence	Rating	Controls
Transportation of material to site	✓ Unsafe road conditions ✓ Un-road worthy vehicles ✓ Equipment and material not safely secured ✓ Incompetent drivers ✓ Driving under the influence of alcohol ✓ Inclement weather ✓ Speeding ✓ Slippery road	✓ Overturning vehicles ✓ Vehicle collisions ✓ Bumping pedestrians / employees	✓ Injuries ✓ Property damages ✓ Third party liability	**M**	✓ Adherence to the speed limit ✓ Only competent/ authorised drivers should operate the vehicle ✓ Inspection of vehicles ✓ Equipment and material to be properly secured ✓ Alcohol testing to be done ✓ The road to be paved to prevent accidents ✓ Traffic control to be implemented to avoid collisions
Offloading of material	✓ Faulty lifting machinery & equipment ✓ Suspended load ✓ Poor housekeeping	✓ Malfunctioning ✓ Falling on employees ✓ Obstructed walkways by materials	✓ Injuries	**M**	✓ Inspect lifting equipment prior to use. ✓ Ensure the safe working load prior to use ✓ Train the employees in manual lifting ✓ Ensure proper housekeeping ✓ The correct PPE must be worn ✓ Designate the stacking areas and put signs ✓ Stacking and storage inspector must be appointed and in charge

WORKING INSIDE CONFINED SPACES

Task	Hazard	Risk	Consequence	Rating	Controls
Entry inside MCC rooms / pump station	✓ Slippery steps	✓ Falling	✓ Injuries	**M**	✓ Inspect the steps prior to entering
	✓ Poor lighting	✓ Falling	✓ Injuries	**M**	✓ Ensure that there is sufficient lighting in the confined space
	✓ Overhead structures	✓ Bumping against overhead structures	✓ Injuries	**M**	✓ Train employees in confined space entry / techniques ✓ Ensure that there is sufficient lighting ✓ Provide employees with safety boots and hard hats
	✓ Limited working space	✓ Falls on equipment	✓ Injuries	**M**	✓ Train employees in confined space entry / techniques ✓ Ensure that there is sufficient lighting ✓ Provide employees with safety boots and hard hats
	✓ Raw sewer	✓ Skin contact ✓ Ingestion ✓ Splashing into eyes	✓ Waterborne diseases	**H**	✓ Provide employees with proper PPE, and ensure that the mouth, nose and eyes are covered. ✓ Vaccinate employees and ensure that they are medically fit to work in confined spaces.
	✓ No fire detection and suppression system	✓ Fire	✓ Fatalities ✓ Damage to property	**H**	✓ Ensure that there is a method in place for detection and suppression of fire. ✓ Ensure that fire fighting equipment is serviced and relevant for the type of fires prevalent in the pump station and MCC room
	✓ Poor / No ventilation	✓ Continued exposure to oxygen-deficient air	✓ Suffocation	**H**	✓ Ensure that there is mechanical / natural ventilation
	✓ Noise	✓ Over-exposure	✓ Noise-induced hearing loss	**M**	✓ Provide employees with hearing protection ✓ Provide rest periods for employees

WORKING INSIDE CONFINED SPACES					
Task	**Hazard**	**Risk**	**Consequence**	**Rating**	**Controls**
Working at heights	✓ Heights ✓ Unfit employees ✓ Using hand tools ✓ Unsecured tools and equipment	✓ Falls ✓ Equipment falling onto employees	✓ Injuries	**M**	✓ Employees to use proper PPE including safety harnesses when working at heights. ✓ Inspect all tools prior to use. ✓ Provide training for using safety harnesses correctly. ✓ Employees working at heights must be certified fit to work. ✓ Hand tools must be attached to lanyards when working at heights. ✓ Use tool bags ✓ Use netting system below each level. ✓ No work should be done on the ground when work at heights is in progress. ✓ Proper signage to be displayed.
Use of hand tools	✓ Repetitive movements	✓ Improper bending	✓ Back pains	**L**	✓ Training in correct posture during shovelling
	✓ Distance between employees	✓ Hitting each other with tools	✓ Injuries	**M**	✓ Ensure safe distance between employees
	✓ Damaged hand tools	✓ Contact with skin	✓ Injuries	**L**	✓ Inspect tools prior to use ✓ Provide employees with gloves

	OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT	
Johannesburg Water	PROJECT NUMBER:	JW
	PROJECT LOCATION:	NORTHERN WASTEWATER TREATMENT WORKS
	PROJECT DESCR:	SUPPLY, DELIVERY AND OFFLOADING OF HELICAL GEARBOX UNITS FOR NORTHERN WASTEWATER TREATMENT WORKS

