INVOICE TO BID (SBD 1)  
on procurement requirements

YOU ARE HEREBY INVITED TO BID FOR THE FOLLOWING SPECIFIED SUPPLY REQUIREMENTS

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BID NUMBER</strong></td>
<td>NRFNZG-019-2017/18</td>
</tr>
<tr>
<td><strong>CLOSING DATE AND TIME</strong></td>
<td>06 June 2017 at 11h00</td>
</tr>
<tr>
<td><strong>BID DESCRIPTION</strong></td>
<td>SUPPLY AND INSTALLATION OF TWO UNDERGROUND FUEL STORAGE TANKS AND ONE FUEL DISPENSER</td>
</tr>
<tr>
<td></td>
<td>MINIMUM CIDB GRADING REQUIRED: 3CE OR 2CEPE</td>
</tr>
</tbody>
</table>

Bidders must sign the signature page of the form SBD1 validating all documents included in the response to this invitation.

The successful bidder and the NRF will sign the written Contract Form (SBD 7) once the delegated authority has approved the award of such contract.

<table>
<thead>
<tr>
<th>Item</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferential Procurement System Applicable:</td>
<td>80:20</td>
</tr>
<tr>
<td>Validity Period From Date Of Closure:</td>
<td>150 days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Compulsory Briefing Session or Site Visit Details</th>
<th>Date and Time</th>
<th>Venue</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19 May 2017 at 11h00</td>
<td>Staff Centre</td>
<td>232 Boom Street, Corner of Boom &amp; Paul Kruger Streets, Pretoria Central</td>
</tr>
<tr>
<td>Contact Person</td>
<td>Chumisa Loyilane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BID DOCUMENTS ARE TO BE DEPOSITED IN THE BID BOX AT:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PHYSICAL ADDRESS:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NATIONAL ZOOLOGICAL GARDENS OF SA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORNER BOOM STREET AND PAUL KRUGER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO 232 BOOM STREET</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRETORIA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The tender box is situated at the Reception area in the Administration Building.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ADDRESSED AS FOLLOWS:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On the face of each envelope, the Bid Number and Bidder’s Name, Postal Address, Contact Name, Telephone Number and email address</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **BIDDERS ARE REQUIRED TO DELIVER THEIR BID TO THE CORRECT ADDRESS TIMEOUSLY IN ORDER FOR THE NRF TO CONSIDER IT. THE NRF WILL NOT CONSIDER ANY BIDS RECEIVED LATER THAN THE CLOSING DATE AND TIME NOR RETURN THESE TO THE BIDDER.** |

Bidders must submit their bid response on the official bid invitation forms *(not to be re-typed)* with additional information provided on attached supporting schedules. The NRF provides the checklist “Returnable Documents” of all required documentation with certain documentation mandatory for entering the evaluation phase.

Non-submission of these marked documents will lead to disqualification of the bidder.

| **THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT AND THE PREFERENTIAL PROCUREMENT REGULATIONS – 2017 AS AMENDED.** |

| **THIS BID IS SUBJECT TO THE GENERAL CONDITIONS OF CONTRACT FOR CONSTRUCTION WORKS 2015 Edition AND SPECIAL CONDITIONS OF CONTRACT STIPULATED IN THIS DOCUMENT. THE BIDDER READ AND ACCEPTED THESE CONDITIONS OF CONTRACT HAS EVIDENCED BY THE BIDDER’S SIGNATURE ON EACH PAGE.** |

| **REGISTRATION ON THE CENTRAL SUPPLIER DATABASE (CSD):** |
## SETS OF BID DOCUMENTS REQUIRED:

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of ORIGINAL documents for contract signing</td>
<td>2</td>
</tr>
<tr>
<td>Bidders must submit the bid in hard copy format (paper document) to the NRF. The hard copy of these original sets of bid documents including the bidder's response to the specification, the bidder's pricing, and the SBD 7, (contract signature page signed by both parties), serve as the legal bid contract document and the master record between the bidder and the NRF. The bidders attach the originals or certified copies of any certificates stipulated in this document to these original sets of bid documents. Any discrepancy between the evaluation copies and the master record, the master record will prevail. Any discrepancy between the original sets deposited with the NRF and that kept by the bidder, the original set deposited with the NRF is the master contract for both parties.</td>
<td></td>
</tr>
<tr>
<td>Number of EVALUATION copies:</td>
<td>0</td>
</tr>
<tr>
<td>Bidders mark documents as either “<strong>Original</strong>” or “<strong>Copy for evaluation</strong>” and number all pages sequentially. Bidders group documents into “PROPOSAL” and “PRICING” Sections.</td>
<td></td>
</tr>
<tr>
<td>Two envelope system required</td>
<td>YES</td>
</tr>
<tr>
<td>The objective for the use of the two-envelope system is to evaluate the Proposals Section without reference to the Price Section ensuring both sections are evaluated fairly and unbiased. The first envelope holds all documents excluding the SBD3 (price summary schedule) and detailed supporting pricing documentation. The second envelope holds the SBD3 and the detailed supporting pricing documentation. An outer envelope encloses both envelopes that have the envelope addressing as stated in this document. The NRF only opens the proposal – the first envelope – at the evaluation stage and only opens the pricing – the second envelope – for those bidders who meet the predefined threshold at the proposal evaluation.</td>
<td></td>
</tr>
</tbody>
</table>

## ENQUIRIES CAN BE DIRECTED TO THE FOLLOWING

<table>
<thead>
<tr>
<th>TECHNICAL ENQUIRIES</th>
<th>SUPPLY CHAIN MANAGEMENT ENQUIRIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ms Chumisa Loyilane</strong></td>
<td><strong>Ms Monica Thapeli</strong></td>
</tr>
<tr>
<td>012 339 2710</td>
<td>012 339 2746</td>
</tr>
<tr>
<td><a href="mailto:Chumisa@nzg.ac.za">Chumisa@nzg.ac.za</a></td>
<td><a href="mailto:Monica@nzg.ac.za">Monica@nzg.ac.za</a></td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS

- **BID DESCRIPTION**: 1
- **SETS OF BID DOCUMENTS REQUIRED**: 3
- **ENQUIRIES CAN BE DIRECTED TO THE FOLLOWING**: 3
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- **THE BIDDERS PARTICULARS**: Error! Bookmark not defined.
- **CONTRACT PERIOD**: Error! Bookmark not defined.
- **SCOPE OF WORK**: Error! Bookmark not defined.
- **SPECIAL CONDITIONS FOR MANAGING THE CONTRACTUAL OBLIGATIONS**: Error! Bookmark not defined.
- **SBD 3.1: PRICING DETAIL WITH FIRM UNIT PRICES**: Error! Bookmark not defined.
- **SPECIAL CONDITIONS OF CONTRACT TO GCC FOR CONSTRUCTION WORKS, 2015 Ed**: Error! Bookmark not defined.
- **PREFERENCE POINTS CLAIMED (SBD 6.1)**: 19
- **REFERENCE LETTER FORMAT**: 28
- **BID SUBMISSION CERTIFICATE FORM - (SBD 1)**: 30
**INTRODUCTION TO THE NRF**

The National Research Foundation (“NRF”) is a juristic person established in terms of the National Research Foundation Act, Act 23 of 1998, and a Schedule 3A Public Entity in terms of the Public Finance Management Act.

The NRF is the government’s national agency responsible for promoting and supporting research and human capital development through funding researchers, provision of the National Research Platforms, and science outreach platforms/programs to the broader community. The NRF provides these services in all fields of science and technology, including natural science, engineering, social science, and humanities.

The NRF delivers its mandate through its internal business units which are both functional and geographical diverse. Unless specifically noted, all contracts flowing from bidding apply to all of its business units.

**INTRODUCTION TO THE NRF BUSINESS UNIT RESPONSIBLE FOR THIS BID**

The National Zoological Gardens of South Africa (NZG) is one of the NRF Business units. The NZG is a wildlife biodiversity conservation and research facility that incorporates a living animal collection, a Wildlife Biomaterials Bank and a Centre for Conservation Science. Its main operating site is situated in the centre of Pretoria, Gauteng and has a spread of 85 ha.

**CONTEXT OF THIS PROCUREMENT**

The National Zoological Gardens wishes to appoint a service provider for the supply and installation of new underground fuel storage tanks and a dispenser at its existing services facility. Two new tanks, one for Diesel storage and one for Petrol storage, each with a capacity of 9m3 needs to be installed. Services and infrastructure associated with the installation of the new tanks are installed and constructed as part of the tank installation.
# RETURNABLE DOCUMENT CHECKLIST TO QUALIFY FOR EVALUATION

<table>
<thead>
<tr>
<th>RETURNABLE DOCUMENTS</th>
<th>Envelope 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>(G = Go/No GO; O = Optional)</td>
<td>Bid Section Reference</td>
</tr>
<tr>
<td>Signed and completed Procurement Invitation (SBD 1) including the SBD 4, 6.1, 8 and 9</td>
<td>G YES NO Volume 1 (Page 21 -33)</td>
</tr>
<tr>
<td>Data Sheet(s) of the equipment or services or both offered in response to the specification in this invitation</td>
<td>G YES NO Volume 3 (Annexure 1)</td>
</tr>
<tr>
<td>Details of sub-contractors (if stipulated in 6.1) with at least two contactable referees.</td>
<td>YES NO</td>
</tr>
<tr>
<td>Evidence of what the bidder offers i.e. profile</td>
<td>G YES NO</td>
</tr>
<tr>
<td>Valid letter of good standing from the compensation commissioner.</td>
<td>G YES NO</td>
</tr>
<tr>
<td>Proof of CIDB registration of a minimum : 3CE or 2CEPE</td>
<td>G YES NO</td>
</tr>
<tr>
<td>Public liability insurance of at least 5 million Rand. A Letter of Intent from a registered financial services provider or an insurance company will be accepted. Application for a public liability insurance alone will not be accepted</td>
<td>G YES NO</td>
</tr>
<tr>
<td>Detailed high level construction programme with duration of no more than 12 weeks. The programme should include the supply and installation of the tanks and all equipment.</td>
<td>G YES NO</td>
</tr>
<tr>
<td>Proof of Registration on the Government’s Central Supplier Database</td>
<td>G YES NO</td>
</tr>
<tr>
<td>B – BBEE Certificate (South African Companies) or, for companies that have less than R10 million turnover, a sworn affidavit or the certificate issued by the Companies and Intellectual Property Commission (CIPC) is required. A copy of the template for this affidavit is available on the Department of Trade and Industry website</td>
<td>O YES NO</td>
</tr>
</tbody>
</table>
**RETURNABLE DOCUMENTS**

<table>
<thead>
<tr>
<th>Document Description</th>
<th>GO</th>
<th>YES</th>
<th>NO</th>
<th>Envelope 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary pricing in the SBD 3 format in this document</td>
<td>G</td>
<td>YES</td>
<td>NO</td>
<td>Volume 2 (Page 20)</td>
</tr>
<tr>
<td>Detail of the priced BOQ and supporting documents</td>
<td>G</td>
<td>YES</td>
<td>NO</td>
<td>Volume 2</td>
</tr>
</tbody>
</table>

**THE BIDDING PROCESS**

**The NRF selects its appointed bidder through the following three-stage process**

<table>
<thead>
<tr>
<th>Stage 1 – Compliance to submission requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bidders warrant that their proposal document has, as a minimum, the specified documents</td>
</tr>
<tr>
<td>required for evaluating their proposals. The NRF provides the Returnable Document</td>
</tr>
<tr>
<td>Checklist listing these including which documents are mandatory (GO/NO GO) to the</td>
</tr>
<tr>
<td>bidders.</td>
</tr>
<tr>
<td>**The NRF evaluates only procurement responses that are 100% acceptable in terms of</td>
</tr>
<tr>
<td>the Returnable Document List. The NRF disqualifies bidders not compliant with this</td>
</tr>
<tr>
<td>list for Stage 2.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 2 – Evaluation of Bids against Specifications and Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The NRF evaluates each bidder’s written response to the specifications issued in</td>
</tr>
<tr>
<td>accordance to published evaluation criteria and the associated scoring set outlined</td>
</tr>
<tr>
<td>in this bid invitation. The evaluation consists of the mandatory minimum specifications in a “Meet/Not meet” or “Go/No Go” format with further specifications requiring qualitative responses.</td>
</tr>
</tbody>
</table>
2. Where circumstances justifies it, the NRF conducts interviews with shortlisted bidders for them to present further information or provide proof of functionality to the evaluation committee. In these cases, the NRF may provide the areas of concern to the short listed bidders to address in their presentations.

3. Bidders making the minimum evaluation score will pass to stage 3.

**Stage 3 – Price/Preference Evaluation**

The NRF compares each bidder's pricing proposal on an equal and fair comparison basis that is equitable to all bidders taking into account all aspects of the bids pricing requirements. The NRF conducts fair market-related pricing tests to arrive at an opinion of reasonableness of the bid price offered.

The NRF ranks the qualifying bids on price and preference points claimed in the following manner:

- **Price** - with the lowest priced Bid meeting the minimum specification as stipulated in the threshold to qualify for this stage receiving the highest price score as set out in the Preferential Procurement Policy 2017 Regulations;

- **Preference** - preference points as claimed in the preference claim form (SBD6.1) supported by a valid BBBEE certification are added to the price ranking scores.

The NRF nominates the bidder with the highest combined score for the contract award subject to the bidder having supplied the relevant administrative documentation.

Where the fair market-related price tests reflect defective pricing or pricing outside of the fair market-related price range, the evaluators will recommend price negotiation with the winning bidder to bring the price within the fair market-related price range. Where the winning bidder did not want to participate in the price negotiation or not prepared to provide a fair market-related price, the award will be cancelled and price negotiations will commence with the second bidder in the price/preference ranking.

**Bid Procedure Conditions:**

**Counter Conditions**

The NRF draws bidders’ attention that amendments to any of the Bid Conditions or setting of counter conditions by bidders will result in the invalidation of such bids.

**Response Preparation Costs**

The NRF is NOT liable for any costs incurred by a bidder in the process of responding to this Bid Invitation, including on-site presentations.
<table>
<thead>
<tr>
<th><strong>Cancellation Prior To Awarding</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The NRF reserve the right to withdraw and cancel the Bid Invitation at any time prior to making an award and, in terms of the Preferential Procurement Policy Framework Act 2017 Regulations, where the award price is outside of the objective determined fair market-related price range, will cancel the award.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Collusion, Fraud And Corruption</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Any effort by Bidder/s to influence evaluation, comparisons, or award decisions in any manner will result in the rejection and disqualification of the bidder concerned.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Fronting</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The NRF, in ensuring that bidders conduct themselves in an honest manner will, as part of the bid evaluation processes where applicable, conduct or initiate the necessary enquiries/investigations to determine the accuracy of the representation made in the bid documents. Should any of the fronting indicators as contained in the “Guidelines on complex Structures and Transactions and Fronting”, issued by the Department of Trade and Industry, be established during such inquiry/investigation, the onus will be on the bidder to prove that fronting does not exist. Failure to do so within a period of 7 days from date of notification will invalidate the bid/contract and may also result in the restriction of the bidder to conduct business with the public sector for a period not exceeding 10 years, in addition to any other remedies the NRF may have against the bidder concerned.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>DISCLAIMERS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The NRF has produced this document in good faith. However, the NRF, its agents and its employees and associates, do not warrant its accuracy or completeness.</td>
</tr>
</tbody>
</table>

| To the extent that the NRF is permitted by law, the NRF will not be liable for any claim whatsoever and how so ever arising (including, without limitation, any claim in contract, negligence or otherwise) for any incorrect or misleading information contained in this document due to any misinterpretation of this document. |

| The NRF makes no representation, warranty, assurance, guarantee or endorsements to any provider/bidder concerning the document, whether with regard to its accuracy, completeness or otherwise and the NRF shall have no liability towards the responding service providers or any other party in connection therewith. |

<table>
<thead>
<tr>
<th><strong>THRESHOLD TO QUALIFY FOR PRICE/PREFERENCE EVALUATION STAGE 3</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bidders are not eligible for the next stage of evaluation, which is Price and Preference scoring, where they score less than the minimum threshold of:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
</tbody>
</table>
### EVALUATION CRITERIA FOR EVALUATING BIDDERS RESPONSES

<table>
<thead>
<tr>
<th>Selection Element</th>
<th>Weight (N/A)</th>
<th>BEC Confirmed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Evaluate, utilising the data sheets provided and specification compliance, the bidder meets the minimum level of the specification.</td>
<td>GO/NO-GO</td>
<td>MEET SPECIFICATION</td>
</tr>
<tr>
<td>2. Evaluate whether a valid letter of good standing from the compensation commissioner has been submitted.</td>
<td>GO/NO-GO</td>
<td>VALID</td>
</tr>
<tr>
<td>3. Evaluate whether the bidder has CIDB registration of a minimum : 3CE or 2CE PE</td>
<td>GO/NO-GO</td>
<td>VALID</td>
</tr>
<tr>
<td>5. Evaluate whether the bidder has public liability insurance of at least 5 million Rands (Letter of Intent from a registered financial services provider or an insurance company will be accepted) (Application for a public liability insurance alone will not be accepted).</td>
<td>GO/NO-GO</td>
<td>MEET SPECIFICATION</td>
</tr>
<tr>
<td>6. Evaluate whether details of sub-contractors are provided (if the details are provided in SBD 6.1), particularly the two contactable referees.</td>
<td>N/A</td>
<td>AVAILABLE</td>
</tr>
<tr>
<td><strong>Selection Element</strong></td>
<td><strong>Weight (N/A)</strong></td>
<td><strong>BEC Confirmed</strong></td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>7 Evaluate whether the proposed construction programme falls within 12 weeks.</td>
<td>GO/NO-GO</td>
<td>MEET SPECIFICATION</td>
</tr>
</tbody>
</table>

Yes Bidder reference to the programme

No
## FUNCTIONALITY / SCORING CRITERIA

<table>
<thead>
<tr>
<th>NO.</th>
<th>ELEMENT</th>
<th>WEIGHT</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Experience on similar projects: Completion letter/certificate accompanied by an award letter (if necessary) to show the value of the project.</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Completed project: ≥ R200 000 &lt; R500 000 = 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Completed project ≥ R500 000 &lt; R1 000 000 = 25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Completed project &gt; R1 000 000 = 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Please note that similar projects relate only to the installation of underground fuel storage infrastructure and points will only be awarded to a maximum of Two projects with the highest values executed by the company.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Positive reference letters from current or previous clients in a format similar to the one detailed below and for civil engineering projects only:</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Completed project: ≥ R200 000 &lt; R500 000 = 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Completed project ≥ R500 000 &lt; R1 000 000 = 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Completed project &gt; R1 000 000 = 20</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Positive letter in this case refers to a letter where the referee gives overall positive appraisal and indicates willingness to work with the bidder in future.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Construction related Qualifications and Experience for the owner/s an/or Director/s of the company:</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• National Diploma/Degree or Higher = 10 (Attach certificate as proof)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• N6 or equivalent = 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• More than 5 years construction experience = 10 (Attach CV as proof)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Less than 5 years construction experience = 5</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>Construction programme with work activities and a duration of no more than 12 weeks</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 0 ≤ 8 weeks = 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• &gt; 8 ≤ 10 weeks = 10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### THE BIDDERS PARTICULARS

<table>
<thead>
<tr>
<th><strong>Name Of Bidder (As stated on the Central Supplier Database registration report)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<table>
<thead>
<tr>
<th><strong>Represented By</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Postal Address</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Telephone Number</strong></th>
</tr>
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<tbody>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th><strong>Cell Phone Number</strong></th>
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<tbody>
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<table>
<thead>
<tr>
<th><strong>Facsimile Number</strong></th>
</tr>
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<td></td>
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<table>
<thead>
<tr>
<th><strong>E-Mail Address</strong></th>
</tr>
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<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>VAT Registration Number:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

### COMPANY REGISTRATION NUMBER

### DESCRIBE PRINCIPAL BUSINESS ACTIVITIES:
<table>
<thead>
<tr>
<th>TYPE OF COMPANY/FIRM [Tick applicable box]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partnership/Joint Venture/Consortium</td>
</tr>
<tr>
<td>Close Corporation</td>
</tr>
<tr>
<td>(Pty) Limited</td>
</tr>
<tr>
<td>One person business/sole proprietor</td>
</tr>
<tr>
<td>Company</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COMPANY CLASSIFICATION [Tick applicable box and provide short description]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer:</td>
</tr>
<tr>
<td>Supplier:</td>
</tr>
<tr>
<td>Professional Service Provider:</td>
</tr>
<tr>
<td>Research and Innovation:</td>
</tr>
<tr>
<td>Construction:</td>
</tr>
<tr>
<td>Logistics:</td>
</tr>
<tr>
<td>Other:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TOTAL NUMBER OF YEARS THE COMPANY/FIRM HAS BEEN IN BUSINESS</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>TAX CLEARANCE CERTIFICATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has an original and valid tax affairs in order letter or Central supplier database certificate with green tax status been submitted</td>
</tr>
</tbody>
</table>

| SUPPLIER NATIONAL TREASURY’S CENTRAL SUPPLIER DATABASE: |
**PREFERENCE CLAIM**

Preference claim form been submitted for your preference points? (SBD 6.1)  Yes/No/NA

**A B-BBEE status level verification certificate must support preference points claimed. Has this been submitted?**  Yes/No/NA

Who was the B-BBEE certificate issued by [Tick applicable box]

- A verification agency accredited by the South African Accreditation System (SANAS);  Yes/No/NA
- Affidavit confirming turnover and black ownership or Companies and Intellectual Property Commission Certificate confirming turnover and black ownership certified by the registered Commissioner of Oaths  Yes/No/NA
- A Registered Auditor registered by IRBA  Yes/No/NA

Are you the accredited representative in South Africa for the goods/services/works offered?

YES or NO If yes enclose proof in the annexure and summarized detail below

---

**CONTRACT PERIOD**

The contract is for a maximum period of 12 weeks. The contract period commences from the date that both parties sign the contract (SBD7 contract signature page)
SCOPE OF WORK

The scope comprise the complete setting out, construction, fabrication, supply, installation, testing and assistance with commissioning of the works, as more fully detailed and provided for in Volume 3: Project and Construction Specification.

Without limitation the works include, and the Contractor is responsible for,

- the supply of all Plant and Materials, Equipment and Personnel, consumables and services, whether of a Temporary or Permanent nature;
- the setting out of the works prior to fabrication, engineering, manufacturing, supply, transport to Site, setting out of the works prior to fabrication, erection and construction, quality control, on and off site testing, painting, finishing, commissioning and complete in working order of the works including all related and ancillary works, plant and services; and
- the rehabilitation of Site.

The scope excludes the de-commissioning of the existing fuel storage infrastructure.

Refer to the Technical drawings together with the Bill of quantities (BoQ) and Project specifications on volume 2 and Volume 3 of the tender documents for detailed specifications.

