Transnet Freight Rail

an Operating Division of **TRANSNET SOC LTD**

[hereinafter referred to as **Transnet]**

Registration Number 1990/000900/30

REQUEST FOR QUOTATION [RFQ] No TFR/2022/08/1211/9517/RFQ
[KBC/38263]

FOR THE:	**Calibration of Assized Weighbridges (ASW) at KM 804 and KM 6. Remove, install and testing of WIM WIM and Bridge Monitoring System Sensor.**
FOR DELIVERY TO:	**Upington and Saldanha**
ISSUE DATE:	**15 August 2022**
CLOSING DATE:	**30 August 2022**
CLOSING TIME:	**10:00**
E-MAIL CLOSING ADDRESS:	**As per BID RESPONSE DOCUMENTS SUBMISSION on page 2 of 46** **[Submit the completed RFQ and associated documents onto the Transnet Portal a day before the closing date to prevent any delay with the uploading of the documents]**
VALIDITY PERIOD:	**90 Business days – 03 January 2023**

Project Manager: **Awethu Mdayi**

Tel: **066 426 8943**

Email: **Awethu.mdayi@transnet.net**

Section 1: SBD1 FORM

PART A
INVITATION TO BID

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF TRANSNET FREIGHT RAIL, A DIVISION TRANSNET SOC LTD							
BID NUMBER:	**KBC/38263**	**ISSUE DATE:**	**15 August 2022**	**CLOSING DATE:**	**30 August 2022**	**CLOSING TIME:**	**10H00 AM**
DESCRIPTION	**Calibration of Assized Weighbridges (ASW) at KM 804 and KM 6. Remove, install and testing of WIM WIM and Bridge Monitoring System Sensor**						

BID RESPONSE DOCUMENTS SUBMISSION

Transnet has implemented a new electronic tender submission system, the e-Tender Submission Portal, in line with the overall Transnet digitalization strategy where suppliers can view advertised tenders, register their information, log their intent to respond to bids and upload their bid proposals/responses on to the system.

RESPONDENTS ARE TO UPLOAD THEIR BID RESPONSE PROPOSALS ONTO THE TRANSNET SYSTEM AGAINST EACH TENDER/RFQ SELECTED.

The Transnet e-Tender Submission Portal can be accessed as follows:

- Log on to the Transnet eTenders management platform website (https://www.transnet.net);
- Click on "TENDERS";
- Scroll towards the bottom right hand side of the page;
- Click on "register on our new eTender Portal";
- Click on "ADVERTISED TENDERS" to view advertised tenders;
- Click on "SIGN IN/REGISTER – for bidder to register their information (must fill in all mandatory information);
- Click on "SIGN IN/REGISTER" - to sign in if already registered;
- Toggle (click to switch) the "Log an Intent" button to submit a bid;

Submit bid documents by uploading them into the system against each tender selected.

BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO		TECHNICAL ENQUIRIES MAY BE DIRECTED TO:	
CONTACT PERSON	**Liezel Weir**	CONTACT PERSON	**Awethu Mdayi**
TELEPHONE NUMBER	**053 838-3202**	TELEPHONE NUMBER	**066 426 8943**
FACSIMILE NUMBER	**053 838-3007**	FACSIMILE NUMBER	
E-MAIL ADDRESS	**Liezel.weir@transnet.net**	E-MAIL ADDRESS	**Awethu.mdayi@transnet.net**

SUPPLIER INFORMATION

NAME OF BIDDER						
POSTAL ADDRESS						
STREET ADDRESS						
TELEPHONE NUMBER	CODE		NUMBER			
CELLPHONE NUMBER						
FACSIMILE NUMBER	CODE		NUMBER			
E-MAIL ADDRESS						
VAT REGISTRATION NUMBER						
SUPPLIER COMPLIANCE STATUS	TAX COMPLIANCE SYSTEM PIN:		**OR**	CENTRAL SUPPLIER DATABASE	UNIQUE REGISTRATION REFERENCE NUMBER: MAAA	
B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE	TICK APPLICABLE BOX] ☐ Yes ☐ No		B-BBEE STATUS LEVEL SWORN AFFIDAVIT		[TICK APPLICABLE BOX] ☐ Yes ☐ No	

[A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE/ SWORN AFFIDAVIT (FOR EMES & QSEs) MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE]			
1 ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	☐Yes ☐No [IF YES ENCLOSE PROOF]	**2** ARE YOU A FOREIGN BASED SUPPLIER FOR **THE GOODS /SERVICES /WORKS OFFERED?**	☐Yes ☐No [IF YES, ANSWER QUESTIONAIRE BELOW]

QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS

IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)?	☐ YES ☐ NO
DOES THE ENTITY HAVE A BRANCH IN THE RSA?	☐ YES ☐ NO
DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA?	☐ YES ☐ NO
DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?	☐ YES ☐ NO
IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION?	☐ YES ☐ NO

IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 1.3 BELOW.

PART B
TERMS AND CONDITIONS FOR BIDDING

1. TAX COMPLIANCE REQUIREMENTS

1.1 BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.

1.2 BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VERIFY THE TAXPAYER'S PROFILE AND TAX STATUS.

1.3 APPLICATION FOR TAX COMPLIANCE STATUS (TCS) PIN MAY BE MADE VIA E-FILING THROUGH THE SARS WEBSITE WWW.SARS.GOV.ZA.

1.4 BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.

1.5 IN BIDS WHERE UNINCORPORATED CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.

1.6 WHERE NO TCS IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.

NB: FAILURE TO PROVIDE / OR COMPLY WITH ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID.

SIGNATURE OF BIDDER: ……

CAPACITY UNDER WHICH THIS BID IS SIGNED: ……

(Proof of authority must be submitted e.g. company resolution)

DATE: _____

SECTION 2: NOTICE TO BIDDERS

1 Responses to RFQ

Responses to this RFQ [**Quotations]** must not include documents or reference relating to any other quotation or proposal. Any additional conditions must be embodied in an accompanying letter.

2 Formal Briefing

A formal briefing session **will not be held** but should Respondents have specific queries they should email these to the Transnet employee(s) indicated in paragraph 3 *[Communication]* below:

3 Communication

3.1 Specific queries relating to this RFQ before the closing date of the RFQ should be submitted onto the system and to [**Leonie.Visagie@transnet.net**] before **12:00 pm on 29 August 2022**. In the interest of fairness and transparency, Transnet's response to such a query will then be made available to other bidders.

3.2 It is prohibited for Respondents to attempt, either directly or indirectly, to canvass any officer or employee of Transnet in respect of this RFQ between the closing date and the date of the award of the business.

3.3 Respondents found to be in collusion with one another will be automatically disqualified and restricted from doing business with organs of state for a specified period.

3.4 Respondents may also, at any time after the closing date of the RFQ, communicate with the name of delegated individual on any matter relating to its RFQ response:

Tender Administrator

Name:	Liezel Weir	Email:	Liezel.weir@transet.net
Telephone:	053 838-3202		

and

Secretary of the Acquisition Council

Name:	Leonie Visagie	Email:	Leonie.visagie@transnet.net
Telephone:	053 838-3119		

Project Manager

Name:	Awethu Mdayi	Email:	Awethu.mdayi@transnet.net
Telephone:	066 426 8943		

After the closing date of the RFQ, a Bidder may only communicate with the Rail Secretariat of the Transnet Freight Rail Acquisition Council, on any matter relating to its RFQ Proposal.

Name:	Leonie Visagie	Email:	Leonie.visagie@transnet.net
Telephone:	053 838-3119		

4 Legal Compliance

The successful Respondent shall be in full and complete compliance with any and all applicable national and local laws and regulations.

5 Employment Equity Act

Respondents must comply with the requirements of the Employment Equity Act 55 of 1998 applicable to it including (but not limited to) Section 53 of the Employment Equity Act.

6 Changes to Quotations

Changes by the Respondent to its submission will not be considered after the closing date and time.

7 Binding Offer

Any Quotation furnished pursuant to this Request shall be deemed to be an offer. Any exceptions to this statement must be clearly and specifically indicated.

8 Disclaimers

8.1 Respondents are hereby advised that Transnet is not committed to any course of action as a result of its issuance of this RFQ and/or its receipt of a Quotation in response to it. Please note that Transnet reserves the right to:

- modify the RFQ's goods / service(s) and request Respondents to re-bid on any changes;
- reject any Quotation which does not conform to instructions and specifications which are detailed herein;
- disqualify Quotations submitted after the stated submission deadline;
- not necessarily accept the lowest priced Quotation or an alternative bid;
- place an order in connection with this Quotation at any time after the RFQ's closing date;
- award only a portion of the proposed goods / services which are reflected in the scope of this RFQ;
- split the award of the order/s between more than one Supplier/Service Provider should it at Transnet's discretion be more advantageous in terms of, amongst others, cost or developmental considerations;
- cancel the quotation process;
- validate any information submitted by Respondents in response to this bid. This would include, but is not limited to, requesting the Respondents to provide supporting evidence. By submitting a bid, Respondents hereby irrevocably grant the necessary consent to Transnet to do so;
- request audited financial statements or other documentation for the purposes of a due diligence exercise;
- not accept any changes or purported changes by the Respondent to the bid rates after the closing date and/or after the award of the business, unless the contract specifically provides for it;
- to cancel the contract and/request that National Treasury place the Respondent on its Database of Restricted Suppliers for a period not exceeding 10 years, on the basis that a contract was awarded on the strength of incorrect information furnished by the Respondent or on any other basis recognised in law;
- award the business to the next ranked bidder, provided that he/she is still prepared to provide the required Goods/Services at the quoted price, should the preferred bidder fail to sign or commence with the contract within a reasonable period after being requested to do so. Under such circumstances, the validity of the bids of the next ranked bidder(s) will be deemed to remain valid, irrespective of whether the next ranked bidder(s) were issued with a Letter of Regret. Bidders may therefore be requested to advise whether they would still be prepared to provide the required Goods/Services at their quoted price, even after they have been issued with a Letter of Regret.