ACTIVITY: ELECTRICAL WORKS

Task	Hazard	Risk	Consequence	Rating	Controls
Electrical works	✓ Live electric cables	✓ Electric Shock	✓ Serious injuries / fatality	**H**	✓ Ensure that electricity supply is switched off during installation ✓ Implement lockout procedures
	✓ Inadequate wiring	✓ Electric fault ✓ Fire	✓ Injuries ✓ Property damages	**H**	✓ Only competent persons to do the electrical work
	✓ Use of faulty cables	✓ Fire ignition	✓ Burns/ damages	**M**	✓ Visual inspection of cable before use
Cabling	✓ Cutting	✓ Eye penetration	✓ Eye injuries/ blindness	**M**	✓ Safety goggles shall be worn by employees when cutting steel
	✓ Unit activation	✓ Struck by equipment	✓ Injuries	**M**	✓ Lock out/ Tag out
	✓ Live Yard	✓ Electrocution Injury ✓ Working unauthorized ✓ Miscommunication between employees	✓ Serious injuries / fatality	**H**	✓ Obtain a permit ✓ Follow cardinal rules ✓ Strict supervision ✓ Fire extinguisher must always be on site ✓ Obtain a permit and follow all procedures ✓ Strict supervision ✓ Competent technician operation ✓ Issue test certificate for every testing and inspection done
	✓ Electrical connection ✓ Extension cords	✓ Explosion ✓ Faulty cord failure	✓ Injuries ✓ Property damages ✓ Fire	**M**	✓ Emergency stop button must always be serviceable ✓ Fire extinguishers must always be kept on site ✓ Work to be done by competent personnel

	OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT	
Johannesburg Water	PROJECT NUMBER:	JW
	PROJECT LOCATION:	NORTHERN WASTEWATER TREATMENT WORKS
	PROJECT DESCR:	SUPPLY, DELIVERY AND OFFLOADING OF HELICAL GEARBOX UNITS FOR NORTHERN WASTEWATER TREATMENT WORKS

ACTIVITY: ELECTRICAL WORKS

Task	Hazard	Risk	Consequence	Rating	Controls
	✓ Electrical equipment ✓ Portable electrical appliances	✓ Use of faulty electrical equipment; ✓	✓ Electric shock/ burns ✓ Injuries	**M**	✓ All tools to be checked and tagged before bringing onto site; ✓ Portable electrical appliances examined and where necessary, tested by a competent person within the recommended time limit; ✓ Defective appliances and leads are removed from use and kept secured until they can be repaired or removed from the site; ✓ Electric tools and installations to be in good condition; ✓ Inspect electric tools before use; ✓ Do not use electric tools in wet / damp conditions; ✓ Use personal protective equipment such as insulated gloves.
	✓ Testing ✓ Inspection ✓	✓ Electrocution ✓ Chocking ✓ Electrocution Injury ✓ Working unauthorized ✓ Miscommunication	✓ Fatalities ✓ Property damages ✓	**H**	✓ Authorized person with COC must do all the installation ✓ Emergency stop button must always be serviceable ✓ Ensure communication between employees ✓ Fire extinguisher must always be on site ✓ Implement lockout procedure ✓ Strict supervision ✓ Work to be done by a competent technician

	OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT	
Johannesburg Water	PROJECT NUMBER:	JW
	PROJECT LOCATION:	NORTHERN WASTEWATER TREATMENT WORKS
	PROJECT DESCR:	SUPPLY, DELIVERY AND OFFLOADING OF HELICAL GEARBOX UNITS FOR NORTHERN WASTEWATER TREATMENT WORKS