SPECIAL CONDITIONS FOR MANAGING THE CONTRACTUAL OBLIGATIONS

<table>
<thead>
<tr>
<th>SERVICE PERFORMANCE LEVELS (MANDATORY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service being Measured</td>
</tr>
<tr>
<td>Time management</td>
</tr>
<tr>
<td>Director/Owner of the company to be directly involved in the project</td>
</tr>
<tr>
<td>Quality of work/workmanship</td>
</tr>
</tbody>
</table>
### Compliance to OHS Act and Construction Regulations 2014
- Health & Safety file to be up to date
- 100% compliance

### Compliance to the Environmental Management Plan (EMP)
- Adherence to mitigation plans provided for in the EMP
- 100% compliance to the EMP

### SERVICE PERFORMANCE LEVELS (MANDATORY)

<table>
<thead>
<tr>
<th>Service being Measured</th>
<th>Penalty where minimum levels are breached</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time management</td>
<td>Penalty of 0.25% of the contract value will be applied as per SCC</td>
</tr>
<tr>
<td>Quality of work/workmanship</td>
<td>The contractor shall repair the works immediately or within 48 hours during defects liability period</td>
</tr>
<tr>
<td>Director/Owner of the company to attend project meetings</td>
<td>1% of the monthly payment certificate will be deducted</td>
</tr>
<tr>
<td>Compliance to OHS Act and Construction Regulations 2014</td>
<td>Stop all construction activities until the issues are resolved and if there are same issues persist, terminate the contract</td>
</tr>
<tr>
<td>Compliance to the Environmental – to be split and has a penalty Management Plan (EMP)</td>
<td>Cutting of trees without permission – R20000 per tree</td>
</tr>
<tr>
<td></td>
<td>Oil and Fuel Spillages - R5000.00 per spillage</td>
</tr>
</tbody>
</table>

### SPECIAL CONDITIONS OF CONTRACT TO GENERAL CONDITIONS OF CONTRACT (GCC) FOR CONSTRUCTION WORKS, 2015 Ed

The bidder is required to purchase a copy of the GCC at his own expense, from the South African Institute of Civil Engineers and/or the SABS.
<table>
<thead>
<tr>
<th>Clause No</th>
<th>Special Condition</th>
</tr>
</thead>
</table>
| Clause 4.4.1 | The bidder shall notify the Employer in writing of all subcontracts that will be used under this contract during the tender stage.  

The contractor shall not sub-contract more than 25% of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level than the supplier, unless the supplier sub-contracts to an Exempted Micro Enterprise that has the capability and ability to execute the sub-contract.  

The bidder shall provide proof, in the legislated formats, of the sub-contractor's B-BBEE status for each subcontract under this contract to the NRF. |
| Clause 4.4.2 | All suppliers of the major components such as the tanks, pumps, dispensers, oil/water separators must have a minimum of 5 years of experience in the respective fields. |
| Clause 5.13.1 | The penalty amount referred to on clause 5.13.1 will be charged at 0.25% of the contract value per calendar day. |
| Clause 6.2.2 | Performance security is not required for this project but 10% retention will be withheld/deducted from every payment certificate. 5% of the retention money will be released upon reaching final completion while the remainder of the 5% will be released 12 months from final completion date. |
| Clause 8.6.1.3 | Liability insurance cover referred to in this clause shall be a public liability insurance cover of at least 5 Million Rands valid from project commencement date up until expiry of the defects liability period. |
| Clause 6.8.2 | Contract price adjustment application is not provided for in this contract and shall not be entertained. |
| Clause 6.10.4 | The employer shall pay the amount due to the Contractor within 30 days of receipt by the Employer of the payment certificate signed by the Employer’s Representative. |

**PREFERENCE POINTS CLAIMED (SBD 6.1)**

**PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2017**

This preference form must form part of all bids invited. It contains general information and serves as a claim form for preference points for Broad-Based Black Economic Empowerment (B-BBEE) Status Level of Contribution.

1. GENERAL CONDITIONS

1.1. The following preference point systems are applicable to all bids:
   1.1.1. the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and
   1.1.2. the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

1.2. The value of this bid is estimated to exceed not exceed R50 000 000 (all applicable taxes included) and therefore the 80/20 preference point system shall be applicable; or
   1.2.2. The 80/20 preference point system will be applicable to this tender (delete whichever is not applicable for this tender).

1.3. Points for this bid shall be awarded for:
   1.3.1. Price; and
   1.3.2. B-BBEE Status Level of Contributor.

1.4. The maximum points for this bid are allocated as follows:

<table>
<thead>
<tr>
<th>POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRICE</td>
</tr>
<tr>
<td>80</td>
</tr>
<tr>
<td>B-BBEE STATUS LEVEL OF CONTRIBUTION</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>Total points for Price and B-BBEE must not exceed</td>
</tr>
<tr>
<td>100</td>
</tr>
</tbody>
</table>

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

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

2. DEFINITIONS

2.1. “B-BBEE” means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;

2.2. “B-BBEE status level of contributor” means the B-BBEE status of an entity in terms of a code of good practice on black economic empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;

2.3. “bid” means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the provision of goods or services, through price quotations, advertised competitive bidding processes or proposals;
2.4. "Broad-Based Black Economic Empowerment Act" means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);

2.5. "EME" means an Exempted Micro Enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;

2.6. "functionality" means the ability of a tenderer to provide goods or services in accordance with specifications as set out in the tender documents.

2.7. "prices" includes all applicable taxes less all unconditional discounts;

2.8. "proof of B-BBEE status level of contributor" means:
   2.8.1. B-BBEE Status level certificate issued by an authorized body or person;
   2.8.2. A sworn affidavit as prescribed by the B-BBEE Codes of Good Practice;
   2.8.3. Any other requirement prescribed in terms of the B-BBEE Act;

2.9. "QSE" means a qualifying small business enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;

2.10. "rand value" means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;

3. POINTS AWARDED FOR PRICE

3.1. THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS

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

\[
P_s = 80 \left( 1 - \frac{P_t - P_{\text{min}}}{P_{\text{min}}} \right) \quad \text{or} \quad P_s = 90 \left( 1 - \frac{P_t - P_{\text{min}}}{P_{\text{min}}} \right)
\]

Where

- \( P_s \) = Points scored for price of bid under consideration
- \( P_t \) = Price of bid under consideration
- \( P_{\text{min}} \) = Price of lowest acceptable bid

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

4.1. In terms of Regulation 6 (2) and 7 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

<table>
<thead>
<tr>
<th>B-BBEE Status Level of Contributor</th>
<th>Number of points (90/10 system)</th>
<th>Number of points (80/20 system)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>12</td>
</tr>
</tbody>
</table>
5. BID DECLARATION
5.1. Bidders who claim points in respect of B-BBEE Status Level of Contribution must complete the following:

6. B-BBEE STATUS LEVEL OF CONTRIBUTOR CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 4.1
6.1. B-BBEE Status Level of Contributor: . = ……..(maximum of 10 or 20 points)

   (Points claimed in respect of paragraph 7.1 must be in accordance with the table reflected in paragraph 4.1 and must be substantiated by relevant proof of B-BBEE status level of contributor.

7. SUB-CONTRACTING
7.1. Will any portion of the contract be sub-contracted?

   (Tick applicable box)

   YES  NO

7.1.1. If yes, indicate:

   7.1.1.1. What percentage of the contract will be subcontracted………………………………%  

   7.1.1.2. The name of the sub-contractor……………………………………………………

   7.1.1.3. The B-BBEE status level of the sub-contractor……………………………………

   7.1.1.4. Whether the sub-contractor is an EME or QSE

   (Tick applicable box)

   YES  NO

7.1.1.5. Specify, by ticking the appropriate box, if subcontracting with an enterprise in terms of Preferential Procurement Regulations, 2017:

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

8. DECLARATION WITH REGARD TO COMPANY/FIRM
8.1. Name of company/firm:
8.2. VAT registration number:
8.3. Company registration number:
8.4. TYPE OF COMPANY/ FIRM
□ Partnership/Joint Venture / Consortium
□ One person business/sole propriety
□ Close corporation
□ Company
□ (Pty) Limited
[TICK APPLICABLE BOX]
8.5. DESCRIBE PRINCIPAL BUSINESS ACTIVITIES
8.6. COMPANY CLASSIFICATION
□ Manufacturer
□ Supplier
□ Professional service provider
□ Other service providers, e.g. transporter, etc.
[TICK APPLICABLE BOX]
8.7. Total number of years the company/firm has been in business:
8.8. I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contributor indicated in paragraphs 1.4 and 6.1 of the foregoing certificate, qualifies
the company/ firm for the preference(s) shown and I / we acknowledge that:

8.8.1. The information furnished is true and correct;
8.8.2. The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
8.8.3. In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 6.1, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;
8.8.4. If the B-BBEE status level of contributor has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –
   8.8.4.1. disqualify the person from the bidding process;
   8.8.4.2. recover costs, losses or damages it has incurred or suffered as a result of that person’s conduct;
   8.8.4.3. 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;
   8.8.4.4. recommend that the bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted by the National Treasury from obtaining business from any organ of state for a period not exceeding 10 years, after the audi alteram partem (hear the other side) rule has been applied; and
   8.8.4.5. forward the matter for criminal prosecution.

WITNESSES

1. ..............................................

2. ..............................................

SIGNATURE(S) OF BIDDERS(S)

SBD 9: CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting this Bid in response to the invitation for the Bid made by the NRF, do hereby make the following statements that I certify to be true and complete in every respect:

I have read and I understand the contents of this Certificate;
I understand that the Bid will be disqualified if this Certificate is found not to be true and complete in every respect;

I am authorised by the Bidder to sign this Certificate, and to submit the Bid, on behalf of the Bidder;

Each person whose signature appears on the Bid has been authorised by the Bidder to determine the terms of, and to sign, the Bid on behalf of the Bidder;

For the purposes of this Certificate and the accompanying Bid, I understand that the word “competitor” shall include any individual or organisation, 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.

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 will not be construed as collusive bidding.

In particular, without limiting the generality of paragraphs 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.

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.

The terms of this 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 the bid or to the signing of the contract.

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.

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

<table>
<thead>
<tr>
<th>SBD 8 - DECLARATION OF BIDDER’S PAST SCM PRACTICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>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? If Yes, furnish particulars as an attached schedule:</td>
</tr>
<tr>
<td>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)? If Yes, furnish particulars as an attached schedule:</td>
</tr>
<tr>
<td>Was the Bidder or any of its directors convicted by a court of law (including a court outside of the Republic of South Africa) for fraud or corruption during the past five years? If Yes, furnish particulars as an attached schedule:</td>
</tr>
<tr>
<td>Was any contract between the Bidder and any NRF terminated during the past five years because of failure to perform on or comply with the contract? If Yes, furnish particulars as an attached schedule:</td>
</tr>
</tbody>
</table>

The Database of Restricted Suppliers and Register for Tender Defaulters 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.

<table>
<thead>
<tr>
<th>SBD 4 - DECLARATION OF INTEREST WITH GOVERNMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any legal person, including persons employed by the STATE ¹, or persons having a kinship</td>
</tr>
</tbody>
</table>

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
with persons employed by the STATE, including a blood relationship, may make an offer or offers in terms of this invitation to Bid (includes an advertised competitive Bid, a limited Bid, a proposal or written price quotation). In view of possible allegations of favouritism, should the resulting Bid, or part thereof, be awarded to persons employed by the STATE, or to persons connected with or related to them, it is required that the Bidder or his/her authorised representative, declare his/her position in relation to the evaluating/adjudicating authority where:

The Bidder is employed by the STATE; and/or

The legal person on whose behalf the Bidding Document is signed, has a relationship with persons/s person who is/are involved in the evaluation and or adjudication of the Bid(s), or where it is known that such a relationship exists between the person or persons for or on whose behalf the declarant acts and persons who are involved with the evaluation and/or adjudication of the Bid.

In order to give effect to the above, the following questionnaire must be completed and submitted with this Bid:

| Full Name of Bidder or his/her representative |
| Identity Number: |
| Position occupied in the Company (director, trustee, shareholder, member): |
| Registration number of company, enterprise, close corporation, partnership agreement |
| Tax Reference Number: |
| VAT Registration Number: |

The names of all directors/trustees/shareholders/members, their individual identity numbers, tax reference numbers and, if applicable, employee/PERSAL numbers must be indicated in a separate schedule including the following questions:

Schedule attached with the above details for all directors/members/shareholders

Are you or any person connected with the Bidder presently employed by the STATE? If so, furnish the following particulars in an attached schedule

YES / NO
<table>
<thead>
<tr>
<th><strong>Name of person/ director/ trustee/ shareholder/member:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name of STATE institution at which you or the person connected to the Bidder is employed:</strong></td>
</tr>
<tr>
<td><strong>Position occupied in the STATE institution:</strong></td>
</tr>
<tr>
<td><strong>Any other particulars:</strong></td>
</tr>
<tr>
<td>If you are presently employed by the STATE, did you obtain the appropriate authority to undertake remunerative work outside employment in the public sector?</td>
</tr>
<tr>
<td>If Yes, did you attach proof of such authority to the Bid document?</td>
</tr>
<tr>
<td>If No, furnish reasons for non-submission of such proof as an attached schedule</td>
</tr>
<tr>
<td>(Note: Failure to submit proof of such authority, where applicable, may result in the disqualification of the Bid.)</td>
</tr>
<tr>
<td>Did you or your spouse or any of the company’s directors/ trustees /shareholders /members or their spouses conduct business with the STATE in the previous twelve months?</td>
</tr>
<tr>
<td>If so, furnish particulars as an attached schedule:</td>
</tr>
<tr>
<td>Do you, or any person connected with the Bidder, have any relationship (family, friend, other) with a person employed by the STATE and who may be involved with the evaluation and or adjudication of this Bid?</td>
</tr>
<tr>
<td>If so, furnish particulars as an attached schedule.</td>
</tr>
<tr>
<td>Do you or any of the directors/ trustees/ shareholders/ members of the company have any interest in any other related companies whether or not they are bidding for this contract?</td>
</tr>
<tr>
<td>If so, furnish particulars as an attached schedule:</td>
</tr>
</tbody>
</table>

**REFERENCE LETTER FORMAT**

<table>
<thead>
<tr>
<th>Bidder’s Letterhead</th>
</tr>
</thead>
</table>

Bid Number NRFNZG-019-2017/18  Page 28 of 32
Initials:
We are submitting a bid for the contract described below. We appreciate your assistance and effort in completing on your letterhead the reference as set out below on your experience with us.

<table>
<thead>
<tr>
<th>Referee Letterhead</th>
<th>Referee Legal Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFERENCE ON COMPANY xxxxx</td>
<td></td>
</tr>
</tbody>
</table>

Bid Number:

Bid Description

Describe the service/work the above bidder provide to you below

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Needs improvement</th>
<th>Meets requirements</th>
<th>Exceeds requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professionalism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health and Safety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication skills and professionalism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning and adherence to construction program</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction with quality and workmanship</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time and Cash flow management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Impression</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No. of times used in past year | Would you use the provider again? | YES/NO
BID SUBMISSION CERTIFICATE FORM - (SBD 1)

I hereby undertake to supply all or any of the goods, works, and services described in this procurement invitation to the NRF in accordance with the requirements and specifications stipulated in this Bid Invitation document at the price/s quoted.

My offer remains binding upon me and open for acceptance by the NRF during the validity period indicated and calculated from the closing time of Bid Invitation.

The following documents are deemed to form and be read and construed as part of this offer / bid even where integrated in this document:

<table>
<thead>
<tr>
<th>Invitation to Bid (SBD 1)</th>
<th>Specification(s) set out in this Bid Invitation inclusive of any annexures thereto</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bidder’s responses to this invitation as attached to this document</td>
<td>Pricing Schedule(s) (SBD3) including detailed schedules attached</td>
</tr>
<tr>
<td></td>
<td>CSD / Tax clearance letter</td>
</tr>
<tr>
<td>Declaration of Interest (SBD4);</td>
<td>Independent Price Determination (SBD 9)</td>
</tr>
<tr>
<td>Preference (SBD 6.1) claims for Broad Based Black Economic Empowerment Status Level of Contribution in terms of the Preferential Procurement Regulations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2011 (SBD6.1) and the BBBEE certificate</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td></td>
<td>Declaration of Bidder’s past SCM practice (SBD 8)</td>
</tr>
<tr>
<td></td>
<td>Conditions of contract as set out in this document (GCC)</td>
</tr>
<tr>
<td></td>
<td>NIPP Obligations (SBD 5) where applicable</td>
</tr>
<tr>
<td></td>
<td>Local Content and Local Manufacturing Certification (SBD 6.2) in accordance with the SABS standard</td>
</tr>
</tbody>
</table>

I confirm that I have satisfied myself as to the correctness and validity of my offer / bid in response to this Bid Invitation; that the price(s) and rate(s) quoted cover all the goods, works and services specified in the Bid Invitation; that the price(s) and rate(s) cover all my obligations and I accept that any mistakes regarding price(s) and rate(s) and calculations will be at my own risk.

I accept full responsibility for the proper execution and fulfilment of all obligations and conditions devolving on me in terms of this Bid Invitation as the principal liable for the due fulfilment of the subsequent contract if awarded to me.

I declare that I have had no participation in any collusive practices with any Bidder or any other person regarding this or any other Bid.

I certify that the information furnished in these declarations (SBD4, SBD6.1, SBD 6.2 where applicable, SBD5, SBD8, SBD9) is correct and I accept that the NRF may reject the Bid or act against me should these declarations prove to be false.

I confirm that I am duly authorised to sign this offer/ bid response.

<table>
<thead>
<tr>
<th>NAME (PRINT)</th>
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<tbody>
<tr>
<td>CAPACITY</td>
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<td>SIGNATURE</td>
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<td>Witness 1</td>
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<td>NAME</td>
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<td>SIGNATURE</td>
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<td>Witness 2</td>
<td></td>
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<tr>
<td>NAME</td>
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<td>SIGNATURE</td>
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NATIONAL RESEARCH FOUNDATION/
NATIONAL ZOOLOGICAL GARDENS OF SOUTH AFRICA

SUPPLY AND INSTALLATION OF TWO UNDERGROUND FUEL STORAGE TANKS AND ONE DISPENSER

MINIMUM GRADING REQUIRED: 3CE or 2CEPE

Bid No: NRFNZG-019-2017/18

TENDER DOCUMENT - VOLUME 2: PRICING

TENDERER .................................................................................................................................

AMOUNT TENDERED ............................................................................................................

AMOUNT IN WORDS..............................................................................................................

CIDB GRADING.....................................................................................................................

BID CLOSING : 06 June 2017 at 11h00
# TABLE OF CONTENTS

Part C2: Pricing Data

C2.1: Bill of Quantities and Preambles  
Page 4

SBD 3: Pricing schedule  
Page 21
PART C2: PRICING DATA
Part C2.1
Bill of Quantities

1. **PREAMBLES TO THE BILL OF QUANTITIES**
   Preambles to the Bill of Quantities is included to assist the contractor in pricing the various items within the Bills notwithstanding the content of the bills of contractors’ attention is referred to the other contract document viz, the Form of Tender, the Conditions of Contract and the Specifications which are to be read in conjunction with the Bills.

2. **PRICES**
   A price must be entered against each item in the bill. Items against which has not been entered shall be considered as being covered by other itemized items as listed by the tenderer in the bill.

   The prices in the bill of quantities shall fully reflect the contractor’s proposed method of working as separately identified in detail elsewhere in its' tender submission. NOTE; ALL PRICES INSERTED SHALL BE EXCLUSIVE OF VAT. The VAT amount shall be included by the tenderer as a single sum where indicated on the form of tender. All prices, however, include for all other duties, taxes and all other obligations arising from the conditions of tender.

   The prices inserted in the bill of quantities shall be the full inclusive value of the work as described under the items, including all costs and expenses which may be required for the speedy, efficient and safe execution of the work described together with all general risks, liabilities and obligations set forth or implied in these documents on which the tender submission is based.

   The prices are deemed to include (unless otherwise specifically stated in the bill of quantities or herein) but shall be not limited to the following:
   - Materials and consumables, including waste, necessary for the completion of the work.
   - Receiving, checking and inspecting for defects before incorporation into the works.
- Storing and protecting against deterioration, contamination, loss or damage, including the provision for any necessary pallets, racks, waterproof sheeting, etc.
- Transportation from the point of delivery, placing in position, fixing, assembly of components, adjustment, lubrication and the like, all in accordance with the works standards.
- Provision and use of contractors’ and/or supplied equipment.
- Overhead charges and profit.
- Overtime working necessary to complete the works in accordance with the completion date.
- Payments to labour in respect of time worked and all other payments and costs relating to labour of any denomination.
- Stoppage for inspection purposes by the engineer or other authorized company personnel.
- Protecting all services.
- Extension of all temporary services of every kind as required to facilitate the progress of the works.
- Transportation, erection and subsequent removal of all temporary supports, working platforms, hard standings, scaffolding and associated works necessary for the safe execution of the works.
- Removal and disposal of contractors’ plant and equipment off site.
- Maintenance of all temporary equipment used and/or installed by the contractor.