9 Specification/Scope of Work

TRANSNET freight rail

A Division of Transnet Limited

RAIL NETWORK

SIGNALS

PROJECT SPECIFICATION

ORE CORRIDOR

CALIBRATIONS OF ASSIZED WEIGHBRIDGE AT KM 804 AND KM 6

SCOPE

1. The purpose of this document is to give a technical specification and a description of the scope of work to be carried out by the supplier.

2. **SPECIFICATION**

- The service provider must be the Original Equipment manufacturer (OEM).
- In the event that the service provider is not the OEM, they must have an association with the OEM and provide a Memorandum of Understanding (MOU) with the OEM.
- The service provider must be NRCS accredited for calibration of assized weighbridges.
- The service provider must provide NRCS certificate to prove that they are NRCS accredited.
- The service provider's personnel who will be executing the work must be willing to do a medical assessment before entering the mine and Transnet Property.
- The service provider's personnel who will be executing the work must be willing to undergo an induction before entering the mine and Transnet property.

3. SCOPE OF WORK

The scope of work includes:

- Performing calibration and certification of the Assized Weighbridge (ASW) at KM 804 (Northern Cape) and KM 6 (Saldanha, Western Cape) on the Ore Corridor.
- Supply of new field junction box and cables for the SAW at KM 6.
- Installation of new field junction box and cables for the ASW at KM 6.
- All these activities must be performed during the Ore Corridor Shutdown.
- The Ore Corridor Shutdown period is 28 September 2022 to 07 October 2022.

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A DIVISION OF TRANSNET LIMITED

TECHNOLOGY MANAGEMENT

TRACK TECHNOLOGY

SPECIFICATION

FORCES, DEFELCTION AND TEMPERATURE MONITORING SYSTEM FOR OLIFANTS RIVER BRIDGE

REPORT NO.: BBG 2374

Author:	Chief Engineering Technician Track Technology	N. Tapela	
Checked	Senior Engineer CAS Technology	G. Breedt	
Checked	Senior Engineer CAS Technology	J. Solomon	
Checked and Approved	Senior Technologist Track Technology	J. Meyer	
Authorised:	Principal Engineer Track Technology	K. Mistry	

Date: 07 June 2015

Circulation restricted to: Technology Management
Infrastructure Maintenance

CONTENTS

List of figures

List of tables

1. SCOPE

1.1 Document Overview

This document specifies the technical, functional and interface requirements of the force, deflection, wind speed and temperature monitoring system for the Olifants River Bridge on the Iron Ore Line of Transnet Freight Rail. The system shall include the supply, installation, commissioning of the hardware and software that comply with the specification. The system supplied shall be integrated into the ITCMS and CASDAM by Transnet.

1.2 Version

This document replaces all previous versions of the specification.

1.3 Identification

The system measures and monitors real time measurements for rail forces, rail temperature, concrete deck deflection, ambient temperature and concrete deck temperature remotely.

Forces monitoring system comprises of the following:

- Rail forces measurement sensor on the rails at the expansion gaps
- Rail temperature measurement sensor on the rails at the expansion gaps
- Concrete deck deflections measurement sensor on the concrete decks at the expansion gaps
- Ambient temperature measurement sensor
- Wind speed measurement
- Concrete deck temperature measurement sensor on the concrete decks at the expansion gaps
- Lightning protection
- Amplifier system
- Setup menu for changing of channels and parameters
- Calibration of system
- Intelligence in determining faulty channels and incorrect data
- Communication hardware
- Uninterrupted power supply
- Computer at the Olifants River Bridge
- Web Interface viewing, maintenance and settings which is protected by access codes of the bridge computer
- Application interface
- Protocol document to allow for the interfacing for the bridge data into the ITCMS and CASDAM

1.4 **Background**

The Olifants River Bridge is situated on the Sishen – Saldanha railway line. This line was built for he transportation of iron ore. The Olifants River Bridge is unique in that it carries continuously welded rails on a ballast bed over its entire length of 1035m. The structure consists of two 11 x 45m continuous concrete side spans fastened at the abutments and a simply supported 45m concrete span in the centre of the bridge. The long decks are free to expand or contract on either side of the centre deck by means of expansion joints in the decks.

The rails are continuous welded over the bridge. Depending on the temperature this would result in tensiles or compressive forces in the rails and deck expansion over the decks. In areas near the bridge expansion joints the thermal movement of the deck interacts with the continuously welded rails and results in additional forces which are superimposed on the SWR rail forces and result in forces that could cause rail breaks or kick outs if not addressed by the maintenance teams.

To manage the forces in the rail within acceptable limits a system is required to measure, monitor and give alarms if the forces reach certain criteria. A system was developed by Track Technology – Strain to perform the above tasks. The current system has reached the end of its life and needs to be replaced with the latest proven technology. This specification covers all the aspects that would result in Transnet having a new early warning system for the bridge.

2. ABBREVIATIONS TO BE INCLUDED

CWR
Continuous welded rail

IICMS
Integrated Infrastructure condition monitoring system

ITCMS
Integrated Train Condition Monitoring System

CASDAM
Condition Assessment System, Data Analysis and Modelling

UPS
Uninterrupted power supply

CTC
Centralised traffic control

ORB
Olifants River Bridge

TCO
Train Control Officer

OAT
Operational alarm terminal

MTT
Maintenance Alarm Terminal

A-D
Analogue to digital

3. APPLICABLE DOCUMENTS

The following specifications, standards and drawings form part of this specification. In the event of conflict between the referenced document and this specification, the contents of this specification shall be considered as the superseding requirement.

Table 1: Applicable documents

Document Number	Description
CSE 1154-001 CAT-E48 (Latest issue)	Environmental specification of Transnet Freight Rail Signalling system
CSE 1159-001 AT X48 (Latest issue)	Standard specification for documentation for signalling equipment Dual GSM (GPRS and SMS) and Orbcomm Constellation Satellite operating and programming manuals
BBG 1048 (Latest issue)	Track Maintenance standards: Olifants River Bridge
	Force Limits of the olifants River Bridge monitoring system
BBD 8646	Specification for CASDAM platform
BBD 6398	ITCMS protocol document
BBD 3235	Installation of earthing and lightning protection of electronic measurement equipment
BBF 9193 Version 1	GPRS failback between APN's for measurement systems

4. COMPLIANCE

a) Where the hardware and software offered complies with the recognised standard of the country of manufacture and not specifically with the standards required by this specification, such hardware and software will be considered at the discretion of Transnet.

b) The system offered must comply with the specification.

c) The supplier must indicate paragraph by paragraph with reference to the paragraph numbers herein, either that system offered complies in every respect with this specification or, if not, precisely how it differs from the specification.

d) A broad statement that the software is in accordance with the specification is not acceptable. Failure to comply with the above requirements may preclude a supplier from consideration.

e) Additional information, comments or data not specifically called for in this specification, but considered by the supplier to be of possible importance or value for the purpose of assessing the merits or components offered by him, should be furnished.

f) In order to facilitate the evaluation, comparison and adjudication of offers, the supplier is requested to suitably bind, mark, index and cross reference the technical enclosures referred to forming part of this proposal/application.

g) The proposal/application must be complete in all respect and cover a complete offer for a system and include the labour, hardware, training and software. Tenders or offers in respect of individual hardware and/or software packages are not acceptable and will not be considered.

h) A price breakdown must be given for each of the following:

- All hardware components
- Spares
- Price for software
- Training
- Documentation
- Price for installation, calibration, integration and commissioning

5. REQUIREMENTS

The system offered can be grouped into the following main components:

- All hardware components
- Spares
- Lighting protection
- Price for software
- Training
- Documentation
- Price for installation, calibration, integration and commissioning

Each of the subsections and sections below describe the requirement for the system.

5.1 System Definition

The force monitoring system shall consist on the following: (refer to Appendix A figure 1 – Layout of the measurement parameters)

a) Track side equipment which measure rail stress on the left and right rail at the concrete deck expansion gap1 (S1) and gap 2 (S2) in real time. 94 Channels of strain gauge measurement at each of the 4 positions, 2 on the field side and 2 on the gauge side of the rail – 16 Strain gauge channels in total) (The equipment must include the cable and stain gauges (halve bridge 120 Ohm)

b) All instrumentation must be modular (Easy to replace)

c) Plugs on all cable ends

d) Track side equipment which measure rail temperature on the left and right rail at the concrete deck expansion gap 1 (S1) and gap 2 (S2) in real time. (4 temperature channels) (The equipment must include the temperature sensor)

e) Track side equipment which measure concrete deck temperature on the left and right rail at the concrete deck expansion gap 1 (S1) and gap 2 (S2) in real time. (4 temperature channels) (The equipment must include the temperature sensor)

f) Track side equipment which measure concrete deck deflection on the left and right rail at the concrete deck expansion gap 1 (S1) and gap 2 (S2) in real time. (8±100 mm deflection channels) (The equipment must include the deflection meter)

g) Track side equipment which measure ambient temperature in real time. (2 Channel) (The equipment must include the temperature sensor)

h) Wind speed sensor to measure the wind speed in the centre of the bridge.

i) Lightning protection equipment to protect the system against lightning and high power surges.

j) Amplifier system to measure all channels.

k) Data acquisition unit that capture, calibrate and store the data, test setup and channel calibrations.

l) The bridge system must be remotely accessible to setup and change the system.

m) Communication module to transmit the data.

n) Computer to monitor, view, store unprocessed data and processed data at the Olifants River Bridge. The computer must allow for the setting to be changed.

o) The system must be password protected with different levels depending on the access required.

p) The system must allow for redundancy in the data to prevent data loss. Details to be supplied by the supplier.

q) The system must allow for the SMS of bridge alarms. (Trigger of a force alarm or faulty hardware)

r) All the necessary data collection, data validation, processing, transmitting, alarms and back-office equipment and software (system server) to host and interface the bridge data with the ITCMS and CASDAM.

s) Connecting and commissioning of the system.