ACTIVITY: MECHANICAL WORKS

Task	Hazard	Risk	Consequence	Rating	Controls
Installation of gearboxes	✓ Heavy pumps and valves	✓ Falling	✓ Injuries ✓ Property damages	**M**	✓ Use proper lifting equipment ✓ Ensure that only the relevant people are in the work area. ✓ Ensure that lifting equipment is load tested. ✓ Only competent personnel to undertake this task
Mechanical lifting	✓ Wind / Unfavourable weather	✓ Deflection ✓ Loss of control	✓ Injuries ✓ Property damages	**H**	✓ Do not use during unfavourable weather conditions
	✓ Incompetent operator	✓ Loss of control ✓ Hitting structures and people	✓ Injuries ✓ Property damages	**H**	✓ Only trained and competent operators many operate the crane
	✓ Overloading	✓ Collapse of material	✓ Injuries ✓ Property damages	**H**	✓ Display safe working load on the crane
	✓ Faulty crane	✓ Malfunctioning	✓ Injuries ✓ Property damages	**H**	✓ Cranes to be inspected by competent persons prior to being used ✓ All faulty cranes to be tagged and locked out
	✓ Incorrect slinging	✓ Employees struck by swinging load	✓ Injuries	**H**	✓ Slinging to be done by competent persons ✓ Employees to stand clear of lifting operations
	✓ Incorrect / damaged lifting tackle	✓ Load falling on employees	✓ Injuries		✓ Inspect all lifting tackle prior to use

	OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT	
Johannesburg Water	PROJECT NUMBER:	JW
	PROJECT LOCATION:	NORTHERN WASTEWATER TREATMENT WORKS
	PROJECT DESCR:	SUPPLY, DELIVERY AND OFFLOADING OF HELICAL GEARBOX UNITS FOR NORTHERN WASTEWATER TREATMENT WORKS

ACTIVITY: MECHANICAL WORKS

Task	Hazard	Risk	Consequence	Rating	Controls
Lubricating of parts	✓ Oils	✓ Contact with skin	✓ Burns ✓ Dermatitis	**L**	✓ Provide employees with gloves ✓ Provide SDS for the lubricants used
Cutting and drilling	✓ Drilling ✓ Drill bit ✓ Drill sharp metal fibres ✓ High Noise Levels ✓ Cutting Grinder/Disc ✓	✓ Vibration ✓ Cutting edges ✓ Eye penetration ✓ Finger cuts ✓ Expose to high noise level area ✓ Uncontrolled disc ✓ Sharp edges	✓ Damaged hearing ✓ Carpal tunnel syndrome ✓ Cuts/ injuries ✓ Eye irritation / blindness ✓ Injuries ✓ Eye injuries	**M**	✓ Use hearing protection when exposed to excessive noise levels (greater than 85 dB) ✓ Assess noise level with sound level meter if possibility exists that level may exceed 85dB. ✓ Rotate drilling tasks to minimize worker exposure to equipment vibration. ✓ Use right size of a drill to drill different layers of the ground ✓ Use as per SOP and manufacturer's instruction
Welding	✓ Welding equipment	✓ Poor maintenance	✓ Injuries	**M**	✓ Welding equipment is visually checked before each use;
	✓ Welding	✓ Sparks	✓ Fire	**H**	✓ Welding screens to be used
	✓ Welding	✓ Sparks	✓ Burns	**L**	✓ Fire resistant overalls and apron to be worn. ✓ Develop method statement for welding
	✓ Welding	✓ Glare	✓ Arc eyes	**M**	✓ Welding glasses to be used

Johannesburg Water	OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT	
	PROJECT NUMBER:	JW
	PROJECT LOCATION:	NORTHERN WASTEWATER TREATMENT WORKS
	PROJECT DESCR:	SUPPLY, DELIVERY AND OFFLOADING OF HELICAL GEARBOX UNITS FOR NORTHERN WASTEWATER TREATMENT WORKS

ACTIVITY: GENERAL ACTIVITIES ON SITE

Task	Hazard	Risk	Consequence	Rating	Controls
✓ **Working on site**	✓ Unhappy community	✓ Community coming to survey site ✓ Violence against employees	✓ Property damages ✓ Serious injuries	**H**	✓ Develop an emergency response procedure ✓ Meet with the community and all stakeholders prior to commencement of the project ✓ Have the contact details of the nearest police station / JMPD offices
	✓ Unfavourable weather conditions	✓ Exposure to temperature extremes	✓ Heat exhaustion ✓ Frost bite	**M**	✓ Provide employees with water for cooling down. ✓ Provide employees with warm jackets and gloves during winter ✓ Provide 5-minute rest periods for every 30 minutes of exposure to temperature extremes. ✓ No work to be undertaken in rainy conditions
	✓ Housekeeping	✓ Trips and falls	✓ Injuries	**M**	✓ Ensure that proper housekeeping is maintained on site at all times.
✓ **Working near open spaces**	✓ Snakes	✓ Bites ✓ Poisoning	✓ Fatalities ✓ Serious injuries	**H**	✓ Inspect the area for snakes prior to entering ✓ Conduct snake awareness training ✓ Know the do's and don'ts of what to do when coming across snakes
	✓ Bees	✓ Bites	✓ Allergic reaction	**M**	✓ Inspect the area for bees / wasps prior to entering ✓ Conduct bees awareness training ✓ Know the do's and don'ts of what to do when coming across bees
	✓ Sharp objects	✓ Getting pricked by sharp objects	✓ Tetanus ✓ Injuries	**M**	✓ All employees to get Tetanus vaccination. ✓ Provide employees with proper safety boots