3. **BILL OF QUANTITIES**

Included herein is a bill of quantities which the tenderer must complete and which will be used for any additional work to be performed. **THE CLIENT RESERVES THE RIGHT TO OMIT OR ADD ANY ITEM AS PRICED FOR IN THIS BILL OF QUANTITIES**
<table>
<thead>
<tr>
<th>Item</th>
<th>Payment Reference</th>
<th>Bill Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Rate</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>SABS 1200 A</td>
<td>SECTION : GENERAL</td>
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<tr>
<td>8.3</td>
<td>SCHEDULED FIXED-CHARGE AND VALUE RELATED ITEMS</td>
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<tr>
<td>8.3.1</td>
<td>Contractual Requirements</td>
<td>sum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.3.2</td>
<td>Establishment of facilities on site</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.3.2.2</td>
<td>Facilities for Contractor</td>
<td>sum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Including offices, storage sheds, ablution and latrine facilities, SHERQ installation, tools and equipment, temporary water connection, temporary electric connection, communication, setting out of works, dealing with water, security and access, Living accommodation.</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>8.3.3</td>
<td>Other Fixed Charge Obligations</td>
<td>sum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.3.4</td>
<td>Removal of Site Establishment</td>
<td>sum</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>8.4</td>
<td>Scheduled time related charges</td>
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<tr>
<td>8.4.1</td>
<td>Contractual Requirements</td>
<td>sum</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8.4.2</td>
<td>Operation and maintenance of Facilities on site, for the duration of Construction, except where otherwise stated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.4.2.2</td>
<td>Facilities for Contractor</td>
<td>sum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Offices and storage sheds, Workshops, Laboratories, Living accommodation, Ablution and latrine facilities, Tools, Temporary water connection, temporary electric connection and communications.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8.4.3</td>
<td>Supervision for the duration of the contract</td>
<td>sum</td>
<td></td>
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</table>
### 8.4.4 Company and head office overheads for the duration of the project

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### 8.4.5 Other time related obligations

<table>
<thead>
<tr>
<th></th>
<th>sum</th>
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</thead>
</table>

### 8.7 DAYWORK (See 8.1.2.1(d))

#### Labour

- Unskilled: hr
- Semi-Skilled: hr
- Artisan (Skilled): hr
- Team Supervisor: hr
- Construction Supervisor: hr
- Operator: hr
- Driver: hr
- Safety Officer: hr

#### Plant

- Crane Truck 5T: hr
- Crane Truck 10T: hr
- Mobile Crane 20T: hr
- Excavator 20T: hr
- Excavator 20T with Pecker: hr
- TLB: hr
- Tipper Truck (6m³): hr
- LDV: hr
- Wacker: hr
- Bomag Roller (1 ton): hr
- Concrete Saw: hr
- Water Pump: hr

### 8.8 TEMPORARY WORKS (See 8.1.2.1(d))

#### 8.8.1 Management of Traffic along access road located next to the works

<table>
<thead>
<tr>
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<td>Item</td>
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<tr>
<td>--------</td>
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<tr>
<td></td>
<td>SABS 1200 C</td>
</tr>
<tr>
<td>8.2</td>
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</tr>
<tr>
<td>-</td>
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</tr>
<tr>
<td>SANS 1200 C 5.3 a) to e)</td>
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<tr>
<td>8.2.10</td>
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Page 8 of 23
<table>
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<td>8.3.1</td>
<td>SECTION : EARTHWORKS (SMALL)</td>
<td>8.3.1 Excavation</td>
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<tr>
<td>8.3.1.b</td>
<td>Excavate in all materials and dispose as per the construction specifications</td>
<td>m³</td>
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<tr>
<td></td>
<td>Tank Installations, excavation to a depth of 3.5m</td>
<td>m³</td>
<td>135</td>
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<td>Oil Water Separator</td>
<td>m³</td>
<td>12.3</td>
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<tr>
<td></td>
<td>Fill Slab</td>
<td>m³</td>
<td>14</td>
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<tr>
<td></td>
<td>New Paving Areas</td>
<td>m³</td>
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<td></td>
<td>New Stormwater Manhole</td>
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<td>8.3.1.b</td>
<td>Excavate in all materials and stockpile for backfill in sloped excavation sides</td>
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<td></td>
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<td>Tank Installation</td>
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<td>Oil Water Separator</td>
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<td>Description</td>
<td>Unit</td>
<td>Quantity</td>
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<td>8.3.1.c</td>
<td>Extra-over for</td>
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<td>8.3.1.c.1</td>
<td>intermediate excavation</td>
<td>m³</td>
<td>-</td>
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<td>Tank Installations</td>
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<td>Oil Water Separator Installation</td>
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<td>8.3.2</td>
<td>Restricted Excavation</td>
</tr>
<tr>
<td>8.3.2.a</td>
<td>Excavate for restricted observation well sumps (0.3 x 0.3 x 0.5m) in all materials and use for backfill or embankment or dispose</td>
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<tr>
<td></td>
<td>no.of 4</td>
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<thead>
<tr>
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<td>8.3.2.b</td>
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<td>8.3.4</td>
<td>Importing of Materials from Commercial Sources</td>
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<td>Tank Slab</td>
</tr>
<tr>
<td></td>
<td>Tank Selected Fill Material as per drawing 1197-C/A1-20103</td>
</tr>
<tr>
<td></td>
<td>Selected G5 Material to top 750mm of tank excavation. Compacted to 95% Mod AASHTO in 150mm layers</td>
</tr>
<tr>
<td></td>
<td>Fill Slab</td>
</tr>
<tr>
<td></td>
<td>Selected G5 Material compacted to 95% Mod AASHTO in 125mm layer</td>
</tr>
<tr>
<td></td>
<td>Separator Installation</td>
</tr>
<tr>
<td></td>
<td>Selected Fill Material as per drawing 1197-C/A1-03102</td>
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<td></td>
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<td>---</td>
<td>---</td>
</tr>
<tr>
<td>8.3.6</td>
<td>Top soilin</td>
</tr>
<tr>
<td>X1</td>
<td>Subgrade</td>
</tr>
<tr>
<td></td>
<td>Construct Subgrade over works area by ripping in-situ material at bottom of excavation to depth of 150mm and re-compacting to 93% Mod AASHTO density</td>
</tr>
<tr>
<td>X2</td>
<td>Placement of Tanks</td>
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</table>

TOTAL CARRIED FORWARD TO SUMMARY
<table>
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<tr>
<th>Item</th>
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<td>SECTION : EARTHWORKS PIPE TRENCHES</td>
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<td>8.3.2</td>
<td>Excavation</td>
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<td>8.3.2.a</td>
<td>Excavate in all material for trenches, backfill, compact and dispose of surplus material</td>
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<tr>
<td></td>
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<td>640mm Wide Trenches</td>
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<td>8.3.2.b</td>
<td>Extra-over item (a) above for</td>
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<td>8.3.2.b.1</td>
<td>intermediate excavation</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>1120mm Wide Trenches</td>
<td>m$^3$</td>
<td>22</td>
<td></td>
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<td></td>
<td>640mm Wide Trenches</td>
<td>m$^3$</td>
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<tr>
<td></td>
<td>720mm Wide Trenches</td>
<td>m$^3$</td>
<td>2.5</td>
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<tr>
<td>8.3.5.a</td>
<td>Services that intersect a trench</td>
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<td></td>
<td>Electrical Cable</td>
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TOTAL CARRIED FORWARD TO SUMMARY
<table>
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<tr>
<th>Item</th>
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<td>SECTION : BEDDING (PIPES)</td>
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<td>8.2</td>
<td>Scheduled Items</td>
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<tr>
<td>8.2.2.3</td>
<td>Supply and placement of bedding material</td>
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<td>1120mm Trenches</td>
<td>m³</td>
<td>4</td>
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<tr>
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<td>640mm Trenches</td>
<td>m³</td>
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### 8.4.4 Unformed Surface Finishes

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### 8.5 Joints

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### 8.7 Grouting

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<td>Under bases (or beds), with reference to dispenser pump</td>
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### X4 Cast in Items

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<tr>
<td>Dispenser Sump</td>
<td>no.of 1</td>
</tr>
<tr>
<td>Observation Wells</td>
<td>no.of 4</td>
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<tr>
<td>Drainage Sump and Grid</td>
<td>no.of 1</td>
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<tr>
<td>Tank Manhole Cover and Frame</td>
<td>no.of 2</td>
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<tr>
<td>Composite Manhole Cover and Frame</td>
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**TOTAL CARRIED FORWARD TO SUMMARY**
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<td>m³</td>
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<td>Construct Subbase Layer with material from commercial sources</td>
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<td>Process Subbase material by the following processes, as relevant, (applicable to X6)</td>
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X15  Supply and installation of observation wells no 4

X16  Supply and installation of concrete bollards no 2

**TOTAL CARRIED FORWARD TO SUMMARY**
### Dispenser - Installation
- **Item:** 1.7
- **Description:** Fillerbox - Petrol 12 tooth Barret
- **Quantity:** no. 1

### Fillerbox - Diesel 18 tooth Barret
- **Item:** 1.9
- **Description:** Fillerbox - Diesel 18 tooth Barret
- **Quantity:** no. 1

### Fillerbox - Vapour recovery
- **Item:** 1.10
- **Description:** Fillerbox - Vapour recovery
- **Quantity:** no. 1

### 4" Vent breather filters 3µm
- **Item:** 1.11
- **Description:** 4" Vent breather filters 3µm
- **Quantity:** no. 1

### 4" Diesel vent
- **Item:** 1.12
- **Description:** 4" Diesel vent
- **Quantity:** no. 1

### Piping

#### 110/90mm single wall petrochemical HDPE pipe
- **Item:** 2.1
- **Description:** 110/90mm single wall petrochemical HDPE pipe
- **Unit:** m
- **Quantity:** 48

#### 63/54mm single wall petrochemical HDPE pipe
- **Item:** 2.2
- **Description:** 63/54mm single wall petrochemical HDPE pipe
- **Unit:** m
- **Quantity:** 8

#### Supply and installation, above ground 4" Carbon steel vent line: 110/90mm single wall petrochemical HDPE to carbon steel 4" 90 DEG coupling
- **Item:** 2.3
- **Description:** Supply and installation, above ground 4" Carbon steel vent line: 110/90mm single wall petrochemical HDPE to carbon steel 4" 90 DEG coupling
- **Unit:** no.
- **Quantity:** 2

#### Special Wrapping in Corrosive Soil for below ground portion of vent pipe (50mm Carbon steel Densolen wrapping)
- **Item:** 2.4
- **Description:** Special Wrapping in Corrosive Soil for below ground portion of vent pipe (50mm Carbon steel Densolen wrapping)
- **Unit:** m
- **Quantity:** 3

#### Supply and installation, Entry boot 63/54mm
- **Item:** 2.5
- **Description:** Supply and installation, Entry boot 63/54mm
- **Unit:** no.
- **Quantity:** 4

#### Supply and installation, Entry boot 110/90mm
- **Item:** 2.6
- **Description:** Supply and installation, Entry boot 110/90mm
- **Unit:** no.
- **Quantity:** 5

#### 110/90mm Sans 62-1 Tank sump Piping
- **Item:** 2.7
- **Description:** 110/90mm Sans 62-1 Tank sump Piping
- **Unit:** m
- **Quantity:** 10

#### 63/50mm Sans 62-1 Tank sump Piping
- **Item:** 2.8
- **Description:** 63/50mm Sans 62-1 Tank sump Piping
- **Unit:** m
- **Quantity:** 4

#### 63/50mm HDPE/Steel Termination fitting -Supply and Install
- **Item:** 2.9
- **Description:** 63/50mm HDPE/Steel Termination fitting -Supply and Install
- **Unit:** no.
- **Quantity:** 4

#### 110/90mm HDPE/Steel Termination fitting -Supply and Install
- **Item:** 2.10
- **Description:** 110/90mm HDPE/Steel Termination fitting -Supply and Install
- **Unit:** no.
- **Quantity:** 5

#### 63/50mm HDPE/Steel Welding socket-supply and install
- **Item:** 2.11
- **Description:** 63/50mm HDPE/Steel Welding socket-supply and install
- **Unit:** no.
- **Quantity:** 4

#### 110/90mm HDPE/Steel Welding socket-supply and install
- **Item:** 2.12
- **Description:** 110/90mm HDPE/Steel Welding socket-supply and install
- **Unit:** no.
- **Quantity:** 10

### NZG: SUPPLY AND INSTALLATION OF TWO UNDERGROUND STORAGE TANKS AND ONE DISPENSER

**Summary of Priced Bills (To be transferred to SBD 3.1)**

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Subtotal . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
14% VAT . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
TOTAL TENDER SUM . . . . . . . . . . . . . . . . . . . . . . . . . . . .
(To be carried forward to tender form)
NOTE

Price quoted is fully inclusive of all costs including delivery to the specified NRF Business Unit geographical address and includes value-added tax, pay as you earn, income tax, unemployment insurance fund contributions, and skills development levies.

In cases where different delivery points influence the pricing, a separate pricing schedule must be submitted for each delivery point.

Detailed bill of quantities is compulsory and is provided in Volume 2: Pricing document.

The NRF accepts no changes, extensions, or additional ad hoc costs to the pricing conditions of the contract once both parties have signed the contract.

Pricing is subject to the addition of Preference Points as stipulated below - Standard Bidding Document 6.1 Preference claim form.

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NATIONAL RESEARCH FOUNDATION/
NATIONAL ZOOLOGICAL GARDENS OF SOUTH AFRICA

SUPPLY AND INSTALLATION OF TWO UNDERGROUND STORAGE TANKS AND ONE DISPENSER

MINIMUM GRADING REQUIRED: 3CE or 2CEPE
Bid No: NRFNZG-019-2017/18

TENDER DOCUMENT - VOLUME 3: PROJECT AND CONSTRUCTION SPECIFICATIONS
Execution Phase

Construction Specification for Civil, Mechanical & Piping, Electrical & Instrumentation Construction Works

(Rev00)

Compiled by:

VGI CONSULTING (Pty) Ltd
PO Box 68968
Highveld
CENTURION
0169

Tel.: 012 682 9140
Fax.: 012 665 1412
e-mail: info@vgi.co.za

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REVISION CONTROL

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ANNEXURE D – EMP
ANNEXURE E - HEALTH AND SAFETY SPECIFICATION
# ABBREVIATIONS

The following abbreviations are used in this document:

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<th>Description</th>
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</tr>
<tr>
<td>BCEW</td>
<td>Bare Copper Earth Wire</td>
</tr>
<tr>
<td>BOQ</td>
<td>Bills of Quantities</td>
</tr>
<tr>
<td>BOM</td>
<td>Bills of Materials</td>
</tr>
<tr>
<td>COC</td>
<td>Certificate of Compliance</td>
</tr>
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<td>DB</td>
<td>Distribution Board</td>
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<tr>
<td>EoJ</td>
<td>End of Job</td>
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<tr>
<td>GA</td>
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<td>OD</td>
<td>Outside diameter</td>
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<td>OHS</td>
<td>Occupational Health and Safety</td>
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</tr>
<tr>
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<td>Quality Control Plan</td>
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<tr>
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<td>Quality Management Plan</td>
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<td>SABS</td>
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1. DESCRIPTION OF THE WORKS

1.1 Employer’s Objective

The National Zoological Gardens plans to install new underground fuel tanks and a dispenser at its existing services facility. Two new tanks, one for Diesel storage and one for Petrol Storage, each with a capacity of 9m$^3$ needs to be installed. Services and infrastructure associated with the installation of the new tanks are installed and constructed as part of the tank installation.

1.2 Description of the Works

1.2.1 General

The works comprise the complete setting out, construction, fabrication, supply, installation, testing and assistance with commissioning of the works, as more fully detailed and provided for in this Construction Specification.

Without limitation the works include, and the Contractor is responsible for, the setting out of the works prior to fabrication, engineering, manufacturing, supply, transport to Site, setting out of the works prior to fabrication, erection and construction, quality control, on and off site testing, painting, finishing, commissioning and complete in working order of the works including all related and ancillary works, plant and services and the rehabilitation of Site.

The works include all Plant and Materials, Equipment and Personnel, consumables and services, whether of a Temporary or Permanent nature, the only exclusions being:

- items and/or services, if any, which are specifically excluded from the Construction Specification;
- the supply of items, if any, which are free issued to the Contractor by the Employer (or by Others) as explicitly stated in this Construction Specification;
- items and/or services, if any, which are expressly stated to be provided by the Employer or by Others elsewhere in the Construction Specification.

Without limitation the works include the following:

- Construction and erection of a laydown and site establishment area for use by the Contractor at the location indicated for such use by the Employer.
1.2.2 Materials

The Contractor procures all materials required for this project with the exception of materials specifically listed as Free Issue Materials in this specification.

The Contractor allows for off-loading of all materials. When determining the required crane size the Contractor to consider the size, weight as well as final position of the equipment.

The Contractor submits material datasheets of the major material he proposes to procure to the Employer’s Representative, prior to procurement of the proposed material commencing.

Major material and equipment procured by the Contractor as part of the works include, but is not limited to:

- Stormwater oil/water separation system.
- Composite Tank manhole frames and covers
- Non-metallic underground piping
- Galvanised Metallic piping
- Pipe supports
- Storage tanks including tank sump
- Fuel Dispenser including dispenser sump
- Filler boxes with filling couplings for Petrol Diesel and Vapour recovery
- Tank vent piping and vents
- Tank gauge hatch
- Fire Hose reel

1.2.3 Civil Works

The Civil Works completed by the Contractor, without limitation includes the following:

Excavation and Earthworks

- Clearing and grubbing of the works area.
- Excavation in the area of the works to the required levels as more fully detailed and provided for in this specification.
- Earthworks including the importing, backfilling and compaction of layer works as more fully detailed and provided for in this specification.
• Profiling of the natural ground level, following completion of the new installations, of the areas along the perimeter of the works as more fully detailed in this specification.

Concrete Works

• Construction of a new reinforced concrete filling slab, including an associated concrete plinth required for the mounting of the dispenser pump unit. The extent of which is more fully detailed in this specification.
• Construction of a new reinforced concrete surface slab over the newly installed petrochemical tanks, to act as additional tank protection. The extents of which is more fully detailed in this specification.
• Concrete works associated with the installation of the oil/water separator. The extents of which is more fully detailed in this specification.
• The Contractor is notified of the restricted nature of the works, situated within an active operational area, and allows for this in the construction methods employed by him during the completion of the works specifically but not limited to the placement of concrete. All construction methods are selected to minimise potential impacts on the existing operations.

Stormwater Drainage

• Supply and installation of new stormwater separation system and sand trap, including all ancillary piping, fittings and components as more fully detailed in this specification.
• Construction of a new masonry stormwater manhole, serving as tie-in into the existing stormwater system.

Segmented Paving

• Construction of new segmented paving within areas identified herewith. Construction includes all associated base and sub base layers including stabilisation of said layers as more fully detailed and provided for in this Specification.
• Provision of edge restraints and tie-in to the existing segmented paving surrounding areas.
Sleeves

- Supply and installation of sleeves, for the later installation of electrical cabling as more fully detailed in this specification.

Miscellaneous

- Construction of bollards as detailed in this specification.
- Supply and installation of observation wells as more fully detailed in this specification.
- Supply and installation of 2no. of 9kg DCP Fire extinguishers, including all auxiliary installation/mounting requirements and relevant safety signage, as more fully detailed in this specification.
- Supply and installation of 1no. of firefighting hose reel, with associated communication piping and tie-in to a suitable supply.
- Provision of relevant safety signage as more fully detailed in this specification.

Rehabilitation

- Rehabilitation of the Site following the complete installation of all works. All excess materials and excavated soils are removed, and ground surfaces are reinstated to the levels prior to construction or to allow the new installation to be tied into the surrounding area, allowing for effective stormwater drainage.

1.2.4 Mechanical Works

Mechanical Equipment

- Supply and Installation of all two storage tanks as required by attached specification, including water tight tank sump, wet leak detection and gauge hatch.
- Supply and Installation of three filler boxes with couplings (Diesel, Petrol and Vapour recovery)
- Supply and installation of a fuel dispenser as required by attached specification

Piping

- Supply, installation and testing of the following lines as per the Flow diagram and Site layout drawing and Typical Pipe Section
- Two filling lines (Diesel and Petrol) from filler boxes to tank inlet
- Two dispensing lines from (Diesel and Petrol) tank outlet to dispensers
- Two vent lines (Diesel vapour and Petrol vapour) from tank vent to vent stack.
- One vapour recovery line from the vapour recovery filler box to the Petrol vent piping in the Petrol tank sump.
- Piping to be installed with associated valves as per the Flow Diagram.

1.2.5 Electrical Works

The extent of the electrical works are detailed herewith in Annexure A.1 and is briefly summarised as follows:

- Installation of additional circuit breaker in the existing DB.
- Electrical supply connection from the existing DB
- Cable installation:
  - Power cables – Cu/PVC/SWA
  - Termination, glanding and make-off of cables
- Conduit Installation.
- Cable numbers for cables and labels for circuit breakers that form of the works.
- Excavation and trenching.
- Earthing installation:
  - System earth.

1.2.6 Concurrent Works:

- All inspections and testing relating to the construction and installation as per the requirements and specifications included hereto in this document. The Contractor is responsible for his own QA/QC activities and inspections and tests necessary to complete the works and verify its compliance with the specified codes and standards.
- All required Quality Control and Assurance in terms of the completion of the works in accordance with relevant Environmental, Quality, Safety and Construction standards
- Compilation of all data packs and as-built drawings.
- Management of water on site during construction with specific focus on the management of ground water and run-off during the excavation activities.
- Complete setting out of the works.
• Supply of all materials, consumables, plant, equipment, personnel and other services or items, temporary or permanent.
• Ensuring all material is fit for purpose including the checking and acceptance of material data packs etc. before delivering material to site.
• Transport ex-works.
• Transportation to site.
• Fabrication of all permanent and temporary structures and supports.
• Installation and construction.
• Quality Assurance in accordance with ISO standards.
• On and off site testing.
• Finishing.
• Protection of all works during construction.
• Rehabilitation of site and working areas.
• Safe working practises in accordance with the Occupational Health and Safety Act.

1.3 Temporary Works

The Contractor provides all temporary works required for the construction of the works.

Temporary works includes, but is not limited to the following:

• Site offices, stores, first aid, mess and ablution facilities;
• Test facilities on site (concrete and compaction);
• Scaffolding, tools and tackles and lifting equipment;
• Cranes and crane foundations (if needed);
• Shuttering required for all concrete works;
• Shoring for excavations where required;
• Supports required to ensure stability of any structures during their erection if required;
• Temporary supports as may be needed for piping and/or equipment during the installation thereof.
• The installation and maintenance of connections to the existing electrical and water supplies, provided by the Employer for the exclusive use during construction works.
• Temporary access into the excavation associated with the tank installation.
• Traffic management and accommodation measures implemented around the works area to ensure minimal disruption to the existing traffic flow and operations adjacent to the works area.
• Barricading of the works area.
• Temporary access to be provided to the bottom of the tank excavation for the duration for which such access is required. Access will comply with the relevant safety requirements and specification.

The Contractor shall be responsible to continuously clear and dispose of waste and surplus materials to maintain the site in a tidy state. All temporary structures, rubble, waste, off-cuts, etc. shall be cleared on a daily basis. Upon completion of the project, the site shall be cleared and cleaned to leave the area in the same clean condition as before the Contractor accessed the area.

2. ENGINEERING

2.1 Design Services and Activity Matrix

The responsibilities for the delivery of design documentation are as follows:

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<td>Detail Design of all earthworks, concrete works, segmented paving and stormwater drainage.</td>
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<tr>
<td>Preparation of data packs and end of job documentation</td>
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The Contractor is referred to section 2 of the Electrical works construction specification included hereto in Annexure A for the design services and activity matrix relating to the electrical works.

2.2 Employer’s Designs

All design information prepared by the Employer are contained in this Construction Specification and the drawings referenced herewith.
2.3 End of Job Documentation Requirements

Hard Copy Requirements

- The content of the test packs, QC packs and data books must be identified and indexed in a manner that enables easy identification of the listed content. The content within the file must be subdivided into numbered chapters and further into detailed documents.
- Chapters must be segregated by divider sheets. The number of a chapter and the title must be printed on the divider sheets.
- The files utilized to compile the printed copy/copies of the packs must be A4 sized lever-arch files with spine pockets provided in hard covered plastic. End pocket and inserts must be used.
- The test packs/QC packs must be handed over 2 weeks after RFC, in both hard copy and electronic format.
- Two sets of the test packs shall be provided.

Electronic Copy Requirements

- One (1) soft copy of each test pack, QC pack and data book shall be provided on CD/ DVD (re-writable)

3. CONSTRUCTION SPECIFICATIONS

The Contractor will complete the works in accordance with the specifications, requirements and drawings indicated in this Construction Specification.

In the event of any ambiguity or conflict between the requirements of the specifications included in this Construction Specification, the specification with the more stringent requirement will take precedence. However the Contractor will refer any ambiguities or conflict between specifications to the Employer’s Representative for clarification prior to commencing with the works.

3.1 Applicable National Standards

The following National Standards are applicable for the completion of the works. Any reference to the below standards are deemed to be a reference to the most recent edition of such
standard. Any reference to the standards below is deemed a reference to the Normative standards listed within the relevant standard where applicable.

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<td>The Structural use of Masonry Part 1: Unreinforced Masonry Walling</td>
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<td>SANS 1020</td>
</tr>
</tbody>
</table>

NOTE: All relevant, applicable requirements of the specifications, codes and standards referred to within the above listed specifications and codes shall also be deemed to be applicable.

The standards and specifications relevant to the electrical works are included in electrical construction specification attached herewith in Annexure A.1.