See Appendix A for system layout and measurements parameters. Appendix A table 2 and table 3 for measurement channels numbering, locations and unit of measurements. See Appendix B for the current system information.

5.2 **Context Diagram**

Figure 1 and Figure 2 give a block diagram of the typical components that the system should have.

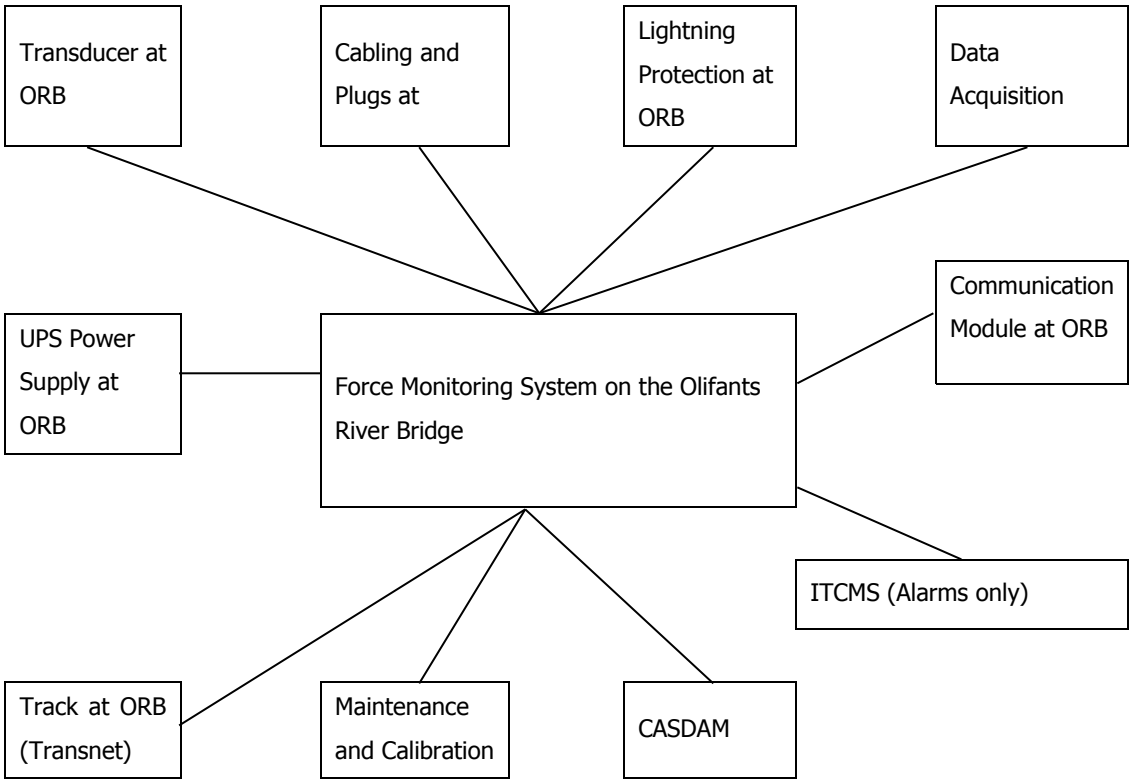


Figure 1: Context Diagram of the Force Monitoring System at Olifants River Bridge

5.3 **Strain gauge transducer requirements**

a) The strain gauge transducers will be used for:
   - Force measurement
   - And temperature measurement

b) The transducers offered must be approved by Transnet.

c) The strain gauge transducer shall consist of the following:
   i. 6 mm 120 Ohm XY strain gauges for force measurement
   ii. 6 mm 120 Ohm linear strain gauges for temperature measurement in conjunction with the LST – 100C – 120D matching network
   iii. The strain gauge/gauges shall be bonded to a brass shim with strain gauge adhesive and the adhesive shall be of the hot curing type and baked under the required pressure and temperature as per the product specification. No cold curing type strain gauge adhesive will be allowed during the encapsulation process.
   iv. The size of the brass shim is:
      - 30mm x 60mm x 0.25mm for the force measurement
      - 30mm x 80mm x 0.25mm for the temperature measurement

v. This brass shim must be encapsulated with a Transnet approved product to form a sealed unit. See Figure 14.

vi. The following information must be visible on the transducer:

- Type of transducer
- The Wheatstone bridge and cable colour

vii. The 0.5m shielded Transnet approved cable and strain gauges must be joined through a solder terminal on the brass shim.

viii. The earth of the cable must be soldered to the brass shim to react as a cable re-strainer.

ix. The strain gauges and solder terminal shall be sealed with a Transnet approved sealer to prevent the ingress of water.

x. The strain gauge transducers shall be encapsulated with a Transnet approved compound to prevent the ingress of water, for the protection of the strain gauges and ease of identification during maintenance.

xi. Each transducer will have an approved plug that is IP67 and that is compatible with Technology management's cables.

xii. All transducers shall be m9unted and coupled to the measurement points in such a way that it will not be effected by rail movement, vibration, heat and moisture.

xiii. The supplier must indicate the process they intend using to build the transducer for approval by Transnet. The information must include:

- Cleaning processes and product
- Brass shim preparation
- Cable Type
- All glues, sealing product, encapsulation compound
- Identification

5.4 **Rail stress measurement equipment**

The rail stress measurement equipment shall meet the following minimum requirements:

a) The field unit shall have the ability to measure the rail stresses. The measurements shall be such that the effects of vertical loads induced on the rails when the train moves along the track are minimised/rejected.

b) The range of the stress measurements shall be between -2000 kN and 2000 kN with an accuracy of 0.1%.

c) The system shall use force transducers that make use of the rail.

d) The strain gauge transducer shall be mounted on the neutral axis of the rails.

e) The force transducer shall be mounted 100 mm apart.

f) The force transducer shall be pasted with Transnet approved glue betweent he two sleepers at the expansion gaps on both sides of both rails

g) Strain gauge transducers shall read zero force when the rails are at a stress free temperature state (during the de-stressing).

h) The transducers shall be sealed with a sealer to prevent the ingress of water and covered with a hot dipped galvanized cover plate to protect the transducers. (Force and temperature) Both products and installation methods must be approved by Transnet. Supplier to supply details as part of their tender submission.

i) The supplier must indicate the method they intend using to clean the surface before gluing and sealing the transducer as part of their tender.

j) On completion of the installation of the transducers the supplier must calibrate the system.

5.5 **Rail temperature equipment**

The rails temperature equipment shall meet the following minimum requirements:

i. Field unit shall have the ability to measure the rail temperature.

ii. The range of temperature measurements shall be between -15 °C and 70 °C with an accuracy of at least 0.5 % using a temperature transducer.

iii. The strain gauge transducer shall be mounted on the neutral axis of the rails.

iv. The temperature transducer shall be mounted 100 from the force transducer.

v. The transducer shall be pasted with a Transnet approved glue between the two sleepers at the expansion gaps on both sides of both rails.

vi. The transducer shall be sealed with a sealer to prevent the ingress of water and covered with a hot dipped galvanized cover plate to protect the transducers. (Force and temperature) Both products and installation methods must be approved by Transnet. Supplier to supply detail as part of their tender submission.

vii. Rail temperature sensors shall be balanced using a calibrated temperature probe.

viii. The supplier must indicate the method they intend using to clean the surface before gluing and sealing the transducer as part of their tender.

5.6 **Deck temperature measurement sensor/transducer/equipment**

The deck temperature equipment shall meet the following minimum requirements:

i. Field unit shall have the ability to measure the concrete deck temperature.

ii. The range of temperature measurements shall be between -15 °C and 70 °C with an accuracy of at least 0.5% using a temperature transducer.

iii. The strain gauge transducer shall be mounted on the inside of the deck.

iv. The transducer shall be pasted with a Transnet approved glue.

v. The transducers shall be sealed with a Transnet approved sealer to prevent the ingress of water.

vi. Supplier to supply detail as part of their tender submission.

vii. The temperature sensors shall be balanced using a calibrated temperature probe.

viii. The supplier must indicate the method they intend using to clean the surface before gluing and sealing the transducer as part of their tender.

5.7 **Deck deflection measurement sensor/transducer/equipment**

The deck deflection equipment shall meet the following minimum requirements:

a) The field unit shall have the ability to measure the concrete deck deflection at the expansion gaps.

b) The range of the deflection measurements shall be between -100 mm and 100 mm with an accuracy of at least 0.5%.

c) Deflection transducers shall be mounted inside the concrete deck over the expansion gap.

d) Deflection transducers shall be balanced when the bridge concrete deck is in the neutral position.

e) The deflection transducer must have good thermal stability during temperature changes.

f) The supplier must submit a mounting method for approval by Transnet during the tender stage.

g) The transducer must be IP67.

h) The transducer is exposed to the weather and must:

- Have UV resistant cables
- Stainless steel transducer to prevent corrosion.

i) Pictures of the current system is attached, see Appendix B figure 16, 17, 18 and 19.