ACTIVITY: GENERAL ACTIVITIES ON SITE

Task	Hazard	Risk	Consequence	Rating	Controls
	✓ Criminals	✓ Getting mugged	✓ Loss of personal possession	**M**	✓ Personal belongings such as phones and car keys to be safely put in pockets while working. ✓ Employees to report any suspicious activities to the local police. ✓ Equipment to be safety stored while not in use
	✓ Criminals	✓ Employees being attacked	✓ Injuries ✓ Fatalities	**H**	✓ Ensure that employees do not work in isolation. ✓ Employees to report any suspicious activities to the local police. ✓ Develop an emergency response procedure
✓ **Working on site**	✓ Open excavations (other works)	✓ Falling inside	✓ Injuries	**M**	✓ Employees to be vigilant while working on site
	✓ Water bodies / channels	✓ Falling inside	✓ Serious injuries ✓ Fatalities	**H**	✓ Employees to be vigilant while working on site ✓ Emergency procedures to be developed
	✓ Rotating equipment	✓ Entrapment ✓ Getting caught by	✓ Serious injuries ✓ Fatalities	**H**	✓ Ensure that machinery is isolated or locked out while working on it.
	✓ Wastewater / live sewer	✓ Skin contact ✓ Ingestion ✓ Splashing into eyes	✓ Waterborne diseases	**H**	✓ Provide employees with proper PPE, and ensure that the mouth, nose and eyes are covered. ✓ Vaccinate employees and ensure that they are medically fit to work in confined spaces.

	OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT	
Johannesburg Water	PROJECT NUMBER:	JW
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ACTIVITY: GENERAL ACTIVITIES ON SITE

Task	Hazard	Risk	Consequence	Rating	Controls
Working near roads inside the Works	✓ Moving vehicles and pedestrians ✓ Speeding ✓ No signage ✓ Improperly placed signage	✓ Road accidents ✓ People getting knocked down by cars	✓ Fatalities ✓ Serious injuries ✓ Property damages	**M**	✓ Adhere to traffic management procedures ✓ Ensure good communication between flagmen ✓ Obey speed limits ✓ Display correct road signage ✓ Employees should wear reflective PPE . ✓ Keep area clean & clear of obstacles.
Using hand tools and portable equipment	✓ Improper placing ✓ Unstable footing	✓ Falling on employees	✓ Injuries	**L**	✓ Provide employees with proper safety shoes. ✓ Ensure that the equipment is properly placed and balanced
Use of hand tools	✓ Repetitive movements	✓ Improper bending	✓ Back pains	**L**	✓ Training in correct posture during shovelling
	✓ Distance between employees	✓ Hitting each other with tools	✓ Injuries	**M**	✓ Ensure safe distance between employees
	✓ Damaged hand tools	✓ Contact with skin	✓ Injuries	**L**	✓ Inspect tools prior to use ✓ Provide employees with gloves
	✓ Loss of grip of tools	✓ Hitting other employees	✓ Injuries	**M**	✓ Train employees on the use of tools ✓ Provide gloves
General activities on site	✓ New employees / untrained employees	✓ Workers not informed of hazards and risks associated with tasks	✓ Injuries	**H**	✓ Site specific Induction training to be conducted on all personnel prior to commencing work.

ACTIVITY: GENERAL ACTIVITIES ON SITE

Task	Hazard	Risk	Consequence	Rating	Controls
	✓	✓ Workers exposed to unknown / unidentified hazards	✓		✓ Appointed Risk Assessor to be in possession of a HIRA certificate (Hazard Identification and Risk Assessment). ✓ Task specific risk assessments to be carried out. ✓ Employees to be trained in the content of the risk assessments. ✓ Attendance registers to be in place
	✓ Community members and passersby	✓ Unauthorised entry	✓ Injuries	**M**	✓ Camp area to be fenced off to prevent unauthorised entry. ✓ Unauthorised entry and general warning signs to be displayed. ✓ Security guard to patrol the site.