3.2 Drawings

3.2.1 Drawings prepared by the Employer

The Drawings prepared by the Employer are listed below and downloadable separately:

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Drawing Description</th>
<th>Drawing Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Location Plan</td>
<td>1197-C/A3-01101</td>
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<td>2</td>
<td>Site Layout Plan</td>
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<td>3</td>
<td>Setting Out Plan</td>
<td>1197-C/A1-02105</td>
</tr>
</tbody>
</table>
A copy of the drawings listed above is included herewith in Annexure B.1.

3.3 As Built Records and Drawings

The Contractor prepares, and keeps up to date at the Site, a complete and accurate set of “as-built” records in the course of providing the works. This will take the form of a “marked-up” copy of the Employer's and the Contractor's drawings as well as all originals.

The Contractor provides the Employer’s Representative with copies of all test results during the execution of the works.

4. PROVIDING THE WORKS

- The Contractor is responsible for the adequacy, stability and safety of his Site operations and method of construction employed by him.
- The Contractor ensures that the works are constructed in accordance with the requirements of this contract and good engineering and safety practices.
- The Contractor exercises due skill, care and diligence in providing the works. The standard of skill, care and diligence required is that of a Contractor seeking in good faith to perform his contractual obligations and in so doing and in the general conduct of his undertakings observing and/or exercising the degree of skill, care, diligence, prudence and foresight which would reasonably and ordinarily be exercised by a skilled and experienced Contractor in relation to his practices, methods, techniques, specifications and/or standards (whether in respect of construction, performance, safety, workmanship, equipment, components or
otherwise) engaged in the same type of undertaking under the same or similar circumstances and conditions to the works.

- The Contractor uses a sufficient number of appropriately qualified professionals, artisans and other individuals who are suitably skilled, competent and experienced in their respective trades or occupations and provides all necessary design, supervision to plan, arrange, direct, manage and inspect the works and generally for the satisfactory and safe execution of the works. Without limitation, supervision is carried out by a sufficient number of appropriately qualified persons who are suitably skilled, competent and experienced in the operations to be carried out (including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents).

- The Contractor represents that he is, and ensures that he is at all times fully experienced, properly qualified, registered, licensed, equipped, organized and financed to perform the works in terms of this contract.

- Except to the extent otherwise expressly stated in this contract:
  - the Contractor is considered to have satisfied himself, prior to the Contract date, as to the completeness and sufficiency of all information and drawings provided to him as at the Contract date;
  - the Contractor is considered to have satisfied himself as to the precise nature and exact location of the works, the type of Plant and Materials, Equipment and facilities and other items and matters required to Provide the works (and the Contractor's failure to so satisfy himself with all such data and information does not relieve his responsibility for properly estimating the difficulty or cost to successfully Provide the Works and he is not by reason thereof entitled to any extension of the completion date, adjustment of the prices or other compensation); and
  - the Employer is not responsible for the failure of the Contractor to understand the precise nature of his undertaking under this contract or for any erroneous interpretation concerning the conditions affecting his performance, it being recognized that the Employer provided the Contractor sufficient opportunity to ask the Employer for clarification of the terms and conditions of this contract prior to submission of his tender to Provide the Works.

- Compliance with Laws; The Contractor keeps himself fully informed of, and complies with all laws which apply to the works and/or to providing the works (including laws which apply to persons employed to Provide the Works). “Laws” includes all national and provincial legislation, statutes ordinances and other laws and regulations and
by-laws, orders and decrees of government or other legally constituted public authority and the common law.

4.1 Construction and Inspections

- The Contractor supplies all of the labour, materials, equipment and any other resource required to provide the works.
- The assigned fire chief needs to be consulted before construction commences, to ascertain what their involvement will be and what critical inspections they need to witness to be able to provide us with a Certificate of Registration for the handling, storage and use of flammable/hazardous substances in accordance with the Fire Brigade Services By-laws of the City of Tshwane Metropolitan Municipality.
- The approved drawings by the Fire council has the reference number F03/233/16
- The assigned Fire Chief is Mr James and can be contacted at 0834036380.
- As each part of the works is erected in stages, it will be inspected as required by the Employer's Representative. This may include the accurate plumbing, levelling, setting and aligning of the various sections. Prior to construction the Contractor ascertains from the Employer's Representative which parts are to be inspected. The Contractor informs the Employer's Representative when a sections needs to be inspected wherever it was identified for inspection by the Employer's Representative.

4.2 The Employer's Representative may request additional tests to be performed by an independent laboratory if he is of the opinion that the Contractors tests are incorrect. If the independent tests prove that the Employer's Representative is correct the Contractor will be responsible for the costs of the extra tests, otherwise the Contractor will be compensated.

4.2.1 General

- All materials used bears the official mark of the SANS or other relevant International standards as stated in the Construction Specification and complies with the latest revision of the relevant standard specification. The Contractor submits material certificates for all material to the Employer's Representative for acceptance prior to its use.
5. CIVIL WORKS

5.1 General

- The project specifications are detailed in SANS 1200 and SANS 2001 as more fully detailed and as amended herewith.
- Reference within SANS 1200 and SANS 2001 to the Engineer, is replaced with Employer’s Representative for the purpose of this project.
- The degree of accuracy of the works shall be II, as more fully detailed in the relevant sections of SANS 1200, unless otherwise specified herewith.
- The Contractor is notified that during the survey performed by the Employer during previous project phases, all underground services where identified as detailed in the layout drawings forming part of these works. No underground services are located directly underneath the new infrastructure or associated excavation perimeters.

5.2 Site Clearance – SANS 1200 Part C.

- For the purpose of this Specification, Site Clearance consists of the clearing and grubbing of the entire works area, as detailed in the project drawings.
- Clearing and Grubbing is defined as per clause 5.3 a) to e) of SANS 1200 Part C.
- The surplus material generated as part of the clearing and grubbing activities are transported and dumped at the location specified by the Employer’s Representative. The area is located within the boundaries of the National Zoological Gardens.
- The requirements of clause 5.4 of SANS 1200 Part C is replaced with the following:
  - All stumps and roots larger than 75mm in diameter is removed to a depth of at least 500mm below the original ground level.
- The Contractor removes the existing segmented paving and associated edge restraints as indicated on the drawings and in the areas where the new infrastructure will be constructed. The Contractor allows for the removal of a maximum of an additional 1000mm strip of existing segmented paving along the edge restraints to be removed and along the perimeter of the paving removed where new infrastructure will be constructed. All segmented paving blocks are removed with the necessary care and is stacked, where indicated by the Employer’s Representative, in such a way to allow for future reuse.
- Following clearing and grubbing the Contractor strips 150mm of topsoil from the areas where the new infrastructure will be constructed. The material is transported
and stockpiled at the location identified by the Employer's Representative. The location is within the boundaries of the National Zoological Gardens. The material is stockpiled to ensure preservation for future use, taking special cognisance of possible erosion due to surface run-off.

5.3 Earthworks – SANS 1200 Part DA

- For the purpose of this specification, Earthworks consists of all excavations required as part of the works, the preparation of the bottom of all excavations as well as the importation and placement of fill material under the reinforced concrete slabs. The importation and placement of fill material under the new segmented paved areas are detailed in the section relating to segmented paving.
- Further to the requirements of clause 3.1.2 of SANS 1200 Part DA, all excavations that are deeper than 500mm below the initial ground level will be considered as intermediate excavations. No hard excavation is required as part of this project.
- The Contractor takes all reasonable precautions to safeguard the excavations forming part of these works. Safeguarding is completed in accordance with the requirements detailed in clause 5.1.1.2 of SANS 1200 – Part DA, and the relevant requirements of the project health and safety specification.
- The use of blasting is not applicable to this project.
- Site Preparation shall be completed in accordance with the requirements for site clearance as detailed in this construction specification.
- Further to clause 8.3.1.b of SANS 1200 DA, the following items are scheduled:
  - Excavation and disposal of material. The rate allows for the excavations of material in accordance with the requirements of this project specification and the subsequent disposal of the material. The material is disposed at the site identified by the Employer's Representative. The site is located in the grounds of the National Zoological gardens.
  - Excavation, stockpiling and backfilling in sloped excavations. The rate allows for the excavations of material in accordance with the requirements of this project specification and the subsequent stockpiling, transport, offloading, backfilling and compaction of the material. The material is used as general backfill in the sloped sides of the tank excavation and separator excavations, where selected backfill is not detailed in the drawings. The material is backfilled in layers not exceeding 150mm after compaction to 90% Mod AASHTO.
• All material transported as part of the works will be regarded as Freehaul. No Overhaul is payable on this Contract.

• The Contractor Box cuts, excavates and removes from site all residual materials to at least a minimum depth of 250mm measured from the initial ground level, in all work areas.

• The Contractor completes any additional excavations required to the minimum depths necessary to construct the new infrastructure in accordance with the detail provided in the construction drawings.

• The Contractor allows for the excavation completed for the tank installations to be battered at an angle of 45 deg, starting at a depth of 1m above the bottom of excavation level. The excavation is further detailed in the relevant project drawings. The Contractor designs and maintains suitable temporary access to the bottom of the excavation for the duration as so required. The temporary access complies with all relevant health and safety requirements detailed in the project health and safety specification.

• The requirements of SANS 10089-3, clause 4.2.2 remain applicable to the tank excavation with the following amendments:
  - The reference to SANS 1200 D, in clause 4.2.2.1 is replaced with SANS 1200 DA.
  - The distances referenced in clause 4.2.2.2 and 4.2.2.3 is replaced with the distances detailed on the construction drawings.

• Payment reference X1 is included in the Bill of Quantities, and covers the costs associated with ripping the bottom of all excavations in the works area, and compacting the material to a minimum of 93% Mod AASHTO.

• Backfilling and the associated layer works are completed in accordance with the detail provided on the drawings. Where selected fill material is specified the material is procured and imported from commercial sources. The Contractor obtains approval for the use of the material from the Employer’s Representative prior to transporting the material to site.

• SANS 1200 DA, clause 8.3.4 is amended to include the following:
  - The rate shall further cover the costs of backfilling and compaction of the imported material in layers not exceeding 150mm following compaction to the levels specified on the relevant construction drawings.

• Backfilling around the tanks are completed in accordance with SANS 10089-3, clause 5.1.1, clause 5.2 a) and clause 5.3.
The level of compaction required on the fill material surrounding the tanks are detailed on the relevant construction drawings. No stabilisation of the backfill around the tanks as per clause 5.3.7 of SANS 10089-3 is required.

Payment reference X2 is included in the Bill of Quantities, and covers the costs associated with the lifting, positioning and placement of the Petrol and Diesel tanks. This includes all activities relating to levelling and stabilising the tanks while backfilling and compaction around the tanks are completed. Placement is completed in accordance with the requirements of SANS 10089-3 clause 5.3 as well as any supplier specific requirements. The costs associated with the procurement of the tanks are not included and is covered elsewhere.

Backfilling around the separator chambers are completed in accordance with the manufacturers requirements.

The level of compaction required on the fill material surrounding the separator chambers are detailed on the relevant construction drawings.

Following completion of all backfilling and in areas where segmented paving and concrete slabs will not be constructed the area is graded and landscaped to allow for adequate drainage of stormwater run-off. The Contractor takes care to continue, and tie-into the existing natural contours of the surrounding area.

Following the completion of the grading the Contractor reintroduces the topsoil stockpiled previously in all areas where segmented paving and concrete slabs will not be constructed. The topsoil is reintroduces the topsoil in accordance with clause 5.2.5.2.

The degree of accuracy for all earthworks will be II as defined in SANS 1200 D, clause 6.

The Contractor allows for density testing of all compacted material to be performed in the following frequencies:
- Tank Backfill Material – 9 tests for every 300mm layer of material compacted.
- Other Areas – A minimum of 1 tests for every 300mm layer placed for every 10m2.

5.4 Earthworks (Pipe Trenches) – SANS 1200 DB and SANS 1200 LB

For the purpose of this specification, pipe trenching consists of all earthworks relating to the installation of piping and electrical sleeves associated with the project. Earthworks includes the excavation of trenches, importation of selected fill materials, and general backfill of the trench.
• All excavations for pipe trenches are completed in accordance with SANS 1200 DB as amended herewith.

• The Quantities for activities relating to site clearance along the pipe trench routes have been scheduled under the site clearance section of the Bill of Quantities. This includes activities relating to the removal and stacking of two sections of segmented paving (each 3.5m long) over which trenches are routed.

• Further to clause 8.3.2.a of SANS 1200DB, the following trench types are identified:
  – 1120mm wide trench for the installation of 2no.of 90mm pipe or 2no.of 110mm pipe sleeves as well as an Earthing cable.
  – 640mm wide trench for the installation of 40mm pipes underneath tanks slab and the fill slab and inside the perimeter of the tank excavation. No additional excavation is allowed for, as it is assumed pipe placement and backfilling with occur concurrently with the backfilling of the tank excavation.
  – 640mm wide trench for the installation of 40mm pipes underneath the fill slab and outside the perimeter of the tank excavation. An additional excavation depth of between 300mm and 900mm is allowed for.
  – 710mm wide trench for the installation of the 110mm stormwater drainage pipes between the fill slab sump and the separator (5m) and separator and the new stormwater manhole (2m).

• SANS 1200 DB, clause 8.3.2 is amended to include the following:
  – The rate shall include the costs associated with the preparation of the trench bottom. Preparation of the trench bottom will include ripping the trench bottom and removing all material with a diameter in excess of 90mm. Following the removal of excess material the trench bottom will be compacted to 93% Mod AASHTO. Following preparation the trench bottom shall be sufficiently level and straight to allow for the pipe to be laid without any localised point loads and within the side allowance tolerances detailed in SANS 1200 DB.

• Detailed trench dimensions are as detailed within the construction drawings.

• The Contractor uses excavated materials as general backfill, where selected fill material is not specified on the drawings. The Contractor screens such backfill to ensure compliance to clause 3.5 of SANS 1200DB.

• The Contractor prepares the trench bottom, and places bedding and padding materials in accordance with the requirements of SANS 1200LB as amended herewith.

• SANS 1200 LB, clause 8.3.4 is amended to include the following:
The rate shall further cover the costs of placement of the bedding material within the trench in accordance with the construction drawings. Placement shall include all transportation, handling and compaction.

- The Contractor provides detail of the proposed material to be sourced for bedding, indicating the material’s compliance to this specification, for acceptance by the Employer’s Representative, prior to ordering the material.

- Bedding for all piping is Class B as per clause 5.2.2 of SANS 1200 DB.

- Bedding material complies with the following requirements:
  - Non cohesive material with a PI of less than 3
  - Plaster sand may not be used
  - No organic material
  - Grading as per attached table

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<thead>
<tr>
<th>Screen Size (mm)</th>
<th>Minimum percentage passing through</th>
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</thead>
<tbody>
<tr>
<td>3mm</td>
<td>100%</td>
</tr>
<tr>
<td>1.5mm</td>
<td>50%</td>
</tr>
</tbody>
</table>

- Following placement and testing of all pipes padding material is placed over the pipes as detailed in the construction drawings.

- Payment reference X3 is included in the Bill of Quantities, and covers the costs associated with the sourcing from commercial sources, transportation, placement and compaction of padding materials as detailed in the construction drawings.

- Padding materials comply with the requirements for bedding materials detailed above.

- An electrical cable intersects the trench route as indicated on the construction drawings. The Contractor takes the necessary care to identify the electrical service and exposes it through hand excavation. The Contractor takes care to handle and protect the exposed service for the duration of the works and reinstates the condition surrounding the service during closure thereof. The requirements of clause 5.4 of SANS 1200 A is applicable to this project.

- No overhaul is applicable to the transportation of material relating to trenching earthworks.

- Following completion of backfilling the Contractor reinstates the sections where trenching was routed over existing segmented paving. Layer works to these areas are completed to the same standard as specified on the construction drawings for
new paved areas. Costs associated with these layer works as well as the laying of segmented paving is scheduled in the Bill of Quantities section Segmented Paving.

- Density tests of the bedding material and main fill main are completed in 10m intervals, or where else directed by the Employer’s Representative.

5.5 Concrete Works – SANS 1200 G and SANS 2001 CC1.

- For the purpose of this Specification, Concrete works consists of the works associated with the construction of the reinforced concrete slabs, detailed on the construction drawings.
- For the purpose of this Contract concrete works items are scheduled and measured in accordance with the requirements of SANS 1200 G, and as set out in the project Bill of Quantities.
- All works are completed under the general requirements of SANS 2011 Part CC1 – Concrete Works (Structural) as amended in the project specification or indicated on the drawings.
- The Contractor is specifically referred to the detailed concrete notes indicated on the relevant concrete drawings, for project specific amendments.
- The Contractor presents for acceptance to the Employer’s representative, a complete set of mix designs, with representative 7day and 28day cube compressive strength results, for all grades of concrete to be used on the project prior to the concrete being order.
- Further to SANS 2001-CC1:2007 paragraph 5.1.3 a minimum of six samples (3 for 7 and 28 days) will be taken from a day’s production if more than 25 m3 is casted on the day. If offsite mixers are used samples will be taken of every truck entering the site for both concrete strength tests as well as a slump tests.
- Unless otherwise accepted by the Employer’s Representative, proprietary grouting materials is obtained ready mixed in sealed pockets as supplied by the manufacturers.
- The Contractor presents the information of the proprietary grout he proposes for use to the Employer’s Representative for acceptance prior to the use thereof.
- All joints are constructed in accordance with detail indicated on the drawings.
- Payment reference X4 is included in the Bill of Quantities, and covers the costs associated with the placement, positioning and temporary support of the materials itemised in order to allow the material to be cast-in as part of the associated concrete placement. The scheduled item does not make allowance for the procurement of the material as this is covered elsewhere. The material is positioned in accordance with
the requirements detailed on the drawings and as per any requirements detailed by the material manufacturer. The Contractor takes care to not damage the material during the placement, positioning, temporary support and associated concrete placement. During concrete placement the concrete surrounding the cast-in material is sufficiently vibrated to ensure all voids surrounding the material is suitably filled. The Contractor consults the material supplier all technical data relating to the material to be casted-in in order to ensure that all supplier technical requirements and work procedures are adhered to.

- The degree of accuracy for all concrete works will be II as defined in SANS 2001 CC1, clause 5.2.

5.6 Stormwater Drainage

- For the purpose of this Specification, stormwater drainage refers to the procurement and construction of the oily water separator system and the associated components. The system comprises the following:
  - Colvic drainage sump and metal grid
  - Colvic sand trap and composite manhole cover and lid.
  - Colvic separator tanks and composite manhole cover and lid.
  - All communication piping as provided by Colvic between the relevant components.
  - Concrete and masonry manhole.
- All components are positioned, assembled and constructed and as detailed in the construction drawings.
- Cost items relating to the trenching of stormwater piping is included in the Bill of Quantities relating to pipe trenching as 720mm pipe trenches.
- Cost items relating to earthworks, including excavation and backfilling for the stormwater drainage components are included in the Bill of Quantities relating to earthworks.
- Payment reference X5 is included in the Bill of Quantities, and covers the costs associated with the procurement, transportation and delivery of the components associated with the stormwater drainage system. The material complies with all requirements detailed as part of this specification.
- Payment reference X6 is included in the Bill of Quantities and covers the costs associated with the installation of the stormwater drainage system as procured above. The installation includes all requirements relating to the positioning of individual components, testing of components, connection of components, testing of
connections between components, support of system during backfilling, first fill and commissioning of system, as well as all other requirements detailed by the supplier. The installation is installed with full compliance to the requirements detailed by the supplier.

- Payment reference X7 is included in the Bill of Quantities and covers the costs associated with the construction of a new stormwater manhole. The stormwater manhole is constructed over the existing stormwater pipeline as detailed in the construction drawings. The existing stormwater pipeline is demolished within the confines of the new manhole once the manhole construction is complete. The manhole is constructed in accordance with the detail and specification provided with the construction drawings.

5.7 Segmented Paving – SANS 1200 MJ

- For the purpose of this Specification, Segmented Paving consists of the works associated with the construction of segmented paving, as well as the associated layerworks as detailed on the construction drawings.
- Segmented paving blocks used are of Class 35 and Type S – A, and complies with the relevant requirements of SANS 1058. Class 35 blocks when tested in accordance with Clause 7.4.1 of SANS 1200: MJ has an average wet strength of at least 35 MPa and individual blocks has a wet strength of at least 30 MPa
- The colour of the segmented paving bricks is selected to match existing and is presented to the Employer’s Representative for acceptance prior to ordering.
- All units are laid in Herringbone pattern, with edges matched to the existing segmented paving pattern.
- Approved pesticide is applied under all paved areas under bedding sand, to supplier requirements.
- The upper selected layer- and the subbase layerworks are as detailed on the relevant construction drawings.
- SANS 1200 MJ, clause 8.2.1 is amended to include the following:
  - The rate shall further cover the costs of supply, transport and placement of the relevant edge restraint detailed on the construction drawings. No separate items will be scheduled in terms of SANS 1200 MK.
- Payment reference X8 is included in the Bill of Quantities, and covers the costs associated with the construction of the Upper Selected Layer. The item covers costs associated with acquiring suitable material, transportation and offloading at the point of placement as well as the backfilling and compaction of the imported material in
layers not exceeding 150mm following compaction to the levels specified on the relevant construction drawings.

- Payment reference X9 is included in the Bill of Quantities, and covers the costs associated with the construction of the Subbase Layer. The item covers costs associated with acquiring suitable material, transportation and offloading at the point of placement as well as the backfilling and compaction of the imported material in layers not exceeding 150mm following compaction to the levels specified on the relevant construction drawings.

- Payment reference X10 is included in the Bill of Quantities, and covers the costs associated with processing the subbase relating to the stabilisation of the layer as detailed on the relevant construction drawing. For further reference refer to clause 8.3.5 of SANS 1200ME.

- Payment reference X11 is included in the Bill of Quantities, and covers the costs associated with providing the stabilising agent. For further reference refer to clause 8.3.8 of SANS 1200 ME.

- Stabilisation of the subbase layer is through the addition of 3% cement measured by mass. Stabilisation is performed and controlled in accordance with the requirements of TRH 13.

5.8 Miscellaneous Items

- Payment reference X12 is included in the Bill of Quantities, and covers the costs associated with the provision of 2no. of 9kg DCP fire extinguishers. The costs includes the procurement, transportation and installation of the units. The installation complies with the requirements detailed on the construction drawings.

- Payment reference X13 is included in the Bill of Quantities, and covers the costs associated with the provision of all safety signage as detailed on the drawings. The costs includes the procurement, transportation and installation of all signage. The signage type and installation method and position complies with the requirements detailed on the construction drawings.

- Payment reference X14 is included in the Bill of Quantities, and covers the costs associated with the provision of a firefighting hose reel and associated communication piping as well as the tie in to the existing water reticulation system. The costs includes the procurement, transportation and installation of all equipment and components. The installation is completed in accordance with the requirements detailed on the construction drawings.
– The Contractor connects the new communication line to the existing vertical riser pipe at the location detailed on the drawings. The connection is performed by the addition of a screwed Tee-piece from the riser pipe. An isolation valve is installed on the new communication pipe directly downstream of the tie in Tee-piece.

– The communication pipeline to the hose reel is run above ground and connected to the existing building wall. The Contractor is responsible to determine a suitable pipe route, taking the following into consideration:
  o All access points, vents, windows and air-conditioning units along the route shall not be affected.
  o The line shall be installed in a way that remains aesthetically pleasing and is similar to the installation of other firefighting piping in the building.