5.8 **Ambient temperature and wind measurement sensor/transducer/equipment**

The ambient temperature equipment shall meet the following minimum requirements:

a. Field unit shall have the ability to measure the ambient temperature.

b. The range of temperature measurements shall be between -15 °C and 70 °C with an accuracy of at least 0.5% using a temperature transducer.

c. The strain gauge transducer shall be mounted inside of the Stephenson screen.

d. The temperature sensors shall be balanced using a calibrated temperature probe.

A wind measurement system must be supplied that can measure the wind speed in the centre of the bridge.

The supplier must propose a system that will allow it to function properly without interfering with the overhead catenary or people working on the bridge. The results of this measurement must be stored as part of the data acquisition. The supplier must indicate the accuracy of the instrument they intend using but it must be at least 5%. The sensor must be designed such that it will not get damaged during high wind speeds.

5.9 **Lighting protection system**

The lightning protection system shall meet the following minimum requirements:

A. Lightning protection shall be of the COPA LD 24v C00222 type.

B. Class 2 surge protection shall be utilized.

C. Alternative lightning protection shall be considered if tested and approved.

D. All connections to the lightning protectors shall consist of plugs and ferrules.

E. The contractor shall propose a lightning protection system as well as an earthing proposal to Technology Management for approval as part of the tender.

F. The lightning protection must comply with Transnet's lightning protection specification.

5.10 **Bridge Power System for the measuring and communication equipment**

The bridge power system must consist of the following:

a. Uninterrupted power supply to supply power to the system.
   - Power to charge the UPS will be supplied from the Transnet System. 220V AC.

b. The power system offer must be modular and easy to repair and replace.

c. The system offered must protect the equipment from over and under voltage situations.

d. The system must also allow for the switch over to mains if there are problems with the UPS system or renewable energy source.

5.10.1 **Main Power Supply**

Transnet will supply the power to charge the uninterrupted power supply for normal operations. This supply will be a 220V feed. The supplier must indicate in their tender proposal the power consumption of their system.

5.10.2 **Uninterrupted Power Supply**

a. The UPS shall must allow for inputs from:
   - Mains

b. The UPS shall have lightning and over-voltage protection.

c. The UPS shall have an output appropriate for the equipment supplied as well as for 220V AC.

d. The size of the UPS must be such that it can drive all equipment at 75% of its capacity.

e. The UPS shall have battery backup for 4 hours if the power to the UPS fails.

f. The UPS shall have computer wall plugs and 4 additional 220V plugs.

g. The system must shut down before the batteries run down and restart automatically when the power returns.

5.11 **SMS send and receive module on the bridge**

The bridge monitoring system must have a cell phone modem that is SMS/GPRS ready with an interface to the proposed system as part of the A-D software that will allow for the sending and receiving of SMS messages. It must have the following functionality:

a. Allow the maintenance technician to request a health check or self-check of the proposed system through SMS messaging.

b. The interface shall provide for an SMS message to be sent to the maintenance technician to alert him/her to the fact that a field unit was registered.

c. Sending of warnings/alarms to the appropriate personnel. These can be grouped into maintenance and critical alarms.

It must allow for the following maintenance alarms:

- Bridge forces approach the maintenance limit
- Bridge forces are not the same on all 4 channels

It must allow for the following critical alarms:

- Bridge forces reached a speed restriction limit
- Bridge forces reached a stop train limit

d. A global table that will allow for 20 names and their numbers that can be selected from for each of the alarms.

e. See Example below for the table;

Name	Cell Number	Alarm 1	Alarm 2	Alarm 3	Alarm 4
John Doe	083 123 1	X			
Jane Doe				X	

f. The system must allow for the selection of an option to send a once off alarm or to repeat it after a software selectable time if it was not reset by itself (Alarm condition not there) or the technician.

g. It must allow for the remote change of the settings, set a reset of alarms as well as for the disabling of all the features.

5.12 **Data acquisition measurement system on bridge**

The data acquisition system consists of a hardware and software components that must be installed at the bridge. See details below.

The contractor must install a data acquisition system that complies with:

a. The measurement accuracy specified.

b. Have the appropriate hardware.

c. The operating system must be Windows server and

d. that can interface with TFR's existing software platform (Windows 7 Excel and Word) and Windows Office 2010.

5.12.1 **Data acquisition hardware**

a. In addition to the freedom to the supplier on choosing the system the following minimum hardware requirements must be met:

I. The amplifier system must be a digital system.

II. It must be able to handle all the various types of sensors.

III. The amplifiers must be a standard off the shelf item.

IV. It must be able to integrate into the network as specified.

b. The system must be housed inside the deck in a cabinet with a positive pressure and applicable filter system.

c. The supplier must have a track record of doing similar work for Transnet. Details to be included as part of the tender.

d. Cables must be connected via plugs on the cabinet.

e. The amplifiers must be controlled from a computer that will automatically set up the amplifiers.

f. Windows based computer with network capability (Primary and secondary mediums) and a minimum 20" screen that have the appropriate resolution to display the data.

5.12.2 **Data acquisition software**

A. The main functions of the A-D software shall be as follows:

I. Capture the data on all transducers and sensors.

II. To configure a group of measuring stations in such a way that they will function as a system with specific infrastructure condition monitoring characteristics. Save and restore settings.

III. To visually present the data in a simple format. The contractor must propose a solution for approval by Transnet. The minimum requirements include:

- Graphical representation of the different channels and average of grouped channels.
- Real time table view.
- Options to select the number of windows, the channels to be viewed on each and the changing of the x and y axis full scale as well as auto scaling.
- Zoom in and out.
- Data scroll on time axis.
- Software selectable time axis.
- Automatic and manual option to save and retrieve the graph setting.

IV. It must be possible to view the data or look at the log files while the system is capturing data.

V. To apply specific maintenance and alarm conditions to the data/results (Configuration management of alarm limits, system parameters and user access control)

VI. Perform intelligent data integrity checks

- Check that hardware is working
- Check that all transducers are working
- Automatically ignore transducers that are faulty
- Prevent false alarms
- Train detection

VII. Redundancy in method of storing data

VIII. Save data to disk before sending it to the database.

IX. Routines must be optimized to speed up data processing

X. Keep different files for daily and monthly data

XI. Automatically check system date and time

XII. Calibration of the system

XIII. The system shall control access via user name and passwords for any user that interacts with the system, other than web users only viewing data

XIV. Data backup

XV. Allow for remote viewing of the computer

XVI. Send and receive SMS messages and react to them

XVII. Communication module to send data to the ITCMS and CASDAM

XVIII. The system shall provide the operator to enter the life-time of measure data, calculated data, alarms, user log files, etc.

XIX. Warning system to inform applicable department of warnings and faults.

XX. Allow for remote access to setup the system, change the alarm conditions and SMS setup.

XXI. Send out maintenance alarms based on the predicted temperature and the last 5 days history.

XXII. Webb connections to change setup, display and retrieve bridge data.

B. In addition to the freedom to the supplier on choosing the system the following minimum hardware and software requirements must be met:

I. Windows based computer with flat screen and appropriate connectivity.

II. Data acquisition where the setup of the hardware and software can be manipulated.

III. System configuration

IV. Database module to store data

V. Remote reboot if the system freezes up

C. Before any measurements can be captured, the specific infrastructure condition monitoring system has to be configured by the user. The supplier/technician build up the system with basic components and configure the Fore Monitory System at ORB. (Transnet to confirm final name on SAP before configuration of system) The system configuration module allows the technician to perform the following actions:

I. The technician gives the specific system a unique name, e.g. FMSORB (for Force Monitoring System at olifants River Bridge). The system supplied must be flexible enough to allow for the installation of an additional Data acquisisiton system.

II. The technician will configure the following data acquisition settings:

- Sample rate. Typically every minute
- Channel names
- Units
- Calibration values
- Transducer setting on system

III. The final system settings will be saved for future setups and system configuration

IV. Set the alarm channels and conditions

V. Disable faulty channels

VI. Set up the communication for sending data and alarms

VII. Set data integrity rules.

5.12.3 **Database module**

The system must store the data on a local database system and send it to the CASDAM database. The supplier must supply the protocol of the data that will be sent for integration by Transnet. This protocol must comply with Transnet CASDAM protocol.

The local data must be kept for a minimum period of 6 months on the local disk before removing records. The software must make the appropriate backups and have redundancy on the bridge and make sure that both databases are synchronized. An additional had drive with the correct setup must be supplied that can be swopped if the HDD fail. (Must be the full system and not on a tray) To prevent the loss of data, data must be mirrored onto a second HDD.

5.12.4 Warnings, alarms and system status

a) The system must have the ability to set up the alarm, warning and status conditions:

I. The status of all transducers

II. The power status

III. Data integrity info on channels

IV. Database errors

V. Communication error

VI. Channel is over a limit

VII. Remote reboot

VIII. Channel prediction indicate that a limit will be reached in the next 24 hours

b) It must be possible to send these alarms, warning and system status through the SMS modules as well as to the database and to enable or disable them. All alarm, warning and status conditions must be logged to a file for access by technicians. Alarm conditions that were disabled by the user must be automatically enabled after a pre-set time period. (This value must be configurable)

c) All data must be send to CASDAM

d) Alarm warning must be sent to the ITCMS as well

e) The bridge system shall provide a prediction of rail forces based on historical data and user defined temperature ranges.

f) The system shall provide reporting tools to:

I. Show Calibration reports

II. Health status of the equipment reports

III. Log file reports

IV. Graphical presentations of measurements over time for each of the channels and the average on a predefined time range

V. SFT of the rail at the 4 locations

VI. Excel export of data on a predefined time range for all channels as well as the average.

VII. Automatically compile a 24-hourly maintenance report to show problems with the system.

5.12.5 **Bridge software package**

5.12.5.1 Minimum requirements

a. The software shall meet the following requirements:

I. The windows application monitoring software shall be password protected.

II. Only users who are registered toc hange the settings shall be allowed

III. Get a view of the line and expansion gaps with the stations at the expansion gaps and their availability status, including, power, rail force sensors, rail temperature sensors, concrete deck deflection sensor, concrete deck temperature sensor, ambient temperature sensor, stress free temperature, warnings and status of the bridge transducers.