RISK ASSESSMENT MATRIX

Likelihood	**Consequences**				
	Insignificant (minor problem easily handled by normal day to day processes	Minor (Some disruption possible e.g.,damage equal to R150k	Moderate (significant time / resources required. E.g., damage equal to R500k	Major (Operations severely damaged. E.g., damages equal to R1m	Catastrophic (business survival is at risk. Damage equal to R5m – 10m
Almost certain (90% chance)	High	High	Extreme	Extreme	Extreme
Likely (between 50-90%)	Moderate	High	High	Extreme	Extreme
Moderate (between 10-50%)	Low	Moderate	High	Extreme	Extreme
Unlikely (between 3-10%)	Low	Low	Moderate	High	Extreme
Rare (<3%)	Low	Low	Moderate	High	High

JOHANNESBURG WATER (SOC) LTD

MEDICAL SCREENING POLICY

SUPPLY, DELIVERY AND OFFLOADING OF HELICAL GEARBOX UNITS FOR NORTHERN WASTEWATER TREATMENT WORKS

NOTICE

It is the Contractor's responsibility to ensure that medical surveillance requirements specified in the Occupational Health and Safety Act (85/1993) and Regulations and any other applicable legal and Johannesburg Water's requirements are fully complied with.

This document is meant to facilitate the Contractor's compliance to applicable requirements and does not replace the applicable legal requirements.

This document may be revised at any time to include applicable legal requirements not currently included that may come to the attention of Johannesburg Water in future. The Contractor will accordingly be responsible to comply with the revised requirements as might be necessary.

Where methods to ensure legal compliance have been specified in this document, Contractors may submit alternative detailed method statements for consideration and approval by Johannesburg Water. Johannesburg Water may, at its sole discretion, reject or accept such alternative methods.

1 PURPOSE OF THE MEDICAL SURVEILLANCE REQUIREMENTS PROCEDURE

The purpose of this Medical Surveillance Requirements Procedure is to facilitate the achievement of legal compliance relating to medical surveillance by all Consultants, Contractors, Subcontractors and suppliers that will be working on the Johannesburg Water project and to ensure that employees are fit to work in the roles that they have been employed to execute and remain so for their duration on the project site.

This document represents the minimum requirements for medical surveillance and does not replace applicable legal requirements.

2 MEDICAL SURVEILLANCE OBJECTIVES

The Johannesburg Water main objectives for medical surveillance are:

a) To ensure compliance with all applicable medical surveillance legal requirements.
b) To ensure compliance with all Johannesburg Water's requirements regarding medical surveillance.
c) To ensure that employees are fit to execute the work for which they have been employed.
d) To prevent employees from acquiring occupational diseases or illnesses.
e) To ensure early detection and treatment of occupational diseases and to prevent the aggravation of existing medical conditions.
f) To ensure that employees on departure from the project have not contracted any occupational diseases and to enable any such condition that arises to be suitably addressed.

All contractors are required to demonstrate total commitment towards the achievement of these objectives.

3 GENERAL REQUIREMENTS

3.1 The Principal Contractor shall ensure that a medical surveillance programme is implemented for all employees.

3.2 An initial health evaluation shall be carried out by an occupational health practitioner immediately after a person commences employment, where any exposure exists or may exist, which comprises:

- an evaluation of the employees medical and occupational history;
- a physical examination; and
- any other essential examination which in the opinion of the occupational health practitioner is desirable in order to enable the practitioner to do a proper evaluation.

3.3 Medical surveillance & Immunization shall be done accredited institutions or occupational health doctor, including, but not limited to:

a) Audiograms.
b) A cardio-respiratory examination, including full size chest x-rays (If lung function tests are abnormal)
c) Lung function tests.
d) Eye/ sight tests.
e) A general physical examination.
f) A review of previous medical history.
g) Blood pressure tests
h) Glucose tests
i) Vaccination (Hepatitis, Typhoid)

Copies of all medical certificates shall be submitted to the Johannesburg Water Safety Specialist or Appointed OHS Agent to prior to site establishment and before an employee is allowed to come onto site.

Specific attention shall be given to the physical and psychological fitness of people who will be required to work in elevated positions and operators of mobile machinery.

An exit medical certificate shall be obtained for all workers at the end of the contract and for all workers who leave the employment of the Contractor before the end of the Project. Copies of all exit medical certificates shall be submitted to the Johannesburg Water Safety Specialist or Appointed OHS Agent.

Medical surveillance shall address all occupational health risks to which the employee is exposed, identified through the risk assessment referred to in section 4 below.

Retention monies will be withheld if the exit medical is not complete for all employees.