– The Estimate length of the communication pipeline between the tie-in point and the hose reel is 35m.

– All piping shall be in compliance with SANS 62-1 and SANS 62-2 and have a minimum pressure rating of 1200kPa.


– All piping and associated joints shall be leaked tested, against the relevant supply pressure after installation.

– All piping and fittings are painted Fire Engineer Red in accordance with SANS 10064 as well as the paint manufacturer’s specifications.

– The Contractor installs the hose reel with its primary direction of operation towards the new tanks.

**Payment reference X15 is included in the Bill of Quantities, and covers the costs associated with the provision of 4no.of observation wells as detailed on the drawings. The costs includes the procurement, transportation and installation of the observation wells. Installation includes the placement and support of the item during backfilling if the tank installation. The observation wells comply to the requirements detailed in the drawings as well as the requirements detailed in clause 5.1.2 of SANS 10089-3.**

**Payment reference X16 is included in the Bill of Quantities, and covers the costs associated with the provision and installation of 2no.of precast concrete bollards. The bollards are cast into the dispenser plinth as detailed on the construction drawings.**
6. MECHANICAL WORKS

Design, detailing and fabrication of piping shall comply with SANS 10089-3:2010.

The Contractor includes the cost of supply, fabrication, installation and testing of piping, pipe supports, and equipment.

Before the pipework system is backfilled, it shall be isolated from the tank(s) and pump/dispenser/vent/filler box and subjected to a hydraulic test with clean water at a pressure of 1000kPa. The pressure shall be maintained at the test pressure for 15 min and without leak or a drop in pressure.

6.1 Pipe Lines - Non Metallic Underground Piping Specification

- Pipes: All piping shall be capable of withstanding 1000 kPa positive pressure. Dispensing lines shall be capable of withstanding 60 kPa vacuum and a 70 kPa peak vacuum pulse. Vent and vapour recovery lines shall be capable of withstanding 10kPa vacuum pulse.
- Joint fittings: Only standard fittings approved by the piping manufacturer shall be used at joints. Joints for non-metallic piping can be of the metallic compression type or induction-welded type. Care shall be taken in both cases to match the variation in piping diameters.
- Pipework shall be laid out in a geometrical pattern and shall be indicated on the site plan of the Site. All non-metallic piping shall be laid out in accordance with the manufacturer's recommendations to accommodate expansion.
- Pipework shall have an adequate fall of at least 100:1 to the tank from the dispenser(s) or suction pump(s), vent(s) or breather(s), and fill point(s).
- Pipe material shall be single wall, fluorinated and be resistant to hydrocarbon permeation.
- The piping shall be Marley Petroplas or similar approved HDPE piping for Petrochemical applications. Supplier Installation instruction shall be followed.
- All HDPE piping shall be SDR17 PN10. The lines from the filler boxes to the tank and from the tank to the vents being DN 90. The lines from the tank to the dispenser shall be DN 40.
- All HDPE electrofusion welding as per SANS 10268-2 (2004). All HDPE electrofusion welders to be qualified to SANS 10269 (2015).
6.2 Pipe Lines - Galvanised Metallic Piping Specification:

- Threaded steel piping shall comply with the requirements of SANS 62 (2013) medium piping. All pipes and fittings shall be galvanized and repairs to damaged galvanised coating shall be performed where required.
- All metallic piping shall be rated for at least 1000kPa. The lines from the filler boxes to the tank and from the tank to the vents including the vents shall be 80mm Nominal diameter medium pressure piping. The lines from the tank to the dispenser shall be 40mm Nominal diameter medium pressure piping.
- In transition from non-metallic piping to steel where vents exit the ground at vertical vent pipe positions, the piping shall be suitably protected from corrosion using Denso wrapping or similar approved corrosion protection.
- Any metallic piping that is not either above ground on inside the tank sump, dispenser sump or inside the filler box shall be suitably protected from corrosion using Denso wrapping or similar approved corrosion protection.
- Flanged transition joints shall be used in transition from non-metallic piping to steel inside the tank sump.
- Only threaded mild steel fittings shall be used. Unions shall be cone-faced and shall be allowed for on each metallic pipe section between fixed points.
- Pipe threads shall comply with the requirements of SANS 1109 (2005) or another approved standard.
- Fittings; Elbows, Tees and Unions shall comply with BS 1740 or another approved standard.
- Flanges shall be SANS 1123 - 1000/4, other standards may be used when connecting to equipment or valves provided that the pressure rating is at least 1000kPa.
- Gaskets shall be graphite type and suitable for petrochemical service and shall be new and unused.
- No welded joints on galvanised piping shall be permitted without prior approval for the employer’s representative.
- Tank vent outlets shall be at least 3,5 m above ground level and/or 600mm higher than a roof, if installed next to a roof.
- The Contractor to include the cost of supply, fabrication, installation of supports, to the support the vent pipes next to the buildings. Horizontal supports to be spaced a minimum of 3m.
- The end of the vent piping shall be fitted with a vent that vents horizontally, prevents water from entering the pipe systems and has a bird screen.
6.3 Mechanical Equipment

6.3.1 Supply and Installation of tanks

- The Contractor shall supply and install Storage Tanks as per datasheets and Scope of Supply in Annexure C. Installation shall be in accordance with manufacturers recommendations.
- The tanks shall be supplied with a gauge hatch with dipping pipe on each with a calibrated dipping stick.
- Tanks shall have an overfill protection with a plug inspection point on the connection piping that allows access to the over fill in the event that the overfill protection is lodged closed.
- Tanks shall have wet leak detection with remote alarm. The Contractor shall also provide for the filling of the tank double skin with a glycol/water fixture.

6.3.2 Supply and Installation of Dispensers

- The Contractor shall supply and install the Dispenser as per Scope of Supply in Annexure C. Installation shall be in accordance with manufacturers recommendations. The dispenser shall be manually lockable or pad lockable and shall comply with SANS 1020 and SANS 10089-3.

6.3.3 Supply and installation of Filler boxes

- The filler shall have Barrett type couplings, the Diesel filler box shall have a 4" 18 tooth Barrett type Coupling, the Petrol filler box shall have a 4" 12 tooth Barrett type coupling. The vapour recovery filler box shall have a Vapour Coupling. All filler box Couplings shall have dust caps attached with stainless steel cable.
- Filler boxes shall have a side entry and shall be designed to be invulnerable to water ingress.
- The filler box shall have a capacity of at least 35 litres.

7. ELECTRICAL WORKS
The project specific specifications relating to the execution of the electrical works are included herewith in Annexure A.1.

8. SITE ESTABLISHMENT

8.1 Facilities provided by the Contractor

- The Contractor allows for his site establishment area within the area indicated for such use by the Employer’s Representative. The area is located within the grounds of the National Zoological Gardens.
- The Contractor is responsible for establishing a level area for his Site establishment requirements including (as applicable) construction offices, storage areas, warehouse, machine and repair shops, power and water distribution lines. Levelling of the area does not impact the existing drainage patterns of the area. Any damage to the levels and to the segment paving is repaired by the Contractor. The area designated for the Contractor’s use for this purpose is identified to him by the Employer’s Representative. The area is located within the grounds of the National Zoological Gardens.
- The Site Establishment area is established in such a way to limit any impact on the movement associated with the daily operations of the Employer in the surrounding area.
- Temporary buildings and sheds are of a standard acceptable to the Employer’s Representative for this category of building. Old and dilapidated structures will not be permitted to be erected on the Site or if erected in conflict with these requirements shall be removed within 24 hours of receipt of written notification from the Employer’s Representative to do so.
- Temporary Ablution facilities and First aid services and SHERQ requirements are provided in accordance with the SHERQ specification of the Employer and complies as a minimum to the Occupational Health and Safety Act and the Construction Regulations.
- On Completion, temporary buildings constructed by the Contractor are completely demolished, including all foundations and the ground reinstated. Underground services to these buildings, if any, shall be removed.
8.1.1  **Facilities for the Employer’s Representative**

The Contractor provides free access to his and his Sub-Contractor’s facilities for the Employer’s Representative, Employer and the Employer’s Inspectors.

The Contractor makes allowance for the provision of one office for use by the Employer’s Representative. The office is furnished and air-conditioned.

8.1.2  **Temporary Electrical and Water Connections**

- The Contractor allows for the temporary connection of water and electrical take-offs from the supply provided by the Employer. The Employer provides these utilities to the Contractor free of charge, for the duration of the project, and for the exclusive use of activities directly associated with the construction works. The Contractor provides a suitable meter at each of the take-off’s to monitor consumption. Consumptions values are recorded by the Contractor and the Employer’s Representative at intervals determined by the Employer’s Representative, but not less than once a week. Excessive or miss-use of any of the utility services will be charged to the Contractor, at the rates charged by the Municipality of Tshwane for similar service.

- All temporary electrical wiring for construction purposes is provided by the Contractor and the installations comply with all appropriate statutory regulations. Wiring is of an accepted type suitably fixed, protected (electrically and mechanically) and maintained. All cables are suitably protected to avoid damage from on Site activities and vehicle movements. All necessary precautions are taken to ensure the safety of every person employed or working on the Site and this includes routine inspection of all temporary installations and portable equipment. Any cables enclosed in a metallic sheath are effectively earthed.

- The Employer’s Representative will require the immediate disconnection or alteration of any parts which he considers may be dangerous.

- As soon as any part of the Contractor’s temporary electrical and/or water installation is no longer required for the carrying out of the Works, the Contractor disconnects and removes same to the satisfaction of the Employer’s Representative.

- The Employer accepts no responsibility for the consequences which may result from the cessation of the supply of electricity.
8.1.3 Accommodation

- The Contractor is responsible for the provision of accommodation and messing for all persons engaged in the execution of the works. This includes the needs of his Sub-Contractors.
- Accommodation on Site is prohibited.
- The Employer reserves the right to inspect these dwellings from time to time, and if necessary with health or other inspectors of the local authority. Any non-conformance is rectified by the Contractor at his cost. The Contractor is responsible for and is considered to have satisfied himself as to the requirements of, and to have allowed for all acceptances as may be required for the establishment and provision of temporary accommodation prior to construction starting.

8.1.4 Transport of Personnel to Site

- The Contractor makes his own provisions for the transport of his and his Sub-Contractors workforce to Site.
- Without limiting the Contractor’s other obligations under this contract relating to transport of persons, the Contractor ensures that Contractor’s workforce are transported only in licensed and roadworthy vehicles, driven by licensed drivers, which are fit for purpose, properly maintained and which comply with applicable laws as a minimum.

8.2 Storage and laboratory facilities

8.2.1 Storage Facilities

- The Contractor is allocated areas on Site specifically for office facilities and storage of Equipment and Plant and Materials. He is responsible for keeping such areas and temporary buildings in a clean, sanitary and orderly condition and for their security.
- Storage facilities for Plant and Materials are well ventilated, weather and damp proof, with floors raised off the ground to keep materials dry and well aerated, and are
subject to the acceptance of the Employer’s Representative, who has full access at all reasonable times to the said facilities.

- Site buildings are maintained in good condition and appearance for the duration of the Contract, and kept free of litter or other debris.
- Plant and Materials, including all components, are stored at Site in such a way as to minimise the risk of deterioration and ensure ready inspection.
- Schedules of location, inspection and rectification of damage are kept by the Contractor on Site.

8.2.2 Laboratory Facilities

- The Employer’s Representative, Employer, and their team have free access to the Contractor’s laboratory and testing facilities on Site.
- The Contractor may make use of commercial laboratories but will instruct such laboratories to provide the Employer’s Representative with access to all results and provide proof of the competency of his personnel working on the works as well as the calibration certificates of the test equipment.

8.3 Notice Boards

The Contractor is permitted to display one notice boards advertising this contract on or near the Site or access points to the project area. The notices are of a form and in a position accepted by the Employer’s Representative and include details of other parties involved (including the Employer) as well as the Contractor. No advertisement shall be displayed without the acceptance of the Employer’s Representative.

9. SITE USAGE

Specific areas of the Site are defined and designated as follows:

- The working areas required for construction including temporary and permanent access roads;
- The areas required by the Contractor for the establishment of facilities such as workshops, storage, plant and equipment, fuel depots and other sensitive facilities, offices and other facilities required by the Contractor in fulfilment of the Contract;
• Other areas of the Site not specifically defined but which may be required by the Contractor for the temporary location of other plant and facilities shall be subject to the prior acceptance of the Project Manager regarding extent, access, programme and layout;

• If required by the Project Manager, certain areas are demarcated as “no go” areas and appropriate signage and fencing shall be erected;

• The Contractor does not use the Site for any purpose other than that of executing the works or for that purpose for which it has been designated and confines his operations to within these areas unless otherwise accepted in writing by the Project Manager.

9.1 Contractor to Keep Site Clear

• The placing of Plant and Materials near the erection Site prior to their being erected and installed is done in a neat, tidy and safe manner. The Contractor, at his own expense, keeps the Site clean and tidy and clear of any wreckage, waste material and rubbish resulting from the works as it accumulates and, subject to the written accepted of the Project Manager first being obtained, removes Equipment when no longer needed.

• Without derogating from the health, safety and environmental requirements stated elsewhere in this contract, all substances, materials and wastes are stored in a manner that complies with the requirements of the applicable law and regulatory authorities. The Contractor prevents any land degradation or contamination of the Site as a result of improper storage of materials and/or inappropriate disposal of wastes. All waste arising from the implementation of the Works is disposed of by the Contractor in accordance with the requirements of this contract.

9.2 Final Clean-Up

Before Completion is certified, the Contractor, at his own expense, removes all wreckage, waste material and rubbish resulting from the works and, subject to the written of the Project Manager first being obtained, all Equipment and executes such works as are required to ensure the Site is left clean to the satisfaction of the Project Manager.
10. MATERIALS

10.1 Materials supplied by the Employer

No materials are free issued by the Employer as part of this project.

10.2 Materials supplied by the Contractor

The Contractor supplies all equipment and materials for the project.

10.3 Equipment and materials

All equipment and materials provided by Contractor, when brought to the Site, are deemed to be needed for and exclusively intended for the execution of the works and the Contractor does not remove the same or any part thereof, except for the purpose of moving it from one part of the Site to another, without the permission of Employer.

Contractor takes every precaution to ensure the safe and efficient handling of equipment and materials and is entirely responsible for their safe custody and freedom from damage until Completion.

10.4 Equipment standards

All equipment supplied as specified in the Construction Specification shall be new and of best quality and shall adhere to:

- Latest editions of the relevant SANS or similar accepted Specification.
- Requirements as detailed in the Construction Specification
- Occupation, Safety and Health Act, as amended.

10.5 Certificate of Compliance

A Certificate of Compliance shall be issued by the Contractor for each electrical connection that exceeds 50Volt ac/dc. This includes the following:

- Electrical connections between electrical distribution boards.
- Solenoid and valve supply or control cable if the voltage exceeds 50V.
- Electrical feeder to electrical loads.
A single COC shall be issued for each individual electrical connection. Each COC shall be individually numbered in terms of the Regulations.

The COC shall signed by a Master Electrician in terms of the Electrical Installation Regulations (Clause 7).

Further detail in this regarded is included in the electrical contractor specification included in Annexure A.1.

10.6 Quality of equipment

All equipment and materials are new, unused, free from defects and imperfections, of first class commercial quality, and follow the best modern practice in the manufacture of high-grade products of the type to be furnished.

All equipment and materials delivered to Site are clearly marked and be accompanied by the data sheets and/or material certificates.

Notwithstanding any omission from the Construction Specification, equipment and materials are of the class most suitable for the purpose specified and withstand ambient conditions and the variations of temperature arising under working conditions without distortion, deterioration or undue strains in any part, such as to affect the efficiency and reliability of the works, and the strength and suitability of the various parts for the work they have to perform.

All parts are made accurately, and where practicable, to standard gauges so as to facilitate replacement and repairs.

11. PERMITS AND WAYLEAVES

The Contractor is responsible for all taxes in connection with the works and the Contractor obtains, at his own cost, all permits, approvals and/or licenses for the Works.

For the purpose hereof “taxes” means any present or future tax, levy, impost, duty, charge, fee, deduction or withholding tax of whatever nature (including, without limitation, any stamp duty, income tax, sales tax, value-added tax, custom, import or export duty or excise tax, property tax,
registration fee or license and any water, sanitary, lighting, environmental, energy or fuel tax or levy) which is levied, collected and/or assessed in any jurisdiction at any time, and any interest, penalty, charge, fee or other amount imposed, collected, withheld, assessed or made on or in respect of any of the above.

12. SURVEY CONTROL AND SETTING OUT OF THE WORKS

- The Contractor is responsible for the true and proper setting out of the works in accordance with the original points, lines and levels specified in the Construction Specification or notified by the Employer’s Representative.
- The Contractor is responsible for the correct position of all parts of the works and rectifies, at his cost, any error in the positions, levels, dimensions or alignment thereof.
- The Employer is responsible for any errors in the specified or notified items of reference but the Contractor takes reasonable steps to verify their accuracy before they are used. These reasonable steps include but is not limited to setting out and verifying dimensions as well as orientation prior to any construction commencing, should any discrepancies be noted by the Contractor this will be notified to the Employer’s Representative without delay.
- After works have been set out and verified by the Contractor, he will notify and request inspection of such works by the Employer’s Representative. No construction works of any kind will be allowed without the prior acceptance in writing of the correctness thereof by the Employer’s Representative. The Contractor makes allowance for this in his planning activities.
- The Contractor allows adequate time for the notice in writing to the Employer’s Representative of at least 48 hours of his intent for the setting out of the works to be verified and checked.

13. QUALITY MANAGEMENT

13.1 Methods and procedures
13.1.1 **Methods of Working**

- The *Contractor* may execute the contract in accordance with his own standard work execution plans and procedures to the extent that they do not conflict with the provisions of this Specification.
- All Materials and supplies detailed in this specification are suitable for and where necessary, specifically treated and processed for delivery, storage and service in the expected environment.
- The Equipment and *Contractor’s* methods of work are at all times such that the *Employer* can be reasonably satisfied that the results will be acceptable and achieved without undue risk to personnel involved.
- All Equipment and tools used in the completion of the works are diesel driven. No Petrol Driven equipment or tools are allowed.
- All equipment, machinery and tools are in accordance with the relevant Occupational Health and Safety requirements and are inspected and controlled accordingly.
- The *Contractor* takes appropriate measures to protect the works from adverse effects of weather during construction.
- All reasonable precautions to prevent any outbreak of fire shall be taken.
- Notwithstanding any omission from this specification, the works are performed and completed in a proper and workmanlike manner, by craftsmen skilled in their respective trades.

13.1.2 **Method and Resource Statements**

- The *Contractor* bi-weekly or, whenever required by the *Employer*, submits details of the resources, arrangements and methods which the *Contractor* proposes to adopt for providing the *works*. Without limitation, method statements show how the technical and safety requirements of this contract will be satisfied by the methods to be adopted.
- No significant alteration to these resources, arrangements and/or methods is made unless it is first accepted by the *Employer*.

13.2 **Quality Plans and Quality Control**
• The Contractor has a well-organized quality control and assurance system based on ISO 9000 Series (or equivalent acceptable to the Employer) to assure that items and services, including subcontracted items and services, comply with this specification.

• The Contractor includes in all his orders to Suppliers and Sub-Contractors a note stating that materials and plant provided are subject to inspection and acceptance by the Employer’s Representative.

• Within two weeks of the Contract date, the Contractor submits his complete quality control and assurance system (with all quality control and assurance procedures and manuals) for review and acceptance by the Employer. The manual includes pro-forma checklists for all requirements of the Contractor’s quality control and assurance program and those called for in the Construction Specification.

• Acceptance by the Employer of the Contractor’s quality assurance programme, quality plans and/or inspection and/or test plans, or of those of his Sub-Contractors will not relieve the Contractor of his obligation to provide goods and services which meet the requirements of the Contract.

• Before any work commences, a detailed Quality Control Plan (QCP) is developed by the Contractor. All QCP’s are submitted to the Employer for comment and acceptance prior to the work commencing.

• This QCP details every activity of the project, from Design to Construction, Health and Safety, Environment and Commissioning. The following is contained in the QCP as a minimum:
  - Quality Procedure Number.
  - Description of each activity.
  - Relevant code / document applicable to this activity.
  - Project specification.
  - Activity Control and Intervention points:
    o Hold Point.
    o Review.
    o Witness.
    o Surveillance.
    o Verification.
  - Party required to sign the activity off.

• Workmanship is subject to acceptance by the Employer’s Representative, and subjected to tests as the Employer’s Representative may require. The relevant tests are as detailed in this specification as well as those referenced in the standards specified herewith. Works which the Employer’s Representative deem necessary to inspect will be detailed by the Employer’s Representative during the review and
acceptance of the Contractor’s quality plans. The Employer’s Representative reserves the right to request additional test or complete additional inspections not detailed in the quality plan or QCP.

13.3 Environment

The Contractor adheres to all conditions and requirements of the Environmental Management Plan included herewith in Annexure D.1.

13.4 Testing, Completion, Commissioning and correction of defects

All tests are carried out according to the relevant codes and specification and as detailed in the Contractor’s quality control plans and QCP’s. More specifically all tests are clearly referenced on site in order that tests results can be attached to specific sections of the Works.

The Employer's Representative is notified in writing at least 48 hours in advance of any tests or inspections which are required.

The contractor needs to notify the assigned fire chief upon completion of the works, for him to satisfy himself with the installation and its compliance to relevant specifications and approved drawings. The contractor will then request and obtain a valid “Certificate of Registration” for the handling, storage and use of hazardous substances in accordance with the Fire Brigade Services By-Laws of the City of Tshwane Metropolitan Municipality, before filling and commissioning procedures may commence.

The commissioning of the works is done by the contractor with relevant commissioning assistance given by the Employer or Employer’s Representative. The commissioning procedure shall be submitted to the Employer’s representative and approval shall be required before commissioning may begin.
ANNEXURE A.1
ELECTRICAL CONSTRUCTION SPECIFICATION
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1. DESCRIPTION OF THE SCOPE OF WORK

1.1 Employer’s objective

The Employer (NZG – National Zoological Gardens of South Africa) needs to supply vehicles with both diesel and petrol. For this purpose the existing fuel dispenser system and tanks need to be upgraded. The upgrade includes both mechanical and electrical work.

Fuel will be delivered via road like a normal fuel service station. They will not re-sell the fuel as it is only for their own use.

This Specification covers the Electrical, Control and Instrumentation (EC&I) Scope of Work. The EC&I Scope of Work entails the supply, delivery and installation of the material and equipment required for the new dispenser unit to be installed.

A Mechanical Flow Diagram of the new facility is attached as an Annexure. Site layout drawings and a Single Line Diagram are also included in the Annexures.

1.2 Overview of the EC&I Scope of Work

This Specification for the EC&I equipment, plant and material covers the detail installation design, equipment, manufacturing machinery, labour, fabrication, factory acceptance testing and inspection, quality assurance, transport to site, delivery, off-loading, installation, site testing, commissioning, initial maintenance, guarantee and handing over to the Employer in a satisfactory operating condition, the material and equipment consisting of:

- Installation of additional Circuit Breakers and Contactor in the existing DB.
- Electrical supply connection from the existing Distribution Board.
- Emergency stop button.
- Cable installation:
  - Power cables – Cu/PVC/SWA.
  - Termination, glanding and make-off of cables
- Conduit installation.
- Tags (Traffolyte labels) for dispenser.
- Cable numbers for cables and labels for circuit breakers that forms part of the Scope of Work.
- Excavation and trenching.
- Earthing installation:
  - System earth.