IV. Get a graphical view of the detailed measurements over time.

V. On the graphical view, measurements shall be group according to measurement parameters.

VI. Graphical view shall contain three graphs (Rails tress graphs, expansion gaps deflection graphs and all temperature graphs)

VII. On boot up it must automatically be able to show the application w3ith the main screen.

VIII. If there is no activity from the user the screen must go back to the main screen.

IX. On the graphical view, rail forces limits shall be displayed.

X. The system must be real time by accessing the database to retrieve the latest information.

XI. Get a view of all current and historic alarms and warnings.

XII. Apply specific maintenance and alarm conditions to the data/results.

XIII. Perform intelligent data integrity checks.

XIV. Automatically ignore transducers that are faulty.

XV. Prevent false alarms.

XVI. Automatically check system date and time.

XVII. Warning system to inform applicable department of warnings and faults.

XVIII. Allow for remote access to setup the system, change the alarm conditions and SMS setup.

XIX. The final system settings will be saved for future setups and system configuration.

XX. Set the alarm channels and conditions.

XXI. Disable faulty channels

XXII. Set up the communication for sending data and alarms

XXIII. Set data integrity rules

XXIV. Export option to export the data to Excel

XXV. Password protection on options that:

- Allow changes to the system
- Retrieval of data and log files

b. The layout of the screens must be as indicated below;

5.12.5.2 Main screen

A. Main screen with 6 screens showing the following data;

I. Rail forces left leg and right leg as well as limits

II. Bridge deflection

III. Temperature

B. The above is shown for both locations.

C. It must also show the data and time.

D. A panel on the right hand side that will show the following;

I. SFT of the two rails at two positions.

II. The alarm status

III. Any warnings or error conditions from the bridge.

IV. Predictions

5.12.5.3 Real time Channel values

A. The real time channel tab must show the following data in a tabular manor
   i) Channel number
   ii) Channel name
   iii) Channel unit
   iv) Channel value

B. The data and time must be show above the table as well as the date and time of the A-D values retrieved. It must have a status flag that will indicate in red if the data is out of sync. (More than 5 minutes – user defined value)

5.12.5.4 Diagnostics

The diagnostics tag must show the channel values as well as the average values that was calculated. See Appendix A table 2. It must also indicate if a channel was excluded from the calculations by a user or due to its own error checking routine.

5.12.5.5 Settings

The Settings tag must allow the user to access the following:

i) Alarms
ii) Warnings
iii) Data integrity rules

5.13 Software for remote access

5.13.1 Main Functions

(a) The will consists of six major components, namely:
   i) Data analysis (trending and forecasting) modules and export of data
   ii) Bridge view
   iii) A report generation module
   iv) System status
   v) Access to all log files
   vi) System configuration

(b) The program will need access to the bridge system via the network.

(c) The program to access the bridge must:
   i) Be a Windows based standalone program that can be installed on any Transnet PC.
   ii) Be supplied on a CD without any password protection.
   iii) Allow for the connection to the bridge to access the database.

iv) Depending on password setting allow users to view or change settings.

v) Allow multiple users to view the data anytime without losing connections to the other users and data integrity.

vi) Have routines that will speed up queries and data manipulation.

vii) Save data on the local PC in a format that can be used in the program instead of accessing the data from the bridge or database.

viii) Allow for the setting of a time window.

ix) Allow data to be exported into Excel.

x) Allow for saving and retrieving the viewing and analysis setting.

The functionality of each component will be discussed below.

5.13.1.1 Data viewing, analysis (trending and forecasting) modules and export of data

The program must be able to retrieve data from the bridge to enable the analysis of the data.

A. Calculation

The program must perform the following calculations

(a) Calculate the SFT based on the rail force and temperature depending on what was selected. (E.g. 1, 2, 3, 4 channels)

(b) Averaging of the grouped channels depending on what was selected.

(c) Amount of time above each of the 3 user defined force limits.

(d) Minimum and Maximum for each day

B. Viewing

The program must be able to perform the following viewing on the data

(a) Maximum of 4 windows for selection plotting any channel or channels or calculated channel on the x and y axis including time on the x axis.

(b) It must be possible to browse through the data, set the window size, x and y scaling manual and automatic, zoom in and out, common x axis.

(c) Capture, export to Excel, PDF and print the view

C. Filtering

The program must be able to perform the following filtering on the data

(a) Select all the data above or below a predefined limit based on the selected channels

(b) Set values for the data to exclude them from the graphs and analysis

(c) Select to exclude data if it is not within a certain value from a certain window size.

D. Modelling (trending and forecasting)

(a) The slope of the line

(b) Based on the expected maximum air temperature it must use the data for the last 5 days to predict the maximum rail forces on a graph.

5.13.1.2 Bridge view

The Bridge view must allow for the same viewing functionality as on the bridge system. No data manipulation shall be possible.

5.13.1.3 A report generation module

The program must be able to generate a report for the following:

(a) The current equipment status

(b) The dates with details of what maintenance were performed on the system

(c) The rail properties used in the calculations

(d) A copy of the various CTC screens showing a rolling months data

(e) A summary of the calibration values and when it was calibrated

(f) The user will be able to print, edit the reports and/or import them into other report-writing software packages, e.g MS Word, PDF, Excel.

5.13.1.4 System status

The web based interface must work on current Transnet computers and be able to get the information, print it, save it as a file and change its status. The details of what alarms, warning and status that is required are discussed else where in this document.

5.13.1.5 Access to all log files

The program must allow access to the bridge log files, history to alarms and warnings on the bridge to view and retrieve them. This shall be password protected.

5.13.1.6 System configuration

The program must allow access to the bridge system to set up and back up;

(a) Alarm levels on rail force

(b) Communication information

(c) SMS module information

(d) Data and date base settings

(e) Warning information

5.14 **Communication module**

The communication module shall met the following minimum requirements;

(a) The interface between the field units and the System Server shall consist of the following possibilities (dual modems shall be supplied):

i) Ethernet TCPIP

ii) GPRS communication channel via TCP-IP sockets (GPRS/SMS capable modem) Contractor to supply modem

iii) SMS messaging on the Transnet APN

All communication equipment must be ICASA type approved.

All above mentioned media shall be accompanied by a detailed design and proposal that has to be approved by Transnet Freight Rail (Rail Telecoms and Technology Management) as well as reasons why particular option or options are proposed. The development of a data sending protocol where needed shall be included in the detailed site design and is governed by specification.

(b) Communication messages shall be sufficient to cater for all the functionality of the system, including at least the following:

i) Status of power management system

ii) Status of the equipment

iii) Calibration status

iv) Data messages as per Appendix A table 2 for channels list and table 3 for sequence of channel display.

v) Data messages for the limits

vi) Time synchronisation message

vii) System Alarm notifications

viii) Error connecting to the database.

The old system worked in the manner as described below, and is given as a guide although it is not comprehensive enough for the new system.

(c) When this time period has elapsed, the A-D bridge system will communicate with the system server and transmits all the data stored up to that point (typically 20 readings).

(d) After each measurement, the communication unit shall go into a low power state and the modem shall then be switched on at the specified transmission rate.

(e) At every transmission interval, the unit shall attempt to communicate to the system server as follows;

i) Wake up the GSM/GPRS modem

ii) Establish GPRS connection with the system server

iii) Transmit measurement data for the measurements that is stored in memory

(f) If the unit cannot establish a GPRS connection, it shall try again. If connection is unsuccessful, the unit shall try to send the data through the Satelite link. The field unit shall received a confirmation of data successfully received by the system server. After this, the field unit shall go into sleep mode until it needs to take the next measurement. After the next measurement, the unit shall try once again to communicate to the server if all the above was not successful and again try to send all data in memory.

5.15 **Integration to CASDAM**

a. The system shall be integrated to CASDAM. (All data to be sent to a centralized database where CASDAM will interface with it.)

b. Integration to CASDAM shall be done as specified in Transnet document BBD 8646.

c. The supplier shall submit database layout / design as part of the documentation when the system is delivered.

d. The above mentioned shall be accompanied by a detailed design and proposal that has to be approved by Transnet Freight Rail (Technology Management) as well as reasons why particular option or options are proposed. The development of a data sending protocol where needed shall be included in the detailed site design and is governed by specification.

e. The system must include all user log files, alarm log files, message log files and system log files. The information must be stored on the remote PC until it is updated on CASDAM.

5.16 **Integration to Operational alarm terminal**

Integration to the Operational alarm terminal in the CTC will be done through the ITCMS.

5.17 **Cabling**

a. All cables connecting to rail mounted equipment shall be removable and protected by suitable UV resistant tubing (i.e. hydraulic hose)

b. All cables shall be properly marked.

c. All cables in the bridge shall be properly laid in steel trunking with new cables.

d. All plug fitted outside the bridge must be IP67 while those inside the bridge must be IP65.

e. All cabling shall conform to the minimum specification of the manufacturer of the "Data acquisition system".

f. Alternative cabling options will only be allowed if approved by Technology Management.

g. All exposed cabling shall be protected by means of an approved hydraulic hose.

h. Plugs must be supplied on all cable ends.