The cost of all medical examinations will be borne by the Contractor as provision is made on the bill of quantities.

4 OCCUPATIONAL HEALTH RISK ASSESSMENT

4.1 The Contractor shall conduct an occupational health risk assessment prior to site establishment.

4.2 The Contractor shall ensure that, as far as is reasonably practicable, ergonomic related hazards are analyzed, evaluated and addressed in the risk assessment.

4.3 The methodology used by the contractor to assess occupational health risks associated with their activities shall be submitted to Johannesburg Water for approval by the Johannesburg Water Safety Specialist or Appointed OHS Agent prior to site establishment. The methodology should take the following into consideration, among others:

a) Legal requirements.
b) Normal activities undertaken by the contractor.
c) Abnormal situations (e.g. unanticipated breakdown of equipment etc).
d) Emergency situations (e.g. fires, exposure to chemicals).
e) Changes in work procedures and methods.
f) Previous experience.

4.4 A risk register that will include the following shall be submitted to the Johannesburg Water Safety Specialist or Appointed OHS Agent before site establishment.

a) All occupational health risks identified during the occupational health risk assessment.
b) A list of the occupational health risks that have been identified as being significant.
c) Reference to the method statements, measures or procedures that will be followed to either eliminate or reduce the significant risks to tolerable levels.

4.5 The Contractor shall, in writing, clearly explain how each occupational health risk assessed to be significant will be addressed to eliminate or reduce it to a tolerable level and submit it for approval by the Johannesburg Water Safety Specialist or Appointed OHS Agent before site establishment. This may be through method statements or written operational control procedures. Associated responsibilities and authorities shall be clearly defined. All method statements shall reflect at least:

a) When the activities relating to the method statement will be conducted (timing).
b) Materials to be used.
c) Equipment and staffing requirements.
d) The proposed construction procedure designed to implement the relevant requirements.
e) The system to be implemented to ensure compliance with the method statement.
f) Any other information deemed to be necessary by the Johannesburg Water Safety Specialist or Appointed OHS Agent and/or the contractor's responsible person.

4.6 For significant occupational health risks identified after site establishment, method statements shall be submitted to the Johannesburg Water Project Specialist or Appointed OHS Agent at least 10 working days before the start of the associated activity, when possible.

4.7 All changes to approved method statements or procedures shall be approved in writing by the Johannesburg Water Safety Specialist or Appointed OHS Agent.

4.8 The contractor's Responsible Person shall retain records of any amendments and shall ensure that only the most current approved version of any method statement or procedure is used.

4.9 Every occupational health risk that is identified during the risk assessment process shall be conveyed to every employee whose work is associated with the risk. This may be done in the form of a toolbox talk but does not replace the toolbox talk entirely. Each employee shall sign to confirm an understanding of the occupational health risks in the tasks.

4.10 Occupational health risk assessments may be combined with safety and environmental risk assessments, but the consideration of occupational health issues shall be clearly reflected in the records generated and maintained.

4.11 The occupational health risk assessment process and effective implementation of measures to eliminate or reduce identified risks is the responsibility of the Contractor. Johannesburg Water will closely monitor the effectiveness of implemented measures.

Acknowledgement of JW Medical Screening Policy

Name of Contractor

I, the undersigned, hereby acknowledge that I have obtained copies of JW Medical Screening Policy and confirm that I fully understand them and the consequences of non-compliance.

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

Signature of Contractor / Mandatory **Date**

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Signature of 16.2 / Construction Manager **Date**

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Witness 1 …… **Witness 2 ……**

OHS CONTRACTORS' MANAGEMENT SYSTEM				
TENDER DOCUMENT OHS SPECS SIGN-OFF FORM				Johannesburg Water
REQUESTED BY	**Thabiso Thabeng**	**DATE**	**06-03-2026**	**JW**

SUPPLY, DELIVERY AND OFFLOADING OF HELICAL GEARBOX UNITS FOR NORTHERN WASTEWATER TREATMENT WORKS

LIST OF OHS SYSTEM ATTACHED TO THE TENDER DOCUMENT

SHE SYSTEM ATTACHED	Y/N	VERSION	NO PAGES	REMARKS
Volume 2 SHE Specification & Acknowledgement Form	Y	V2 – 09/16	41	For info
Baseline Risk Assessment	Y	V01 – 05/15	13	For info
Medical Screening Policy	Y	V01 – 05/15	8	For info
Returnable Annexure A	Y	V02 - 02/20	1	Return with tender document