The design, manufacture, testing and delivery of the equipment and material shall comply with the specifications provided in this Specification.
The above is a summary of the scope of the EC&I Scope of Work. The detail specification of the material and equipment required is specified in the following sections of this document.

1.3 General Items related to the EC&I Scope of Work
Apart from the general items required as per the main Contract, this Specification for the EC&I Scope of Work include the following additional general items:
- Detail material and equipment installation engineering (and design).
- Site QC documentation for each tagged electrical item and instrument.
- Catalogue and data sheets for the equipment supplied as part of the Scope of Work.
- Certificates of Compliance (COC) for each electrical feed/connection.

The above is a summary of the scope of the general items that forms part of the Scope of Work.

1.4 Construction Hold-points
Construction Hold-points shall be applicable to the following activities:
- Earthing installation hold points:
  - After completion of the trenching or any excavation for earthing.
  - After laying the earth cable in the trench or excavation just before back filling.
  - To check the earth connections to the reinforcing (rebar) of the slab, before the concrete is poured.

At the required hold points the Contractor shall inform the Employer’s Representative that the hold point is reached and the required inspection needs to be performed. The maximum time period required for a hold point is 5 working days after which the Contractor may continue with the Scope of Work. The Employer’s Representative shall be notified one week in advance of the required release of the hold point.

1.5 EC&I Scope of Work Exclusions
The following items are excluded from the Scope of Work:
- Maintenance on the existing Distribution Board.
- Work or maintenance on any other part of the plant not included in this Specification and drawings.

No inventory management system is included at this stage.

2. GENERAL PROJECT REQUIREMENTS
   2.1 Engineering
The responsibilities in terms of the design documentation required for the material and equipment to be supplied and delivered in terms of the *Scope of Work* are as follows:

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>RESPONSIBILITY</th>
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<tbody>
<tr>
<td>Site Layout Drawing</td>
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<td>Site Earthing Diagram</td>
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<td>Single Line Diagram</td>
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<td>Hazardous Area Classification Drawing</td>
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<table>
<thead>
<tr>
<th>DESCRIPTION</th>
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<tr>
<td>Final cable routes on site</td>
<td>Contractor</td>
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<tr>
<td>Detail equipment site installation design:</td>
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<tr>
<td>Cable ladder installation design</td>
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<tr>
<td>Cable support and sleeve design</td>
<td>Contractor</td>
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<td>Lifting and fixing of material and equipment</td>
<td>Contractor</td>
</tr>
<tr>
<td>Commissioning</td>
<td>Employer/Contractor</td>
</tr>
<tr>
<td>Red-lining of Employer supplied drawings for as-build</td>
<td>Contractor</td>
</tr>
</tbody>
</table>

All design information prepared by the *Employer* is contained in this Specification.

### 2.2 Installation Design

Installation design for which the *Contractor* is responsible in terms of the Specification includes the following material and equipment design aspects:

- Proper fixing of panels and boards with the correct size fixtures.
- Fixing of cable ladders and stands to walls and the floor (or on a plinth).
- Routing of cables along the main cable routes indicated on the drawings.
- Using suitable supports for cables along the main cable route.
- Suitable supports for electrical material, equipment and instrumentation.
- Ensure male and female threads are compatible.
- Proper strapping of cables to the supports without damaging the cables.
- Use of proper tools for the correct application.

### 2.3 Equipment Standards

All equipment supplied as specified in the Specification shall be new and of best quality and shall adhere to:

- Requirements as detailed in the Detail Scope of Work.
- Occupation, Safety and Health Act, with all the applicable Regulations as amended.
- Latest editions of the relevant SANS, IEC and BS Standards and Specifications.
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<thead>
<tr>
<th>Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>SANS 10089-1</td>
<td>South African National Standard, Storage and distribution of Petroleum products in above ground bulk storage installations.</td>
</tr>
<tr>
<td>SANS 10142-1</td>
<td>The wiring of Premises</td>
</tr>
</tbody>
</table>

2.4 Site Conditions

2.4.1 General

All equipment and material are suitable for application and continuous operation under industrial conditions and an explosive atmosphere as contained in this section.

2.4.2 Electrical Conditions

Material and equipment concerned are rated for service under the following conditions:

- LV rated nominal voltage 400/230Vac, 3-phase.
  Fault level: 5kA.
- Rated frequency 50 Hz.
- Voltage / frequency fluctuation up to + 5% for Voltage / + 2 % for frequency.

2.4.3 Hazardous Area Classification

The site area is classified in accordance with the applicable SANS codes and standards (SANS 10089 & 10108). The classification is also based on the requirements of the American Petroleum Institute RP505 document.

The hazardous area classification is based on the fuels handled on site. The material safety data sheets are available if required by the Supplier. The flash point of the fuels handled on the site are Petrol (ULP95) and Diesel 50 (SANS 10108: 2005; 4.2.2):

- Class I
- Class II(1)

The mixtures of flammable gases or flammable vapours are (SANS 10108: 2005; Table A.1, Gas Group):

- Subgroup IIA

The maximum allowable surface temperature will depend on the lowest auto ignition temperature of fuel handled, which is Diesel at 257°C. The temperature class is (SANS ARP0108: 2007 Table B.1):

- T3

Some areas on the site shall be classified for Zone 0, Zone 1 and Zone 2 as indicated on the Hazardous Area Classification drawing. All equipment to be installed in these areas shall be
duly classified and certified for use in such areas:

- Explosion Proof  Ex-d  IIA  T3
- Intrinsic Safe  Ex-i  IIA  T3
- Increased Safe  Ex-e  IIA  T3
- Non-sparking  Ex-n  IIA  T3

The Contractor shall ensure that all personnel that work under this Contract, do not:

- Use uncertified equipment in the hazardous areas.
- Smoke in the hazardous areas.
- Bring cellphones on site.

Any work near the existing flammable liquid stores or other existing hazardous areas will be subject to the issuing of Hot Work Permits by the Employer.

2.5 Quality of Equipment

All equipment and materials are new, unused, free from defects and imperfections, of first class commercial quality, and follow the best modern practice in the manufacture of high-grade products of the type to be furnished.

All equipment and materials delivered to Site are clearly marked and accompanied by the data sheets and/or material certificates.

Notwithstanding any omission from the Specification, equipment and materials are of the class most suitable for the purpose specified and withstand ambient conditions and the variations of temperature arising under working conditions without distortion, deterioration or undue strains in any part, such as to affect the efficiency and reliability of the Scope of Work, and the strength and suitability of the various parts for the work they have to perform.

All parts are made accurately, and where practicable, to standard gauges to facilitate replacement and repairs.

2.6 Acceptance Tests

Material and equipment that forms part of the Scope of Work shall be subject to the following testing procedures prior to acceptance by the Employer:

- Contractor Internal Testing (CIT) – Prior to FAT and SAT; attended by the Employer’s Representative.
- Factory Acceptance Testing (FAT) and inspection prior to delivery to site; attended by Employer and Employer’s Representative.
- Site Acceptance Testing (SAT) and inspection prior to commissioning on site; attended by
Employer, Employer’s Representative and Others.

Site acceptance testing shall be performed by the Contractor with Others after installation of the material and equipment.

After completion of each of the acceptance test procedures, the Contractor will rectify all deviations and non-conformances as listed on a Punch List.

2.7 Delivery
After completion of the FAT, the Contractor will deliver the equipment and material to site to the Contractor’s construction site store.

The material and equipment shall be suitably packaged, crated and wrapped as applicable, to protect the equipment during transport to the delivery address.

After delivery, the equipment shall be:
- Moved into position.
- Fixed and secured.
- Levelled and bolted down.
- Connected.
- Site tests and loop checks performed.
- Site commissioning assistance after connection of all cabling.
- Final commissioning assistance after completion of the installation work.

2.8 Commissioning
The Contractor shall be responsible for the testing and commissioning of the material and equipment installed and connected by the Contractor, together with Others. A copy of the commissioning procedures applicable to this project will be available prior to commissioning of the system. These will be issued by the Employer’s Representative or Employer to the Contractor during construction.

Commissioning shall be performed in the following stages in collaboration and cooperation together with Others:

1) **Loop/cable testing**
The Contractor shall be responsible to test each instrument loop and motor drive cable with Others to ensure all loops and cables are correctly done and connected. Each loop shall be signed off for correct operation with the relevant test results noted. The Contractor shall be responsible to test each motor drive with Others to ensure all drives are correctly controllable. Each drive shall be signed off for correct operation with...
the relevant test results noted.

2) **Start-up commissioning**

The *Contractor* with Others shall be responsible to expedite all the necessary tests prior to cold commissioning. All these tests shall be witnessed by the *Employer’s Representative*. Test certificates shall be signed off by the *Contractor* and Others, including the *Employer’s Representative*.

3) **Cold commissioning**

The *Contractor* shall be responsible to expedite all the necessary tests with Others in the presence of the *Employer’s Representative* to proof the basic sectionalized operation of the system. These tests shall be done without the process being activated. After cold commissioning the installed hardware shall be signed off for:

- Instrument Completion – IC
- Electrical Completion – EC

4) **Hot commissioning**

Prior to hot commissioning, all sub-systems are to be completed and the relevant completion certificates signed. Electrical and instrument completion certificates are to be signed off before hot commissioning can proceed. Only after all completion certificated are signed shall the Employer issue a ready for commissioning certificate (RFC). The *Employer* with the *Contractor* and Others shall be responsible to expedite all the necessary tests to proof the live operation of the system with the process operational. These tests shall be performed to proof that the total system as designed, do comply to the necessary requirements.

Commissioning certificates will be completed and signed off for each material and equipment item.

The *Contractor* will provide all test equipment and manpower needed for the commissioning of the material and equipment supplied and installed as part of this *Contract* – this excludes the free issued items.

All tests are carried out according to the relevant codes and specification.

*Employer* is notified in writing at least 7 days of any final tests or inspections which are required. For all other intermediary inspections, 24 hours notice is required.

The commissioning of the *Scope of Work* is done in accordance with the relevant codes and specification. The relevant *Employer* QMS procedures that must be adhered to is available in PDF format.

2.9 **Setting out of the Scope of Work**
The Contractor is responsible for the true and proper setting out of the Scope of Work in accordance with the original points, lines and levels as:

- Specified in the Specification.
- Notified by the Employer’s Representative.
- Indicated on the drawings.

Contractor is responsible for the correct position of all parts of the Scope of Work and rectifies, at own cost, any error in the positions, levels, dimensions or alignment thereof.

Employer is responsible for any errors in the specified or notified items of reference but Contractor takes reasonable steps to verify their accuracy before they are used.

2.10 Drawings and Diagrams

2.10.1 Drawings by Employer

The drawings included with the Specification are prepared by the Employer.

The Contractor will base the installation design and work on these drawings. The drawings are available to the Contractor for red-lining. It will be updated by the Employer.

All other drawings required for the installation and the equipment and material to be provided, shall be prepared by the Contractor.

2.10.2 Drawings by Contractor

During the progress of the Scope of Work, the Contractor shall keep detailed records noting the positions and details of all new materials, apparatus, components, equipment, together with the relative positions of any existing materials, apparatus, components, equipment, plant and services or obstructions which may be exposed by excavations for said new materials, apparatus, components, equipment, plant and services. This information, if it differs from the design drawings, will be red-lined to indicate the actual installation details.

These records shall be kept on site and shall be available for inspection by the Employer or the Employer’s Representative during the progress of the Scope of Work.

Sufficient details shall be included in the as-built drawings and diagrams to enable any section or portion of any apparatus, component, equipment, plant and service to be readily and accurately located and identified on site should the need arise.

A complete set of red-lined drawings, as-built drawings and diagrams of all materials,
apparatus, components, equipment, plant and services shall be submitted to the Employer within two (2) weeks after first handover of the Scope of Work.

3. DETAIL EQUIPMENT AND MATERIAL REQUIREMENTS

This section contains the detail equipment and material requirements and specifications and must be read with the applicable SANS specifications. The requirements listed in this section cover the minimum requirements.

3.1 Certificate of Compliance

A Certificate of Compliance (COC) shall be issued by the Contractor for each electrical connection. This includes the following:

- Electrical connections between electrical distribution boards.
- Feeders to electrical actuators, lighting, pumps, heaters, etc.
- Solenoid, valve supply and control cable.
- Electrical feeder to electrical loads.

A single COC shall be issued for each individual electrical connection. Each COC shall be individually numbered in terms of the Regulations. For this project with one dispenser, only one COC is required.

The COC shall be signed by a Master Electrician in terms of the Electrical Installation Regulations (Clause 7).

3.2 Conduit and Accessories

Galvanized mild steel conduit complete with brass end bushes shall be used for all surface sleeve pipes inside the buildings. The conduit shall be fixed to the surface with spacer saddles.

Spacer saddles shall be spaced at maximum 1'000mm apart; at least two saddles will be used on all straight runs.

All surface cables shall be installed and supported by conduit.

The Contractor shall install galvanized 20mm diameter conduits from the cable ladders to the instruments as indicated on the drawings. The conduits shall be clamped to the support/pipe by means of a clamp bracket as indicated on the drawings.

3.3 Distribution Boards
The Contractor shall install new circuit breakers and a 4 pole contactor in the existing Distribution Board as indicated on the drawings.

### 3.3.1 Wiring of Boards

This section covers all internal wiring and cabling of distribution boards, switchgear and switchboards for connection to equipment with a current rating not exceeding 200A:

- Incoming or outgoing cables shall be terminated on a gland plate.
- Clamp type terminals, where the clamping screws are not in direct contact with the conductor, may be used for cables or conductors up to and including 70mm².
- Busbars connected to associated equipment, shall be used to terminate cables larger than 70mm².
- Where parallel incoming or outgoing cables connect to a collector busbar, the same shall not be crossed.
- Numbered terminal strips shall be utilized to terminate external wiring for low voltage control, interlocking, alarm, measuring and dc circuits.
- Correct terminal sizes to be used throughout.
- Terminal numbers to agree with details reflected on wiring diagrams.
- Power wired terminals to be separated from control terminals.
- Conductors shall be sufficiently rated for the maximum full load current that can occur in the circuit.
- Current rating applicable to conductors in the table below shall be applied for ambient temperatures up to 30°C.

<table>
<thead>
<tr>
<th>NOMINAL CROSS-SECTIONAL AREA OF CONDUCTOR (mm²)</th>
<th>CURRENT RATING OF CONDUCTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NUMBER OF CONDUCTORS IN BUNCH</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>2.5</td>
<td>28</td>
</tr>
<tr>
<td>4</td>
<td>37</td>
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</tr>
<tr>
<td>50</td>
<td>172</td>
</tr>
<tr>
<td>70</td>
<td>213</td>
</tr>
</tbody>
</table>

- Internal wiring for power purposes to be done with standard 600/1000V Grade PVC-insulated stranded annealed copper conductors.
- Minimum conductor size for power wiring shall be 2,5mm².
- Wiring to be neatly arranged and bunched in vertical and horizontal rows.
- Wiring to be grouped in PVC wiring channels or by means of plastic strip fasteners.
- Power and control wiring shall not be installed in the same wiring channel.
• Wiring channels shall not be more than 50% full.
• Grommets shall be used where wiring is routed through openings and holes.
• Joints in the wiring are not acceptable.
• Connections to circuit-breakers, isolators or contactors shall be as follows:
  - A ferrule of the correct size.
  - Soldering or ferrule sleeves at the end of the conductor.
  - Conductors terminating on equipment with screwed terminals shall be fitted with lugs.
• Colour of conductors shall correspond to the colour of the supply phase for that circuit - neutral conductors shall be black.
• Conductors for control circuits, et cetera, shall be coded in colours other than red, white, yellow, blue or black specified above.

3.3.2 Moulded-case Circuit Breakers
MCCB's shall be of the miniature-DIN type.

Supply-end connections to equipment shall be at the top and load-end connections at the bottom.

The circuit breaker rating is specified on the drawings.

3.4 Emergency Stop Button
An Emergency Stop button (ESD) shall be installed in the position indicated on the drawings. The purpose of the ESD is to interrupt supply to the dispenser in case of an emergency.

ESD button shall be a twist to release red mushroom button.

The ESD button shall be installed 1.5m above natural ground level on the wall.

The signage shall be included with the ESD button.

3.5 PVC-insulated Cables - Power cabling
Cables shall be in accordance with SANS 1507-3. The additional requirements are defined in this section.

Cables shall all be of the armoured type as follows:
• PVC-insulated/PVC-bedded/steel wire armoured/black PVC outer sheath, red stripe.
• The conductors to be of annealed, stranded shaped or circular copper with high conductivity.
• The voltage rating shall be PVC, 600/1000V Grade.
The cable core assignment shall be as follows:

- Red = Red phase.
- Blue = Blue phase.
- Yellow = White phase.
- Black = Neutral or earth (use a green sleeve for pump drives installed in hazardous area).

The following represent the minimum bending radii for cables with "d" the overall diameter of the cable:

- Unsheathed cables: 4d.
- Sheathed/unarmoured: 8d.
- Armoured: 10d.

Cables shall be manufactured and supplied in one length. Where the cable is longer than a standard drum/reel length the Employer or Employer’s Representative shall make a ruling on the installation of the cable.

Aluminum conductor cables shall not be used on this site.

3.6 General Cable Requirements

3.6.1 Cable Numbering System

Cable numbering shall be embossed on stainless steel tape attached to the cable with stainless steel wire. Cable numbering tags shall be installed on underground cables every 5m and for above ground cables every 10m.

The cable numbering shall be as follows:

- Installed at each cable termination point.
- Reflect the source and load sides of the cable.
- Identify the cable function: control, normal or stand-by power.

The cable number shall have an average of fifteen characters per termination.

The final cable numbers shall be provided to the Contractor by the Employer’s Representative during construction of the Scope of Work.

3.6.2 Glanding and Gland Plates

Mechanical cable glands shall be selected for the hazardous area classification of the area in which they are to be used.
Irrespective of whether the gland shall be used indoors, outdoors or in a hazardous area, all mechanical cable glands shall be fitted with a protective shroud or corrosion guard to prevent the ingress of dust and moisture at the point of cable entry.

All holes in a gland plate shall be drilled or machined, depending on its size. The use of a cutting torch for the making of holes is not acceptable.

Irrespective of the type of material used in its construction, all enclosures and panels in general shall be provided with a metal gland plate. The metal gland plate shall be bonded to the plant earthing system via an earth bar.

Where the gland plate is of adequate thickness, it shall be drilled and tapped to accept the size of cable gland that is to be fitted. Care shall be taken to maintain the IP classification of the enclosure.

Where the hole in a gland plate is too large for the gland to be fitted, use shall be made of the correct size of reducer.

3.6.3 Connections and Terminations
Terminations for all 600/1000V cables comprises of the following components:
- Crimp lugs/sleeves.
- Glands.
- Cable number.

All cores of cables shall be terminated by means of the use of proper copper lugs or sleeves.

Lugs will be used for bolted terminations. Sleeves will be used for terminations in screw terminals.

All cables will enter the distribution board through a gland fixed to a gland plate. Glands are to be used for terminating of all PVC/SWA/PVC cables at both ends.

Glands shall be:
- Of the adjustable type.
- Suitable for 600/1000V grade cable.
- Manufactured from heavily nickel-plated bronze or brass.
- Consist of a barrel, a cone bush screwed, nickel-plated brass nipple, a nickel-plated brass or a heavy galvanized steel lock-nut screwed into the other end.
- Be easily convertible to watertight glands by means of a waterproofing shroud and inner
seal kit.

- Provided to accommodate the top rim of the waterproofing shroud.

The shrouds shall be made of non-deteriorating neoprene and shall be resistant to water, oil and sunlight.

The shrouds shall fit tightly around the glands and cable.

For unarmoured cables the cone bush and compression ring of the gland shall be replaced with a synthetic rubber compression bush and ring to provide the required grip on the outer sheath of the cable.

All cable terminations shall be identified with a cable number.

Where aluminum to aluminum or aluminum to copper connections are to be made, use shall be made of the commercially available connectors suited for this purpose. Mating surfaces shall be cleaned and treated with an inhibiting compound before joining together.

For all bolted connections, use shall be made of a combination flat and a spring washer under each nut.

Where dry terminations (heat shrink) are to be used on air insulated boxes, the distance between gland plate and equipment terminals shall be adequate for the voltage and type of terminating kit to be used.

The tails of cables shall be long enough to allow for interchanging for phase reversal.

Each used core of cable shall use a crimped type lug for its termination. Lugs shall be crimped onto cable cores using a crimping tool that does not release until the crimping operation is complete.

Lugs shall be purposely designed and suited for the type of connection that is to be made. The current rating of the lug shall match that of the conductor. The use of an undersized lug on a compacted cable is unacceptable. Lugs shall not be modified. Blind lugs shall not be used.

Cables in panels, boards, junction boxes, etc., shall be terminated on approved terminals. Terminal strips and individual terminals shall be marked according to drawing.

For all cables of 50mm$^2$ and larger, the cable lug shall be crimped by means of a hexagon
crimping die. The Contractor shall ensure that the correct lug and die are used for a compacted cable.

Allowance shall be made in the length of cable core at each termination to permit the cutting and remaking of the termination at least once without interference to the rest of the wiring.

All external wiring entering at a terminal strip shall be neatly loomed and tied up using non-metallic straps. Spare cores shall be identified and left long enough to reach the furthest terminal and shall be loomed together with the rest of the wires.

3.6.4 Installation of Underground Cables
All cables shall be installed in the sleeve pipes provided by the civil contractor.

Cable shall be removed from the drum in such a manner that the cable is not subjected to twisting or tension exceeding that stipulated by the cable manufacturer. In case of twisting of a cable on site, the cable shall be replaced free of any cost.

Cable rollers shall be used to run out cables.

The Employer’s Representative shall be informed timeously of the intention to carry out all cable laying operations to allow an inspection of the installation quality.

Identification numbers of cables shall be shown on "as built" drawings of the installation.

3.6.5 Strapping and Clamping of Cables
Cables in outdoor areas shall be secured to the cable rack or runner by strapping at intervals not exceeding 1,000 mm. Strapping shall be done by means of stainless steel tape.

Cables in indoor areas shall be secured to the cable rack or runner by strapping at intervals not exceeding 1,000 mm. Strapping can be done by means of plastic cable ties but this will depend on the number and size of cables to be strapped.

3.7 Earthing Installation
An appropriate earthing system and network shall be installed in accordance with the South African Standard code of practice SANS10142 The Wiring of Premises. The general earthing installation shall be as follows:

- The armouring of cables shall be earthed by means of the appropriate size cable glands and gland plates.
- All flanges, rail sections and tanks shall be bonded to the earth ring.
- All tanks, hand rails and metal structures shall be properly earthed and bonded to the
• All electrical and process equipment including plant structures, fencing, gates and other loose metallic items not intended to be live, shall be bonded and connected to the plant earthing system by means of an external visible earth connection.