5.18 **Calibration and commissioning**

a. It is the responsibility of the contractor to install commission and calibrate the system.

b. This must be completed before signoff of the project.

c. The preferred method for calibration of the force sensor is by cutting the rail. If it is not possible to cut the rail the contractor must use a de-stressing frame with a valid calibration certificate.

d. The contractor must quote on installing the system during a shut as well as then they have to install the system between trains. If the shut is available it would require the work to be done in 4 days.

e. A comprehensive soak test and system approval must be done and approved by Transnet (Technology Management) before installing the system in the field.

f. Once the old system is disconnected the system must be installed and operational within 4 days. The system must not be installed during a period where there are the potential of force alarms being triggered without the contractor actually monitoring the rail forces.

5.19 **Delivery**

a. The system must be delivered on time as set out in the contract documentation.

5.20 **Experience**

a. The system offered must be past the experimental stage and must have a proven track record. The supplier must have installed at least 5 similar systems with the same amount of complexity. The supplier must supply proof of the above (hardware and software) during the tender stage.

5.21 **General**

a. The complete bridge system must be housed in a dustproof cabinet inside the bridge deck using positive pressure with the applicable filters.

b. All equipment attached to the rail shall be clamped or glued to the rail and under no circumstance shall welding, drilling or any other form of attachment be allowed.

c. No rail mounted equipment shall protrude above the rail surface.

d. The rubber hose shall have a double layer of wire re-enforcing.

e. All work near or close to the railway line must be co-ordinate with the depot engineer.

f. Safety induction of all the contractors' personnel will be required to ensure they know how to operate near railway lines. This would include an electrical awareness course.

g. The sleepers where the force monitoring transducers will be installed must be painted yellow as per Transnet requirements for monitoring systems.

6. ENVIRONMENTAL REQUIREMENTS

a. The system shall be suitable for operation in 3-kilovolt DC traction, 25-kilovolt AC traction and 50-kilovolt traction areas. The system shall be immune to the traction profiles as specified in the relevant section of Infrastructure (signals) standard specification no. CSE-1122-103 CAT E97.

b. High humidity, thunderstorms and corrosion shall be catered for.

c. The system shall operate in ambient temperatures varying from -15° to 70° Celsius, with humidity ranging from 0 to 95% non-condensing. The thermal design of the system shall be such that the increased temperature experienced by system components caused by system packaging and exposure to direct sun light, shall not influence the operation and reliability of the system.

d. All track-mounted and track side equipment shall have comprehensive lighting protection to enable the equipment to withstand, without damage or loss of functionality, severe lighting activity, except for a direct

hit. The lighting protection shall comply with the relevant sections of Infrastructure (Signals) standard specification no. CSE-1154-001 CAT E48.

e. All track-mounted and trackside equipment shall be capable of withstanding, without damage or loss of functionality, the vibration experienced with the passage of a train. Vibration resistance shall comply with the relevant sections of Infrastructure (Signals) standard specification no. CSE-1154-001 CAT E48.

f. All equipment shall comply with the relevant sections of Infrastructure (Signals) standard specification no CSE-1154-001 CAT E48 as applicable to both coastal and inland areas.

g. Track-mounted and track side equipment shall be protected against vandalism, flying ballast stones and equipment dragging from the train.

h. Electromagnetic susceptibility limits of the system and all its components shall comply with Infrastructure (Signals) standard specification no. CSE-1154-001 CAT E48.

7. DOCUMENTATION

a. The system and its documentation shall be fully documented in English in compliance with Infrastructure (Signals) standard specification no. CSE-1159-001.

b. 3 Sets of hard copy operational, maintenance and training manuals shall be available upon delivery of the system. 3 CD's with an electronic copy of the manuals must also be supplied.

c. The list of documents as described in Standard Specification CSE-1159-001 category X48 shall be supplied with the system.

d. The technical documentation shall contain all the relevant information of the interfaces to the system in addition to the requirements of standard specification no CSE-1159-001.

e. The documentation shall be adequate to enable the technical staff of Transnet Freight Rail to be able to interface with the system for purposes of upgrading the force monitoring field units, extraction of information, or integration into existing infrastructure systems.

f. The documentation shall be adequate to enable the maintenance staff of Transnet Freight Rail to be able to maintain the system to reach a satisfactory availability level. Maintenance schedules and procedures with a proposed spares list shall form of this document.

g. "As-built" set of drawings shall be delivered at the force monitoring system site.

h. All documentation and software shall be delivered on CD to TFR apart from the hard copies as prescribed in Standard Specifications CSE-1159-001 Category X48. Any software supplied by 3rd parties such as Microsoft SQL Server will be supplied as received from the relevant supplier.

i. All printed manuals shall be delivered in high quality plastic covered 4 ring binders.

8. LOGISTICS

8.1 Training

a. The Transnet personnel that will be responsible for maintaining the system shall be trained to install the transducer modules. The supplier can outsource the accredited supplier. This will be done in Saldanha during the installation of the system.

b. The supplier shall provide on job training to Transnet personnel during the installation of the system.

c. The supplier shall provide 3 days training to the relevant personnel at the depot on completion of the installation. Date to be fixed 30 days before the date of training. Training material must be supplied as part of the training that is comprehensive enough to allow new staff to do self-training.

d. The supplier shall provide 1 days training to the relevant personnel at the Olifants River Bridge on completion of 3 days training above.

8.2 **Maintenance**

a. The system offered must limit preventative maintenance to a minimum but must not be more than once per annum. Supplier must indicate what maintenance and how frequent it will be required.

b. Any required preventative maintenance shall be clearly defined in the maintenance documentation.

c. ATFR engineering Technical shall execute first line maintenance with specific training in the functional operation of the system at unit level.

d. A TFR Engineering Technician shall execute second line maintenance with specific training in the functional operation of the system at component level.

e. The contractor must supply a list of strategic spares and prices for all the items that they do not keep stock and that they cannot source within a week from the request for spares or repairs.

8.3 **Guarantees**

a. The contractor must have a qualified technician in South Africa that can service/repair and replace equipment.

b. The contractor must guarantee that he can supply a technician to do the work within 5 working days.

c. To reduce the risk the contractor must indicate what equipment cannot be repaired locally.

d. The supplier must state by which year it is anticipated that this equipment will be out of production and for how long spares will be available thereafter.

e. No equipment must be supplied that will be phased out in the next 5 years.

f. The contractor must undertake to have spares and a repair facility that can replace and repair the supplied equipment for a minimum period of 5 years within 7 days. This spares exclude the spares in the list of strategic spares requested above.

g. The system and all equipment supplied must have a warranty of at least 2 years from the date of handover to TFR.

9. QUALITY ASSURANCE

a. All proposed equipment used in the design shall be approved by Transnet Freight Rail (technology Management)

b. All the technology owners of the systems that need to be integrated including Technology Management shall be presented at the mandatory tender site meeting as well as at the Technical clarification meeting with the preferred contractor.

9.1 **Test and examinations**

a. An acceptance test procedure (ATP) to test the functionality of the system using a holistic approach shall be drawn up by the contractor. This document shall be subject to approval by Technology management.

b. The test shall trace the flow of information to and from the various subsystems to ensure the correctness of information throughout the system.

c. The test shall firstly verify correct operation under normal conditions. The test shall then be repeated using data with known fault content to verify the operation under fault conditions.

d. The test procedure shall be documented by the contractor in an Acceptance Test Procedure (ATP) document.

e. This ATP shall then be presented to Technology Management for approval during the tender stage and before the tender is signed.

f. The contractor shall make any changes to the ATP, deemed necessary by Technology Management. Once approved, this ATP, together with the System Specification shall be used to determine system compliance during commissioning.

g. The test shall be conducted for short term and long term.

h. The system shall be tested and approved to be used in Transnet.

9.2 **Responsibility of tests**

Technology Management shall appoint a Test Officer (TO). The appointed TO shall perform acceptance tests on completion of the installation and shall complete an acceptance report with the signatures of the maintenance representative, before the system or part thereof is handed over to maintenance. The minimum tests to be performed shall be determined by mutual consent between Technology Management and the supplier before signing of the contract.

10. DELIVERY

The system must be delivered and installed as specified in the contract document.

11. APPENDIX A – LAYOUT AND MEASUREMENTS PARAMETERS

11.1 APPENDIX A Figure 3: Layout of the measurements parameters

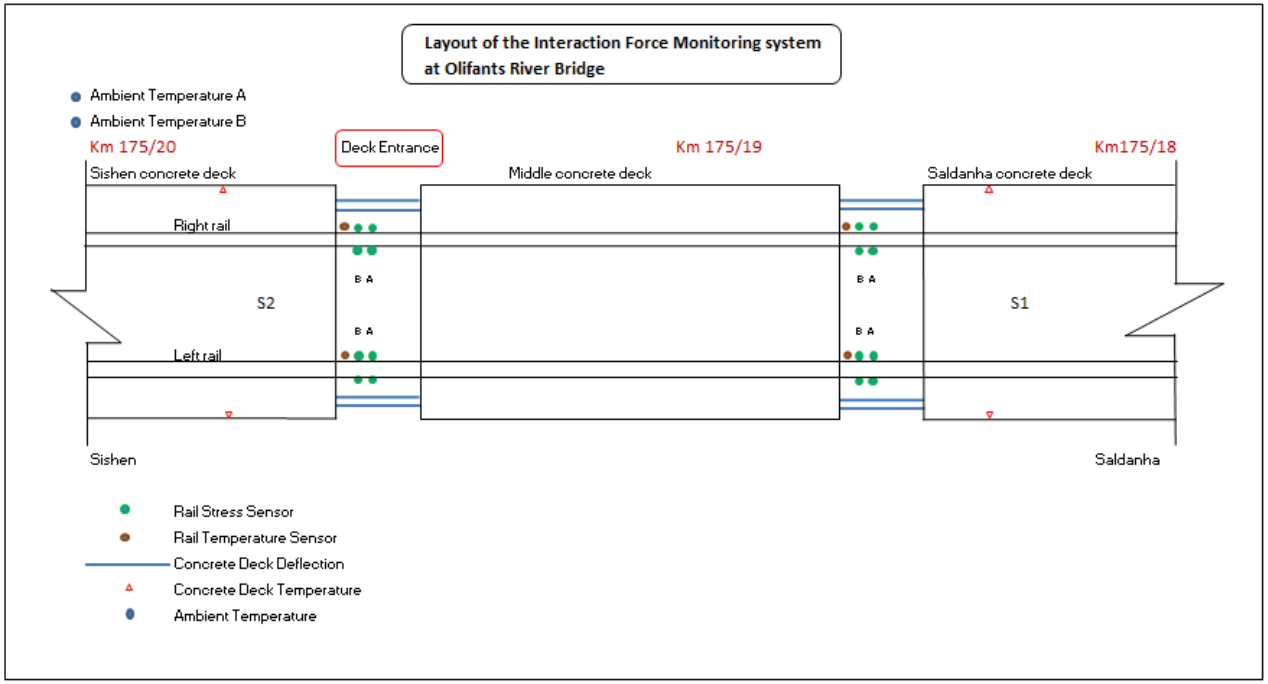


Figure 2: Layout of the measurement parameters on the Olifants River Bridge

11.2 APPENDIX A Table 2: Measurements Parameters and Positions

Table 2: Measurement locations, parameters and units of measure

Olifants River Bridge Interaction Force Monitoring System Measurements Parameters					
Channel #	**Measurements Location**	**Parameter**	**Rail Position/Location**	**Abbreviation**	**Units**
1	Saldanha expansion gap (S1)	Rail Stress	Left Field A	S1 RS LF A	KN
2	Saldanha expansion gap (S1)	Rail Stress	Left Field B	S1 RS LF B	KN
3	Saldanha expansion gap (S1)	Rail Stress	Left Gauge A	S1 RS LG A	KN
4	Saldanha expansion gap (S1)	Rail Stress	Left Gauge B	S1 RS LG B	KN
5	Saldanha expansion gap (S1)	Rail Stress	Right Field A	S1 RS RF A	KN
6	Saldanha expansion gap (S1)	Rail Stress	Right Field B	S1 RS RF B	KN
7	Saldanha expansion gap (S1)	Rail Stress	Right Gauge A	S1 RS RG A	KN
8	Saldanha expansion gap (S1)	Rail Stress	Right Gauge B	S1 RS RG B	KN
9	Sishen expansion gap (S2)	Rail Stress	Left Field A	S2 RS LF A	KN
10	Sishen expansion gap (S2)	Rail Stress	Left Field B	S2 RS LF B	KN
11	Sishen expansion gap (S2)	Rail Stress	Left Gauge A	S2 RS LG A	KN
12	Sishen expansion gap (S2)	Rail Stress	Left Gauge B	S2 RS LG B	KN
13	Sishen expansion gap (S2)	Rail Stress	Right Field A	S2 RS RF A	KN
14	Sishen expansion gap (S2)	Rail Stress	Right Field B	S2 RS RF B	KN
15	Sishen expansion gap (S2)	Rail Stress	Right Gauge A	S2 RS RG A	KN
16	Sishen expansion gap (S2)	Rail Stress	Right Gauge B	S2 RS RG B	KN
17	Saldanha concrete deck (S1)	Concrete Deck Deflection	Left A	S1 CDD LA	mm
18	Saldanha concrete deck	Concrete Deck Deflection	Left B	S1 CDD LB	mm
19	Saldanha concrete deck	Concrete Deck Deflection	Right A	S1 CDD RA	mm
20	Saldanha concrete deck	Concrete Deck Deflection	Right B	S1 CDD RB	mm
21	Saldanha concrete deck	Concrete Deck Deflection	Left A	S2 CDD LA	mm
22	Saldanha concrete deck	Concrete Deck Deflection	Left B	S2 CDD LB	mm
23	Saldanha concrete deck	Concrete Deck Deflection	Right A	S2 CDD RA	mm
24	Saldanha concrete deck	Concrete Deck Deflection	Right B	S2 CDD RB	mm
25	Saldanha expansion gap (S1)	Rail Temperature	Left	S1 RT L	°C
26	Saldanha expansion gap (S1)	Rail Temperature	Right	S1 RT R	°C
27	Saldanha expansion gap (S2)	Rail Temperature	Left	S2 RT L	°C
28	Saldanha expansion gap (S2)	Rail Temperature	Right	S2 RT R	°C
29	Saldanha concrete deck	Concrete Temperature	Left	S1 CDT L	°C
30	Saldanha concrete deck	Concrete Temperature	Right	S1 CDT R	°C

31	Saldanha concrete deck	Concrete Temperature	Left	S2 CDT L	°C
32	Saldanha concrete deck	Concrete Temperature	Right	S2 CDT R	°C
33	Stephenson Screen	Ambient Temperature		ATA	°C
34	Stephenson Screen	Ambient Temperature		ATB	°C
35	Centre of bridge	Wind Speed		W1	m/s

11.3 **APPENDIX A Table 3: Measurements Parameter Display Requirements on the Web and Application Interface**

Table 3: Proposed sequence of parameters or channels display

Sequence of Channels Display on the Web and Application Interface							
Number	**Abbreviation**	**Number**	**Average**	**Number**	**Average**	**Number**	**Average**
15	S1 RS LF A	7	S1 RS LF	3	S1 RS L	1	S1 RS
16	S1 RS LF B						
17	S1 RS LG A	8	S1 RS LG				
18	S1 RS LG B						
19	S1 RS RF A	9	S1 RS RG	4	S1 RS R		
20	S1 RS RF B						
21	S1 RS RG A	10	S1 RS LF				
22	S1 RS RG B						
23	S2 RS LF A	11	S2 RS LF	5	S2 RS L	2	S2 RS
24	S2 RS LF B						
25	S2 RS LG A	12	S2 RS LG				
26	S2 RS LG B						
27	S2 RS RF A	13	S2 RS RG	6	S2 RS R		
28	S2 RS RF B						
29	S2 RS RG A	14	S2 RS LF				
30	S2 RS RG B						
37	S1 CDD LA	33	S1 CDD L	31	S1 CDD		
38	S1 CDD LB						
39	S1 CDD RA	34	S1 CDD R				
40	S1 CDD RB						
41	S2 CDD LA	35	S2 CDD L	32	S2 CDD		
42	S2 CDD LB						
43	S2 CDD RA	36	S2 CDD R				
44	S2 CDD RB						
47	S1 RT L	45	S1 RT				
48	S1 RT R						
49	S2 RT L	46	S2 RT				
50	S2 RT R						

53	S1 CDT L	51	S1 CDT
54	S1 CDT R		
55	S2 CDT L	52	S2 CDT
56	S2 CDT R		
54	ATA	53	AT
55	ATB		

12. APPENDIX B – CURRENT SYSTEM INFORMATION

This document depicts the Force Monitoring system installed at Olifants River Bridge. Below is the depiction of the current Force monitoring system installed at Olifants River Bridge

Appendix B Figure 3: Olifants River Bridge on the Ore Line

Appendix B Figure 4: Location 1 of the Force Monitoring System on the Olifants River Bridge – the nearest KM distance

Appendix B Figure 5: Location 2 of the Force Monitoring System on the Olifants River Bridge – the nearest KM distance

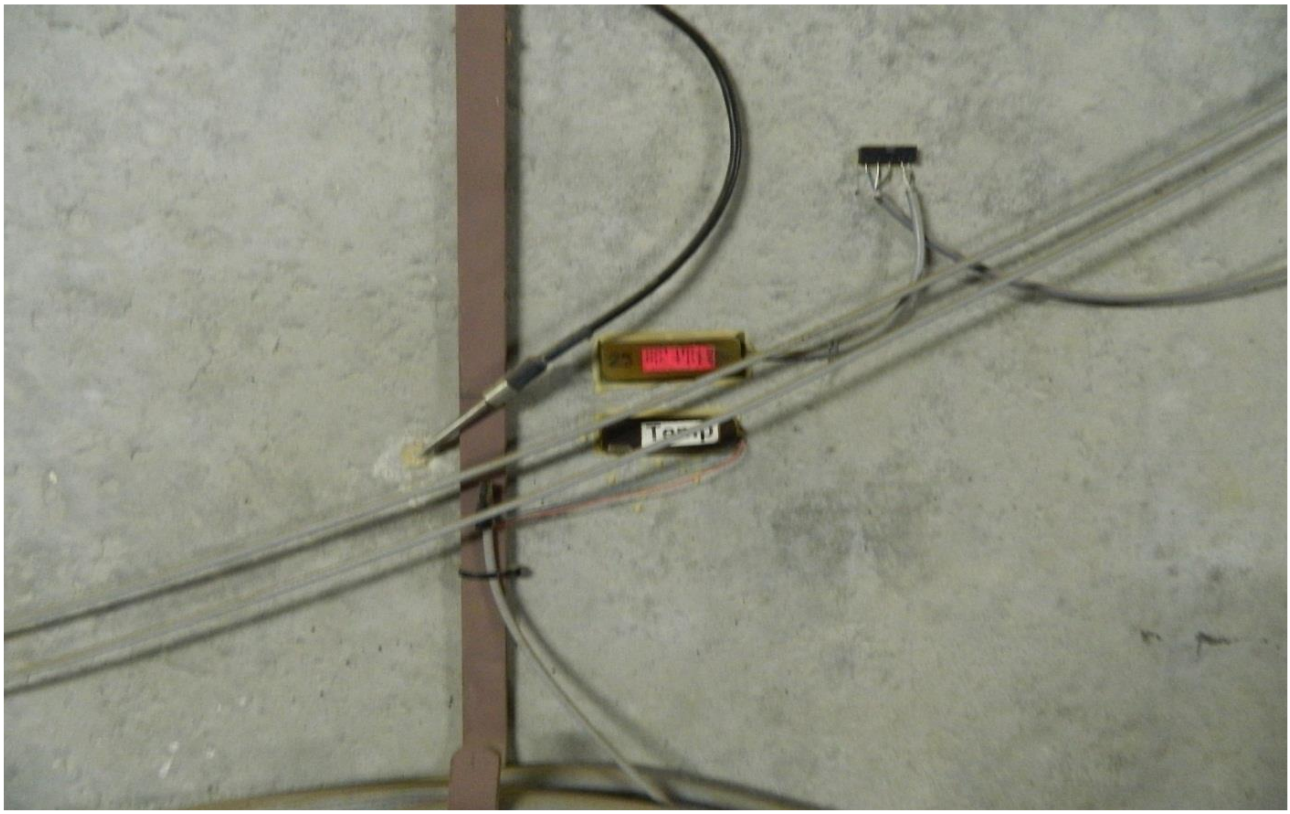
Appendix B Figure 6: Expansion joint on the Sishen side of the ORB by the right hand side – It is used as the entrance to the hardware of the monitoring system