• Where an earth boss is to be installed against a structure that is required to be fire proofed or insulated, the boss shall be of sufficient length so as to protrude outside the finished fire proofing or insulation.

• Where earth cables need to be joined in places other than at an earth bar, it shall be done by means of an exothermic weld, hexagon crimped ferrule or ‘C’ ferrule. Such joints shall be insulated with tape or other means approved by the Employer.

• Only one lug is allowed per bolted connection where earth cables are to be attached to an earth bar, or any other earthing facility supplied for the earthing of equipment.

• Where exothermic welds are installed, use shall be made of the correct size and type of mould for the joint. The joint shall be dressed after welding to remove all burrs and sharp edges.

• The mould for the exothermic weld shall be used in a manner and for the number of operations as prescribed by the manufacturer. Moulds that have exceeded their life time, or that have been damaged, shall not be used.

• The contact area of the earth boss, or any other earthing facility supplied for the earthing of equipment, shall be cleaned to bare metal prior to making the earth cable connection.

• All lugs to be covered with bi-colour (green and yellow) sleeving. PVC tape is not allowed.

• All bolts, nuts and washer used for making the earth connections shall be either stainless steel, brass, galvanised or cadmium plated.

• The steel galvanised wire or tape used in cable armouring shall be bonded to earth. However, the armouring shall not be relied upon as an earthing conductor.

• Earthing by way of an additional core within a cable is acceptable only for 220 V lighting and socket outlet circuits not exceeding 20 A. Unless approved otherwise by the Employer, all other earthing shall be done via a separate earth cable of the required size according to SANS 10142.

• A cable rack exceeding 30 m in length shall be earthed at both ends. A cable rack shall also be earthed at the point where it enters or leaves a process unit.

• The loop of earth cables used for bonding and earthing of equipment shall be long enough, or flexible enough to allow for expansion / contraction and/or vibration of the equipment.

• The number and size of earth cables to be installed per item of equipment shall be according to the relevant drawings. Where two or more earth connections are required on a piece of equipment, the earth cable shall be from different earth loops to ensure effective earthing of the equipment in case of failure of a loop.

• Where use is made of an expansion joint on a cable tray or rack, a bonding strap shall be
installed across the joint on the visible side. The bonding strap shall be connected using bolts that are independent of the expansion joint.

- With the exception of expansion joints, galvanised or stainless steel cable tray does not require a bonding strap across the fish plates. A bonding facility shall be provided at each end of a section of tray that has been painted or treated with a non conductive medium for its protection against corrosion.

The earthing of the system shall be in accordance with SANS 10292. The specific earthing configuration applicable to this site is **TN-S** and is defined as:

- Transformer neutral solid earthed to ground.
- Earth cable distribution together with the power cables.
- Separate earth connection for each power distribution point.
- Separate earth for each electrical load.

System earthing requirements:

- Earthing to each sub-distribution board from the main distribution board shall be a radial configuration comprising a 70mm² Copper/PVC (Green) earth wire. Copper earth wire of 50% cross section of the feeder cable shall be installed along each reticulation cable length.
- A ring earth system (70mm² BCEW) shall be installed on site along the cable ladders for earthing of all instrumentation and smaller electrical equipment.
- Pump drives installed in the hazardous area shall be earthed by a fourth cable core (black) as well as external earthing.
- External earth cables above ground shall be of the Cu/PVC (Green) type.
- Buried earth copper cables shall be of the BCEW type.

Earthing installation hold points:

- After completion of the trenching or any excavation for earthing.
- After laying the earth cable in the trench or excavation just before back filling.
- After connection of the earthing to the reinforcing bars of a concrete slab, before pouring the concrete.

### 3.8 Earth Mats

Separate earth mats shall be provided for:

1) Lightning protection: Earthing for lighting protection.
2) System earth: Earth mat for normal material earthing.
3) Clean earth: Instrument earthing and IS earthing.

**Lightning protection**
The lightning earth shall be installed directly from the connection point (steel structure or lighting mast) to an earth spike in the ground. Although the lightning earth is regarded separate from the other earthing networks it shall be connected to the closest system ring main earth conductor.

**System earth**

The system earth mat for the normal material earthing comprises of an earth mat installed in the position as indicated on the drawings. All connecting conductors shall be of the bare earth copper conductors and shall be 70mm². All equipment shall be earthed to the system earth with a Cu/PVC (Green) earth wire of minimum 50% the feeder cable cross section but not smaller than 16mm². The system earth impedance shall be lower than 4.0 Ohm.

**Clean earth**

A clean earth (high quality earth) is not installed at this site.

### 3.9 Earthing Electrodes

Only the following type of earth rods shall be used:

- Solid drawn copper.
- Solid stainless steel.
- Solid steel with a bonded copper protection.
- Solid steel with a plated copper protection.
- Solid steel with a shrunk-on copper jacket.
- Solid steel with a shrunk-on stainless steel jacket.

All rods shall be of the solid round sectional type with 1’200/1’500mm length.

The nominal diameters of the earthing rods shall not be less than 16mm unless the rods are specified for placing in pre-drilled holes in which event the minimum nominal diameters shall not be less than 12mm.

Earthing electrodes shall be provided with \((n-1)\) couplings where \(n\) = number of rods supplied.

Conductor clamps shall be provided to suit the type and size of rods provided and the type and size of conductor specified.

The material of the clamps shall be compatible with the rod and conductor materials.

An adequate number of driving caps or bolts shall be supplied with the rods to protect the ends of the earthing rods whilst being driven into hard soil.
From the 70mm² BCEW main ring the Contractor shall Cadweld or crimp 16mm², 25mm² and 70mm² BCEW branches to the different electrical equipment.

4. LABELS AND TAGGING

All cables, material and equipment installed by the Contractor shall be properly tagged and labeled.

The labels to be fixed shall be for:

- Cables: cable numbers as specified
- Panels and Functional Equipment: 100 x 200mm traffolyte label
- Electronic Process Transmitters and Gauges: tag number as specified
ANNEXURE B.1

CIVIL DRAWINGS
ANNEXURE B.2
MECHANICAL DRAWINGS
ANNEXURE B.3
ELECTRICAL DRAWINGS
ANNEXURE C
MECHANICAL DATA SHEETS AND TANK SCOPE OF SUPPLY
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# ANNEXURES

Annexure 1: Tank Data Sheets.
1. **SCOPE**

1.1 **General**

The **Supplier** will design, procure materials, fabricate, assemble, shop test, paint (where applicable), supply and deliver to site 2 off carbon steel double walled underground storage tanks all in accordance with the requirements of this enquiry document and the applicable requirements of the Standards, datasheets and documents referenced herein.

1.2 **Previous Experience and Compliance**

In addition to compliance with the technical requirement of this Scope of Supply, the Supplier must have completed at least 5 years’ experience in manufacturing similar size tanks, and must have completed one such project in the past two years. On completion, the supplier shall provide a Certificate of Conformity (COC) for the tanks.

1.3 **Scope of Supply**

The **Supplier’s** scope of supply will include, but will not necessarily be limited to the complete design, procurement of materials, fabrication, assembly, shop testing, corrosion protection, supply and the delivering to site of 2 new, carbon steel double walled underground storage tanks all in accordance to the relevant specifications. Altogether the **Supplier’s** scope of supply will include the items specified below:

- Design and supply of the tanks all in accordance the Scope of Supply and the Data Sheets as per Annexure 1:
- Detail design will also include the design of all nozzle connections
  4.1.1 Manufacturing of all elements of the storage tank.
  4.1.2 Transportation and off-loading of the tanks and all elements of the tanks to the NZG Pretoria Zoo.
  4.1.3 Tank Wet Leak Detection with the first fill of Glycol
  4.1.4 Tank support frame
  4.1.5 Drop tubes for tank inlet, outlet and Dip riser
  4.1.6 Overfill protection device
  4.1.7 Dip stick
  4.1.8 Tank Containment Chamber
  4.1.9 Manhole cover
1.4 **Protection, Packaging for Delivery and Storage**

The *Supplier* must include for all costs associated with the delivery of all items in the Scope of Supply to the NZG Pretoria Zoo, Gauteng. These costs shall be priced separately. The *Supplier* is responsible for the off-loading of all tanks.

The *Supplier* shall include packing and protection for all items in the Scope of Supply so as to protect the equipment from any deterioration or damage while being transported to site or while being stored on site. The cost of packing and protection shall be priced separately.

All equipment and materials, including all components, are carefully packed for transport to Site. The nature and type of packing used are such that they ensure the items are fully protected against both mechanical damage and corrosion during all stages of transportation.

On receipt at Site, it is the responsibility of the *Purchaser's Representative* to check each item for compliance with the list of contents to ensure the quantities, descriptions and item identifications are correct.

All items and components are inspected on receipt for completeness and to ensure that they are undamaged. Any missing or incorrectly identified or damaged items shall be brought to the attention of the *Purchaser’s Representative* immediately and appropriate actions agreed between the relevant authorities. Rectification and/or replacement action are commenced immediately and all necessary approvals obtained. Accurate records of damage and the agreed rectification work shall be kept. Rectification, where required, is subject to *Purchaser's Representative* acceptance.

1.5 **Exclusions**

The following items and/or services are specifically excluded from the Scope of Supply:

- Design and construction of the reinforced concrete bases / foundation plinths.
- Design and construction of piping or mechanical work to and from the tank, outside the steel shells and nozzles.
- Installation at the site
2. CODES AND STANDARDS

2.1 General

The Supplier shall comply with the codes and standards stated in this document. To the extent not stated where the Supplier also complies with internationally recognised codes and standards the supplier shall list this in the quote.

Where conflicts exist between the codes, standards, datasheets etc, the more stringent one takes precedence; provided always that the tank comply as a minimum and in any event, with applicable law and mandatory South African national codes, standards and guidelines. The Supplier must however first clear any discrepancy with the Purchaser before proceeding.

The items will be designed, manufactured and supplied in compliance with the applicable regulations and requirements of the following:

- Occupational Health and safety Act (OSHA) of South Africa, Pressure Equipment Regulations (PER)
- Applicable requirements of the attachments to this specification.
  - South African Bureau of Standards (SABS & SANS), specifically:
    - SANS 10089-3, 2010: Part 3: The installation, modification, and decommissioning of underground storage tanks, pumps/dispensers and pipework at service stations and consumer installations
    - SANS 1535:2007: Glass-reinforced polyester-coated steel tanks for the underground storage of hydrocarbons and oxygenated solvents and intended for burial horizontally
- The applicable standard specification, such as may be referred to in the body of this Scope of Supply or referenced by other specifications listed above and published by the following authorities.
  - American Society of Mechanical Engineers (ASME).
  - American Welding Society (AWS).
3. **ENGINEERING**

3.1 **Requirements for drawings**

- For each revision the changes are clearly described, as well as who requested the changes and who accepted them.
- All drawings submitted for acceptance are to an acceptable scale. All drawings are made to scale and fully detailed and dimensioned. All dimensions marked on the drawings are to be considered correct, although measurements by scale may differ. The material from which each part is to be made shall be indicated.
- The drawings include tolerances for manufacture. The tolerances are suitable and of sufficient accuracy to provide safe and trouble free operation over the life of the component. The Supplier achieves the tolerances stated on the accepted drawings.
- All copies of drawings submitted for review are provided on white paper with black lines. The drawing size is A3 unless the use of another size is unavoidable. All drawings are provided in PDF format. All drawings are dimensioned in metric units. Where applicable, drawings show a graphic scale key plan and north arrow. Dates on drawings are reflected in the following format: dd/mm/yyyy. 
  
  Drawing revisions shall be in sequence as follows:
  
  A, B, C, etc. - All drawings issued for review or squad checks prior to AFC
  
  R - Drawings which are made redundant
  
  01 – First issue of drawings that are ‘Approved for Construction’ (AFC)
  
  02, 03, etc. - As-built and / or revised

3.2 **Design Procedures**

3.2.1 Interfaces with existing structures

The tank will be erected on reinforced concrete bases / foundation plinths to be designed and constructed by others based on the Supplier’s detailed supports drawings and foundation loading data. The Tank shall be supplier with a supporting frame that is to be mounted onto the plinth.
3.2.2 Supplier’s Design and Drawings and Other Documents

The Supplier delivers all documentation for approval. The Supplier allows sufficient time for the verification and approval by the Purchaser. Supplier will allow for a review period of 5 working days, excluding ‘post time’.

The Purchaser’s Representative and/or the Purchaser’s acceptance, receipt of, review of or comment on the Supplier’s drawings or other documents or other matter does not relieve the Supplier from responsibility for the Supplier’s errors or omissions in design and drawings.

3.2.3 Document Submissions

The Supplier submits his drawings, designs and calculations for acceptance prior to the start of manufacture. No work may proceed before a B approval has been issued as required by the Purchaser’s Representative. All such material becomes the property of the Purchaser. Calculations are supplied to substantiate the Supplier’s designs of leading items of the supply and are submitted to the Purchaser’s Representative for acceptance before the start of manufacture.

All correspondence and submissions are prominently identified as relating to the Scope of Supply and are submitted under the cover of appropriate letters or transmittal notes in accordance with the correspondence procedures which will be advised by the Purchaser’s Representative after the order has been placed.

The Supplier submits his drawings and other documents for acceptance in sufficient time to permit modifications to be made and for the document to be resubmitted for acceptance without delaying the initial deliveries or the completion of the items specified in this document.

If the Supplier requires early acceptance of any documents in order to avoid delay in the completion, he must advise the Purchaser’s Representative to such effect when submitting the drawing.

3.2.4 Acceptance of Designs & Calculations by the Purchaser’s Representative
Not later than 7 working days after receipt, the Purchaser’s Representative returns one copy of the drawing marked “A”; “B” or “C”, as may be appropriate. The notations “Accepted” and “Accepted as Noted” authorize the Supplier to proceed with the manufacture covered by such drawings subject to the corrections, if any, indicated thereon. Where prints or drawings have been “Not Accepted” the Supplier makes the necessary revisions on the drawings and submit further copies for acceptance in the same procedure as for the original submission of drawings. Every revision is shown by number, date and subject in the revision block on the drawing.

3.2.5 Change Control

The Supplier does not change or substitute a design, manufacturing process or item of Plant and Material which is required by this Purchase order or has previously been accepted by the Purchaser’s Representative unless the Purchaser’s Representative has accepted the change or substitution. The Purchaser’s Representative is under no obligation to accept the change or substitution and no claim will be considered if the change or substitution is not accepted.

3.2.6 Meetings

The Supplier and his Designer attend the following meetings at the time indicated:

- Kick-off Meeting: After order placement
- Design review meeting/ Pre-Manufacturing Meeting: If required

The Supplier and his designers are available to attend other design review meetings with the Purchaser’s Representative at all reasonable times, until all the designs and drawings are accepted by the Purchaser’s Representative.

3.2.7 As Built Records and Drawings

The Supplier prepares, and keeps up to date at the workshop, a complete and accurate set of “as-built” records in the course of fabrication. Copies of these records are provided to the Purchaser’s Representative, Purchaser prior to delivery.

3.2.8 Design of Tank
Design and operating conditions of pressure and temperature and the fluids to be contained shall be as specified on the datasheets.

3.2.9 Tank Fabrication

The Supplier appoints his own Quality Control Team with all relevant Non Destructive Testing technicians and relevant Quality Control personnel to ensure that the conditions of the relevant specifications are met at all times.

3.3 Guarantee of Works

The Supplier shall guarantee the tank against defective materials and faulty workmanship for a period of twelve (12) months after commissioning of the plant to a maximum of eighteen (18) months after delivery.

3.4 End of Job Deliverables

The Supplier submits provisional Data Books (1 electronic and 1 hard copies) to the Purchaser’s Representative on delivery of the tank. The Data Books are in accordance with the specific requirement stated elsewhere in the Scope of Supply and otherwise to satisfaction of the Purchaser’s Representative. Supplier submits Data Book Index for review.

The Supplier updates and submits final Data Books to the Purchaser’s Representative (2 electronic and 2 hard copies) 2 weeks after to Completion.

3.4.1 Hard Copy Requirements

The content of the equipment data book must be identified and indexed in a manner that enables easy identification of the listed content. The content within the file must be subdivided into numbered chapters and further into detailed documents.

Chapters must be segregated by divider sheets. The number of a chapter and the title must be printed on the divider sheets.

The files utilized to compile the printed copy/copies of the equipment data books must be A4 sized lever-arch files with spine pockets provided in hard covered plastic. End pocket and inserts must be used.
One data book must be compiled per tank.

The approved equipment data books must be handed over 2 weeks after equipment delivery, in both hard copy and electronic format.

Three sets of the data book shall be provided in hard copy.

Supplier shall use data book cover page and spine templates as provided by the Purchaser’s Representative.

3.4.2 Electronic Copy Requirements

Documents need to be segregated within sub directories. Mentioned sub-directories must contain the following:

- Index of the contents
- Native files (Autocad or Microstation)
- Scanned / non-maintainable files (.pdf). All pdf documentation and drawings must be saved under this directory, including an exact replica of the entire data book

Two sets of each data book shall be provided on CD/ DVD (re-writable)

When issuing CD/DVD’s labels must contain the following:

- Client:
- Project description:
- Contractor Name / Logo
- Date issued
- Area :
- Tag number
ANNEXURE 1

TANK DATA SHEETS
# UST DATA SHEET

<table>
<thead>
<tr>
<th>Client:</th>
<th>NZG</th>
<th>Rev:</th>
<th>02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank Number:</td>
<td>TK-01</td>
<td>Date:</td>
<td>24/02/2017</td>
</tr>
<tr>
<td>Area:</td>
<td>Pretoria Zoo</td>
<td>Completed by:</td>
<td>M. Fannin</td>
</tr>
</tbody>
</table>

## DESIGN DATA

- **Design Code:** SANS 1535
- **Tank Type:** Double wall underground storage tank
- **Tank Construction Material:** Carbon Steel
- **Tank Capacity (m³):** 9
- **Tank Diameter & Length (m):** Diameter: TBC, Overall Length: TBC
- **External coating required (Yes/No):** Yes
  - Glass Reinforced Fibre
- **Internal coating required (Yes/No):** No
- **Design Life:** 20 Years
- **Design Pressure/Vacuum:** 5 / 0.25
- **Operating Pressure/Vacuum:** ATM / ATM
- **Design Temperature (min/max):** 0 / 50
- **Operating Temperature (min/max):** 10 / 38
- **Product:** Petrol
- **Product Density (g/cm³):** 0.71
- **Vapour Pressure (kPa):** 50-70 @ 38 °C
- **Flash Point:** <0 °C

## TANK NOZZLE SCHEDULE

<table>
<thead>
<tr>
<th>NO.</th>
<th>NOZZLE DESCRIPTION</th>
<th>ND (mm)</th>
<th>CLASS (#)</th>
<th>FLANGE FACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Inlet (includes drop tube)</td>
<td>80</td>
<td>1000</td>
<td>Flat Faced</td>
</tr>
<tr>
<td>A2</td>
<td>Vapour Return</td>
<td>80</td>
<td>1000</td>
<td>Flat Faced</td>
</tr>
<tr>
<td>A3</td>
<td>Dispenser Conn. (includes drop tube)</td>
<td>40</td>
<td>1000</td>
<td>Flat Faced</td>
</tr>
<tr>
<td>G1</td>
<td>Manual gauging (includes drop tube)</td>
<td>50</td>
<td>1000</td>
<td>Flat Faced</td>
</tr>
<tr>
<td>L1</td>
<td>Automatic Tank Level Gauging (with blank)</td>
<td>50</td>
<td>1000</td>
<td>Flat Faced</td>
</tr>
<tr>
<td>X1</td>
<td>Leak Detection</td>
<td>50</td>
<td>1000</td>
<td>Flat Faced</td>
</tr>
</tbody>
</table>

## FABRICATOR TO INCLUDE THE FOLLOWING

1. Interstitial liquid and interstitial monitoring to permanently monitor the integrity of the double skin tank.
2. Drop tube at nozzle G1.
4. Tank to be supplied with Speed Chasis.
5. Non-destructive testing of materials and welds as required by the referenced codes.
6. Hydrostatic testing, pressure testing, and pneumatic leak testing as required by the referenced codes.
7. Corrosion protection, inspection and testing of corrosion protection in accordance with the referenced codes.
8. Dipping tables as part of the as-built information.
10. Certificate of Conformity
11. Flanges to SANS 1123

## GENERAL NOTES

1.
2.
3.
4.
**UST DATA SHEET**

<table>
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- **Internal coating required (Yes/No):** No
- **Design Life:** 20 Years
- **Operating Pressure/Vacuum:** ATM / ATM
- **Design Temperature (min/max):** 0 / 50
- **Operating Temperature (min/max):** 10 / 38
- **Product:** Diesel
- **Product Density (g/cm³):** 0.89
- **Flash Point:** 65 °C
- **Tank Construction Material:** Carbon Steel
- **External coating required (Yes/No):** Yes. Glass Reinforced Fibre
- **Internal coating required (Yes/No):** No
- **Design Pressure/Vacuum:** 5 / 0.25
- **Tank Diameter & Length (m):** Diameter: TBC Overall Length: TBC
- **External coating required (Yes/No):** Yes. Glass Reinforced Fibre
- **Internal coating required (Yes/No):** No
- **Design Life:** 20 Years
- **Operating Pressure/Vacuum:** ATM / ATM
- **Design Temperature (min/max):** 0 / 50
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**FABRICATOR TO INCLUDE THE FOLLOWING**

1) Interstitial liquid and Interstitial monitoring to permanently monitor the integrity of the double skin tank.
2) Drop tube at nozzle G1.
3) Drop Tube and mechanical overfill protection at nozzle A1.
4) Tank to be supplied with Speed Chasis.
5) Non-destructive testing of materials and welds as required by the referenced codes.
6) Hydrostatic testing, pressure testing, and pneumatic leak testing as required by the referenced codes.
7) Corrosion protection, inspection and testing of corrosion protection in accordance with the referenced codes.
8) Dipping tables as part of the as-built information.
9) Material Certification.
10) Certificate of Conformity
11) Flanges to SANS 1123

**GENERAL NOTES**

1) 
2) 
3) 
4)
1. Contents

Environmental Management Plan for the Design and Construction of the National Zoological Gardens in Pretoria’s Fuel storage infrastructure

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1. Introduction

The National Zoological Gardens Pretoria (NZGP) needs to construct a new fuel storage facility in the location of the current fuel storage facility. The site is zoned as a fuel storage facility and no Environmental Authorisation is required, but an EMP is required to manage the process. The facilities do not impact on a watercourse and the environment has been substantially altered by city and the NZGP infrastructure and development. This EMP will serve to inform the NZGP and their Site Engineer of the potential environmental impacts and provide a means to monitor and manage these impacts.

The installation of fuel storage facilities are highly regulated and subjected to specialised design, installation, commissioning and operational systems that includes many safety, security and pollution prevention mechanisms. This EMP seeks to augment these systems and not to interfere with these important systems. The expected impacts considering the systems given in the method statement are “Very Low”

The site location and method statement is attached as Addendum A and Addendum B

2. Project Roles, Responsibility and Contact Details

2.1. Design and construction and monitoring during construction:
Site Engineer: VGI Consulting

Phone: 012 6829140
Address: Building 4, Highgrove Office Park | Corner of Tegel & Olievenhoutbosch Avenues | Highveld, Centurion
Postal address: PO Box 68968 | Highveld | 0169
South Africa

2.2. Operational phase and operational phase monitoring:
National Zoological Gardens Pretoria

Phone: 012 3392700
232 Boom Str
Pretoria
South Africa

2.3. Compiler
Spatial Ecological Consulting
B.Sc. hons UP
Pri.Sci.Nat 400009/09
2.4. Representatives

Site Engineer: VGI Consulting

Name: __________________________

Signature: ______________________  Date:___________________________

National Zoological Gardens Pretoria

Name: __________________________

Signature: ______________________  Date:___________________________

Spatial Ecological Consulting

Name: __________________________

Signature: ______________________  Date:___________________________
3. Impacts and Proposed remedial measures

3.1. Design impacts
The design is sufficiently regulated that no further design measures will be proposed to reduce the risk of pollution and the sensitivity of the site is sufficiently low that no alternative site is proposed.

1. The design and construction may not adhere to the relevant standards published for the construction and operation of the storage facility. There is a SMALL RISK OF A LARGE NEGATIVE IMPACT.
2. The design will improve pollution control, reduce pollution risk and improve pollution mitigation relative to the old installation; this is a LONG TERM POSITIVE IMPACT.

3.2. Construction Impacts
1. The project will clear vegetation and expose soil and store excavated material to short term increased erosion risk. This is a SMALL NEGATIVE IMPACT.
2. Some bare soil may be left after construction. SMALL NEGATIVE IMPACT
3. The installation will interrupt the subsurface drainage patterns by installing a barrier in the ground. This is a LONG TERM SMALL NEGATIVE IMPACT given the low sensitivity of the site (city district) and the lack of close watercourses.
4. The site will increase hard surfaces and paving to a negligible amount for the catchment and is situated in an area that is currently a lawn. This is a SMALL NEGATIVE IMPACT given the low sensitivity of the site and the city environment.
5. The development will improve pollution control, reduce pollution risk and improve pollution mitigation relative to the old installation; this is a LONG TERM POSITIVE IMPACT.
6. The construction phase will use large machinery, which can potentially cause pollution and damage the existing infrastructure. This constitutes a RISK OF MODERATE NEGATIVE IMPACTS.
7. The construction process will generate litter. This is a MODERATE NEGATIVE IMPACT.
8. Litter generated during the construction phase may be dispersed into the city environment. This is a RISK OF A MODERATE NEGATIVE IMPACT.

3.3. Operational Impacts and risks
1. The operation of the storage facility will improve hydrocarbon pollution control, reduce pollution risk and improve pollution mitigation relative to the old installation, this is a LONG TERM POSITIVE IMPACT.
2. The pollution emanating from the facility may be of such a nature that it is not contained in the installed oil and grease traps. This is a RISK OF A MODERATE NEGATIVE IMPACT
3. The operation of the fuel storage facility will generate a small amount of litter. This is a SMALL NEGATIVE IMPACT.
4. Litter generated during the operational phase may be dispersed into the city environment. This is a RISK OF A MODERATE NEGATIVE IMPACT.
5. The pollution prevention measures may be rendered inoperative by neglect or larger than design spill events and rainfall events. This is a RISK OF A MODERATE TO LARGE NEGATIVE IMPACT.
6. Vehicles outside the design specifications may attempt delivery to the storage facility, risking damage and overflow. This is a **SMALL RISK OF A MODERATE IMPACT**

7. Incorrect procedures and vehicles and equipment in disrepair may cause spills. **MODERATE RISK OF LOW IMPACT**

### 4. Mitigation Measures

#### 4.1. Design impacts

**RISK:** The design and construction may not adhere to the relevant standards published for the construction and operation of the storage facility.

**AVOID:**

- 2. Audit design and construction compliance with the relevant standards.
- 3. Comply with the method statement attached in Addendum A

#### 4.2. Construction Impacts

**RISK:** The project will clear vegetation and expose soil and store excavated material to short term increased erosion risk.

**MITIGATION:**

- 1. Limit the duration of exposed soil by only clearing soil when construction will start in earnest and limit inactivity on the site with bare soil to two days.
- 2. Pave the area as soon as possible
- 3. Identify potential uses for the excavated material that will not be backfilled prior to construction.
- 4. Place excavated material in an area where sediment will not reach the stormwater or natural watercourses.
- 5. Protect stored material from rainfall events.
- 6. Store the top 20cm of the excavated material separately as topsoil if any topsoil use is identified in point 3 above.

**RISK:** Some bare soil may be left after construction, leading to erosion and/ or capping.

**MITIGATION:**

- 1. Clear the minimum vegetation needed for construction
- 2. Store topsoil for use to cover bare patches.
- 3. Cover bare areas left after construction with topsoil and protect from erosion and trampling.

**RISK:** The installation may interrupt the subsurface drainage patterns by installing a barrier in the ground.

**MITIGATION:**

- 1. Confirm geotechnical findings during excavation, if problematic to the safety of the installation, adapt design.
- 2. A water course or wetland is extremely unlikely in the current setting, confirm this during the excavation. If problematic get advice and adapt design.
IMPACT: The site will increase hard surfaces and paving to a negligible amount for the catchment and is situated in an area that is currently a lawn

MITIGATION:

1. Channel the run-off from the site into the oil trap and then into the storm water system.

RISK: The construction phase will use large machinery, which can potentially cause pollution and damage the existing infrastructure.

MITIGATION:

1. Do not allow leaking vehicles to operate on-site.
2. Inspect all vehicles for leaks before they are allowed on-site.
3. A suitable spill absorption and capture kit for the expected risks must be available and accessible on-site and a person trained in its basic use must be on-site at all times there are machinery on-site.
4. A spill response contractor must be informed and contact details of the spill response contractor must be available and accessible on-site.
5. All workers must be trained to identify spills and to inform supervisors of any spill immediately.
6. All spills must be recovered and disposed of at a registered waste disposal facility.
7. Protect existing infrastructure from damage by machinery.

IMPACT: The construction process will generate litter. Litter generated during the construction phase may be dispersed into the city environment

MITIGATION:

1. Install segregated waste bins to facilitate recycling
2. Train workers in the use of the bins
3. Take segregated bins to recycling company
4. Do not allow waste to lie un-sorted and un-collected on site.
5. Do not allow waste to disperse into the environment

4.3. Operational Impacts and risks

IMPACT: The operation of the storage facility will improve hydrocarbon pollution control, reduce pollution risk and improve pollution mitigation relative to the old installation.

MITIGATION:

None

Impact: The operation of the fuel storage facility will generate a small amount of litter. Litter generated during the operational phase may be dispersed into the city environment.

MITIGATION:
1. Install segregated waste bins to facilitate recycling
2. Train workers in the use of the bins
3. Take segregated bins to recycling company
4. Do not allow waste to lie un-sorted and un-collected on site.
5. Do not allow waste to disperse into the environment

RISK: The pollution emanating from the facility may be of such a nature that it is not contained in the installed oil and grease traps. This would typically be the breakdown products petrol and diesel fuels and other oils, when exposed to the environment either in the traps or on the surface of the facility.

MITIGATION:

1. Do not allow leaking vehicles to operate on-site.
2. A suitable spill absorption and capture kit for the expected risks must be available and accessible on-site and a person trained in its basic use must be on-site at all times the facility is operative
3. A spill response contractor must be informed of the site and contact details of the spill response contractor must be available and accessible on-site.
4. All workers must be trained to identify spills, appropriate response and to inform supervisors of any spill immediately.
5. All spills must be recovered and disposed of at a registered waste disposal facility.
6. Obtain disposal for every spill that required disposal.
7. Spills that soak into the permeable part of the paving or are larger in magnitude than the spill kits can contain, need to be cleaned up by a spill response contractor.
8. Ensure that no spills in the facility are left untreated for any length of time.
9. Monitoring spills:
   a. Obtain a background sample value from the stormwater system for BTEX, MTBE, Gasoline Range Organics and Diesel Range Organics prior to construction close to the site, but unaffected by the site.
   b. Monitor the outflow from the traps for BTEX, MTBE, Gasoline Range Organics and Diesel Range Organics periodically after the first rains in summer for three (3) years. Gain advice if levels in the outflow are substantially higher than background values.
   c. Monitor the outflow from the oil traps for BTEX, MTBE, Gasoline Range Organics and Diesel Range Organics periodically after significant spill events.
   d. Obtain advice from a pollution specialist to improve the trap design if trap design is faulty and it passes DRO’s and GRO’s
   e. Obtain advice from soil geochemist specialising in bioremediation for a long lasting solution for the outflow if the values exceed the background values regularly for those breakdown products that will disperse into the water and are not floating on top of the water.

RISK: The pollution prevention and monitoring measures may be rendered inoperative by neglect or larger than design spill events and rainfall events.

MITIGATION:

1. Maintain the entire facility in line with best practice from the supplier.
2. Inspect the oil and grease traps on a weekly basis and after spills and rainfall events
3. Regularly inspect the leak detection facility
4. Repair any device connected to the fuel storage immediately
5. Clean any spills or captured spills immediately

RISK: Vehicles outside the design specifications may attempt delivery to the storage facility, risking damage and overflow.

MITIGATION:

1. Confirm delivery vehicle scheduled to deliver product to the facility
2. Train staff in identifying the correct type of vehicle.

RISK: Incorrect procedures and equipment in disrepair may cause spills.

MITIGATION:

1. Train employees and supervisors in the correct procedures to work with equipment
2. Do not allow untrained people to operate the equipment
3. Train employees and supervisors to identify fault situations and react appropriately
4. Refresh training on an annual basis and when new or temporary operators are appointed.

5. Environmental Management Plan

The Site Engineer must appoint an Environmental Officer (Internal) who must monitor on a weekly basis, and report on a monthly basis compliance with the EMP, during construction. The client may allocate a staff member to monitor and aid in compliance with the EMP and other relevant documents from the supplier during the operational phase, reporting must be done on a monthly basis. The nature of the work may require that this person is aided by a staff member versed in water quality sampling. This EMP seeks to detect concerns early and prevent a cascade of faults creating a hazardous situation. This EMP does not address safety concerns, as these are best addressed by the manufacturer of the equipment.

This information may be requested by the authorities in the event of a spill, and may inform the authorities of the level of care applied by the client to managing the risk of pollution.

The proposed table for monitoring purposes are shown below, this document may be amended by the client and site engineer as the project requirements change; however the guiding principles must be the prevention of pollution and the reduction of risk of pollution.

The published norms and standards guiding the installation and operation of these installations must take precedence when a direct conflict is observed, however this is not expected. In the case there is direct conflict please request an amendment of this document.
## Design Impacts

**RISK:** The design and construction may not adhere to the relevant standards published for the construction and operation of the storage facility.

1. Audit design and construction compliance with the relevant standards.
2. Comply with the method statement and layout plan attached in Addendum A and B.

### Mitigation

<table>
<thead>
<tr>
<th>Monitor (yes/no/chemical parameter)</th>
<th>Yes/No/value</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the design compliant with the relevant standards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the as-built compliant with the relevant standards and the method statement and layout plan</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Construction Impacts

**RISK:** The project will clear vegetation and expose soil and store excavated material to short term increased erosion risk.

1. Limit the duration of exposed soil by only clearing soil when construction will start in earnest and limit inactivity on the site with bare soil to four days.
2. Pave the area as soon as possible.
3. Identify potential uses for the excavated material that will not be backfilled prior to construction.

### Mitigation

<table>
<thead>
<tr>
<th>Monitor</th>
<th>Yes/No/value</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site is inactive for no more than 4 days, whilst bare soil is present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site is inactive for no more than 4 days, whilst bare soil is present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uses for excavated material and topsoil is identified prior to construction, or disposal area is confirmed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Place excavated material in an area where sediment will not reach the stormwater or natural watercourses.</td>
<td>Is the storm water and watercourses protected from excavated material pollution</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>5. Protect stored material from rainfall events.</td>
<td>Is the excavated material covered and protected from erosion</td>
</tr>
<tr>
<td></td>
<td>6. Store the top 20cm of the excavated material separately as topsoil</td>
<td>Is the topsoil stored separately and saved</td>
</tr>
<tr>
<td>RISK:</td>
<td>Some bare soil may be left after construction, leading to erosion and/ or capping.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Clear the minimum vegetation needed for construction</td>
<td>Is the site cleared wider than the necessary work area?</td>
</tr>
<tr>
<td></td>
<td>3. Cover bare areas left after construction with topsoil and protect from erosion and trampling.</td>
<td>Is topsoil reinstated on cleared areas immediately after construction and protected</td>
</tr>
<tr>
<td>RISK:</td>
<td>The installation will interrupt the subsurface drainage patterns by installing a barrier in the ground.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Confirm geotechnical findings during excavation, if problematic to the safety of the installation, adapt design.</td>
<td>Does Geotechnical investigation support project</td>
</tr>
<tr>
<td></td>
<td>2. A water course or wetland is extremely unlikely in the current setting, confirm this during the excavation. If problematic get advice and adapt design.</td>
<td></td>
</tr>
<tr>
<td>IMPACT:</td>
<td>The site will increase hard surfaces and paving to a negligible amount for the catchment and is situated in an area that is currently a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Channel the run-off from the site into the oiltrap and then into the storm water system.</td>
<td>Is the entire site run-off connected to the oil trap</td>
</tr>
</tbody>
</table>
RISK: The construction phase will use large machinery, which can potentially cause pollution and damage the existing infrastructure.

1. Do not allow leaking vehicles to operate on-site.
   - Are all vehicles confirmed clean and without leaking prior to site access?

2. Inspect all vehicles for leaks before they are allowed on-site and keep a register of allowed vehicles.
   - Are all vehicles checked for leaks prior to site access and the register maintained?

3. A suitable spill absorption and capture kit for the expected risks must be available and accessible on-site and a person trained in its basic use must be on-site at all times there are machinery on-site.
   - Is a suitable spil kit present and accessible on-site and workers trained in its use?

4. A spill response contractor must be informed and contact details of the spill response contractor must be available and accessible on-site.
   - Are the contact details for a spill response contractor available and accessible on site?

5. All workers must be trained to identify spills and to inform supervisors of any spill immediately.
   - Are the workers on site trained to identify spills and react appropriately?

6. All spills must be recovered and disposed of at a registered waste disposal facility. Keep a register and obtain disposal certificates.
   - Are there spills evident on the site?
   - Are there logs of recovered spills?
   - Does the register and
<table>
<thead>
<tr>
<th>Impact: The construction process will generate litter. Litter generated during the construction phase may be dispersed into the city environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Install segregated waste bins to facilitate recycling</td>
</tr>
<tr>
<td>2. Train workers in the use of the bins</td>
</tr>
<tr>
<td>3. Take segregated bins to recycling company</td>
</tr>
<tr>
<td>4. Do not allow waste to lie unsorted and un-collected on site.</td>
</tr>
<tr>
<td>5. Do not allow waste to disperse into the environment</td>
</tr>
</tbody>
</table>

### Operational Impacts

<table>
<thead>
<tr>
<th>Impact: The operation of the storage facility will improve hydrocarbon pollution control, reduce pollution risk and improve pollution mitigation relative to the old installation.</th>
<th>Mitigation</th>
<th>Monitor</th>
<th>Yes/No/Value</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact: The operation of the fuel storage facility will generate a small</th>
<th>Mitigation</th>
<th>Monitor</th>
<th>Yes/No/Value</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Install segregated waste bins to facilitate recycling</td>
<td>Are segregated bins present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>amount of litter. Litter generated during the operational phase may be dispersed into the city environment.</td>
<td>2. Train workers in the use of the bins</td>
<td>Are the workers trained in the use of segregated bins</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Take segregated bins to recycling company</td>
<td>Is the bins emptied on a regular basis and recycled</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Do not allow waste to lie unsorted and un-collected on site.</td>
<td>Are the bins used, and is the site clean</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Do not allow waste to disperse into the environment</td>
<td>Is any waste dispersed to the rest of the environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Do not allow leaking vehicles to operate on-site.</td>
<td>Are all vehicles confirmed clean and without leaking prior to site access</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. A suitable spill absorption and capture kit for the expected risks must be available and accessible on-site and a person trained in its basic use must be on-site at all times the facility is operative</td>
<td>Is a suitable spill kit present and accessible on-site and operators trained in its use.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. A spill response contractor must be informed of the site and contact details of the spill response contractor must be available and accessible on-site.</td>
<td>Are the contact details for a spill response contractor available and accessible on site?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. All workers must be trained to identify spills, appropriate response and to inform supervisors of any spill immediately.</td>
<td>Are the workers on site trained to identify spills and react appropriately</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**RISK:** The pollution emanating from the facility may be of such a nature that it is not contained in the installed oil and grease traps. This would typically be the breakdown products petrol and diesel fuels and other oils, when exposed to the environment either in the traps or on the surface of the facility.
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5.</strong> All spills must be recovered and disposed of at a registered waste disposal facility.</td>
<td>Are there spills evident on the site? Is there a log of recovered spills?</td>
<td></td>
</tr>
<tr>
<td><strong>6.</strong> Obtain disposal certificates for every spill that required disposal.</td>
<td>Are there certificates for the disposed spills</td>
<td></td>
</tr>
<tr>
<td><strong>7.</strong> Spills that soak into the permeable part of the paving or are larger in magnitude than the spill kits can contain, need to be cleaned up by a spill response contractor.</td>
<td>Are all large spills cleaned by a spill contractor, are there certificates for the disposed spills.</td>
<td></td>
</tr>
<tr>
<td><strong>8.</strong> Ensure that no spills in the facility are left untreated for any length of time.</td>
<td>Are there spills evident on the site? Are they treated immediately - same day.</td>
<td></td>
</tr>
<tr>
<td><strong>9.</strong> Monitoring pollution:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>9.a.</strong> Obtain a background sample value from the stormwater system for BTEX, MTBE, Gasoline Range Organics and Diesel Range Organics prior to construction close to the site, but unaffected by the site.</td>
<td>Is a background value obtained for BTEX, MTBE, GRO and DRO prior to construction</td>
<td></td>
</tr>
<tr>
<td><strong>9.b.</strong> Monitor the outflow from the traps for BTEX, MTBE, Gasoline Range Organics and Diesel Range Organics periodically after the first rains in summer for three (3) years. Gain advice if levels in the outflow are substantially higher than</td>
<td>Is outflow of the Oiltraps monitored after the first rains (values obtained for BTEX, MTBE, GRO and DRO prior to organics)</td>
<td>Is there a register of all results?</td>
</tr>
<tr>
<td>background values. keep a register of results</td>
<td>Is the outflow from the traps monitored after spill events</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>----------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is there a register of all results?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is the values often higher than the background values?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Has the cause of pollution reaching the stormwater been established</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is there work in progress to address the issues</td>
<td></td>
</tr>
<tr>
<td>9.c. Monitor the outflow from the oil traps for BTEX, MTBE, Gasoline Range Organics and Diesel Range Organics periodically after significant spill events.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical Parameters to assess:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C10-28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C28-40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C10-40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAME</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,2,4 Trimethyl benzene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,3,5 Trimethyl benzene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MTBE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPHC610</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benzene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toluene</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Ethylbenzene
- **o+o-Xylene**
- **m-Xylene**
- **Naphthalene**

### RISK: The pollution prevention and monitoring measures may be rendered inoperative by neglect or larger than design spill events and rainfall events.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Maintain the entire facility in line with best practice from the supplier.</td>
<td>Is the maintenance register according to schedule and are repairs up to date.</td>
</tr>
<tr>
<td>2.</td>
<td>Inspect the oil and grease traps on a weekly basis and after spills and rainfall events</td>
<td>Are the oil traps clean and is the register up to date.</td>
</tr>
<tr>
<td>3.</td>
<td>Regularly inspect the leak detection facility</td>
<td>Is the leak detection showing no leaks and is the register to check leak detection up to date.</td>
</tr>
<tr>
<td>4.</td>
<td>Repair any malfunctioning part connected to the fuel storage immediately</td>
<td>Are repairs done immediately</td>
</tr>
<tr>
<td>5.</td>
<td>Clean any spills or captured spills immediately</td>
<td>Are spills cleaned immediately</td>
</tr>
</tbody>
</table>

### RISK: Vehicles outside the design specifications may attempt delivery to the storage facility, risking damage and overflow.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Confirm delivery vehicle scheduled to deliver product to the facility</td>
<td>Check register for delivery vehicle description</td>
</tr>
<tr>
<td>2.</td>
<td>Train staff in identifying the correct type of vehicle.</td>
<td>Can staff identify the correct type of delivery vehicle</td>
</tr>
</tbody>
</table>

### RISK: Incorrect procedures and equipment in disrepair may cause spills.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Train employees and supervisors in the correct procedures to work with equipment</td>
<td>Can staff and supervisors use the equipment correctly</td>
</tr>
</tbody>
</table>

---

28
<table>
<thead>
<tr>
<th></th>
<th>Activity</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Do not allow untrained people to operate the equipment</td>
<td>Can untrained staff use the equipment</td>
</tr>
<tr>
<td>3.</td>
<td>Train employees and supervisors to identify fault situations and react</td>
<td>Can staff and supervisors identify fault conditions</td>
</tr>
<tr>
<td></td>
<td>appropriately</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refresh training on an annual basis and when new or temporary operators</td>
<td>IS the training register up to date.</td>
</tr>
<tr>
<td></td>
<td>are appointed.</td>
<td></td>
</tr>
</tbody>
</table>
ANNEXURE E
HEALTH AND SAFETY SPECIFICATION

The SHE Plan (File) should contain the following:

- The contractor SHE policy statement
- Notification and Appointments;
  - Construction supervisor (full-time)
  - Construction Safety Officer (part-time or full time)
  - Competent First Aider
  - Letter of good standing with the Compensation Commissioner (Compulsory)
- Project specific Risk Assessment
- Valid medical certificates for all staff involved in the project issued by a competent and registered occupational medical practitioner
- SIGNED 37(2) form attached
- CEO/Sec 16(1) appointment or Sec 16(2) appointment
- Risk assessor appointment accompanied by a certificate of competency
- First Aider appointment + certificate
- Driver appointment + copy driver’s license

Documentation:

- The above should be presented in writing with qualifications where possible
- Register of persons completing safety induction
- Safety induction training
- Copies of completed and signed site regulations
- Register of safety training talks
- Register of skill training provided
- Copies of certificates issued for skills training
• Training and Induction:
  Only suitably trained and competent persons may be employed on construction works
  The Principal Contractor must provide written proof of general safety induction training and task specific training

• Personal Protective Equipment (Safety Equipment)
  - All employees, visitors or officials should be issued with appropriate PPE’s
  - All equipment’s on site should be of good quality
  - PPE and equipment registers should be kept

• Public and Environmental Issues
  - Principal Contractor to develop and implement measures to safeguard the public and environment from hazards that may arise as a result of the construction work.

• Risk Assessment:
  - Site Risk Assessment should be conducted prior to any construction work
  - Copies of Risk Assessment should be kept in the Safety File

• Incidents and Accidents:
  - Register of incidents and injuries
  - Copies of incident investigation reports
  - Copies of the persons reporting injuries to Compensation Commissioner

Prior to commencement of any construction work, the contractor must attend a safety induction. An appointment should be made through this office.

Contact person:
Tshepo Maake: Occupational Health and Safety Practitioner: NZG
012 339 2854