Appendix B Figure 7: Entrance to the hollow deck – stairs are used to go down.

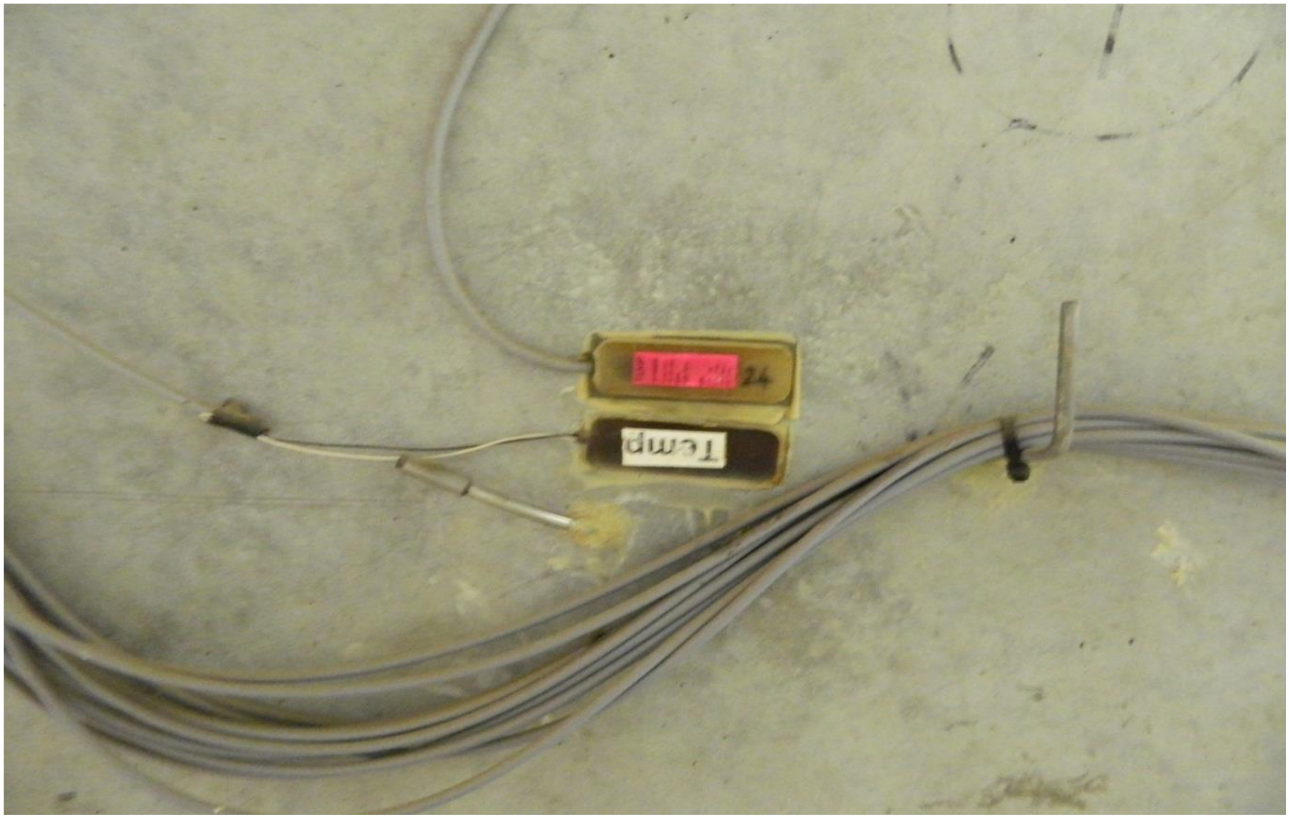
Appendix B Figure 8: Positions of the measurements locations on the Olifants River Bridge indicated by the white ballast at expansion joint 1 (Sishen deck) and expansion joint 2 (Saldanha deck)

Appendix B Figure 9: Rail stress and temperature measurements sensors at expansion joint 1 for system 1 and 2

Appendix B Figure 10: Rail stress and temperature measurements sensors at expansion joint 1 for system 1 and 2



Appendix B Figure 11: Concrete temperature sensors inside the hollow deck walls on the right hand side for system 1 and 2



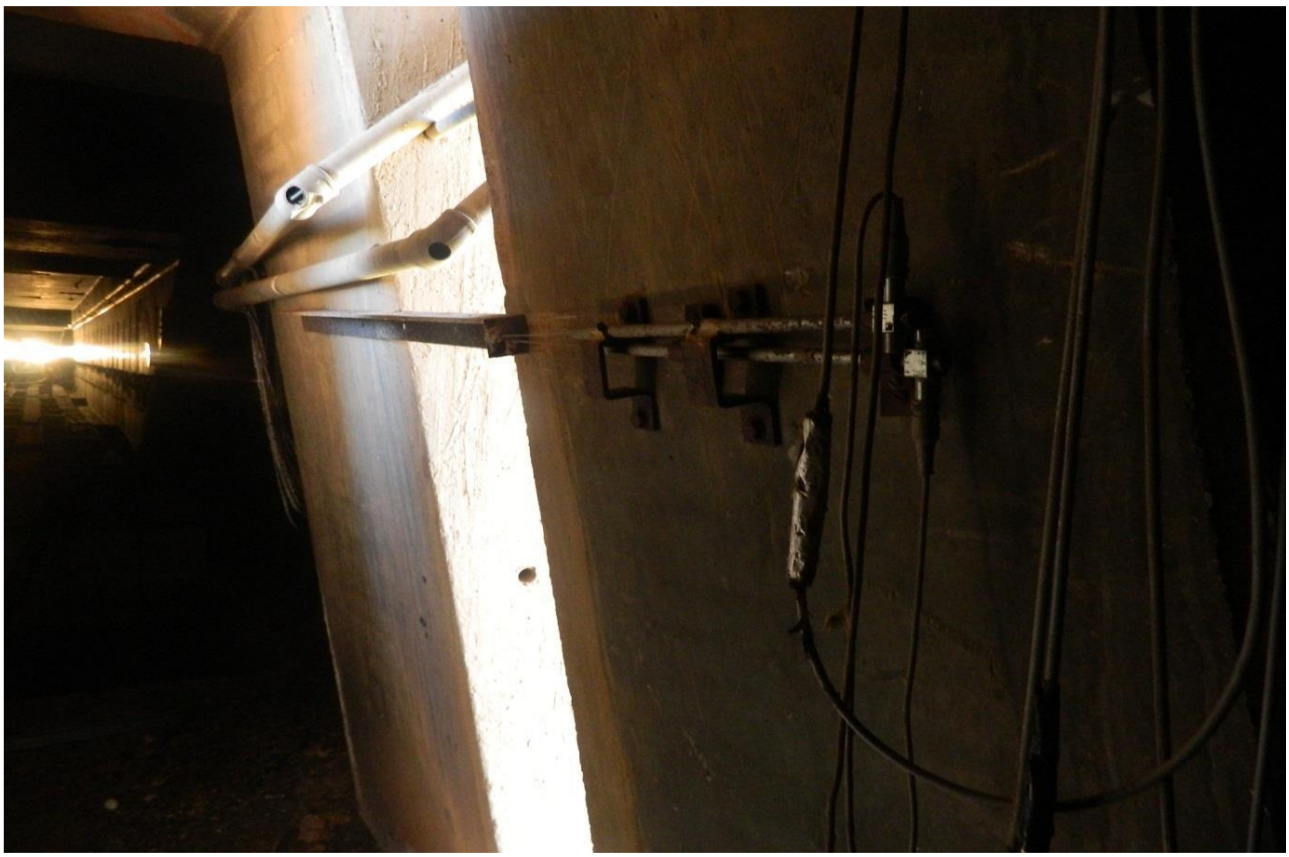
Appendix B Figure 12: Concrete temperature sensors inside the hollow deck walls on the left hand side for system 1 and 2

Appendix B Figure 13: Ambient temperature sensors inside the Stevenson screen for system 1 and 2

Appendix B Figure 14: Ambient temperature sensors inside the Stevenson screen for system 1 and 2

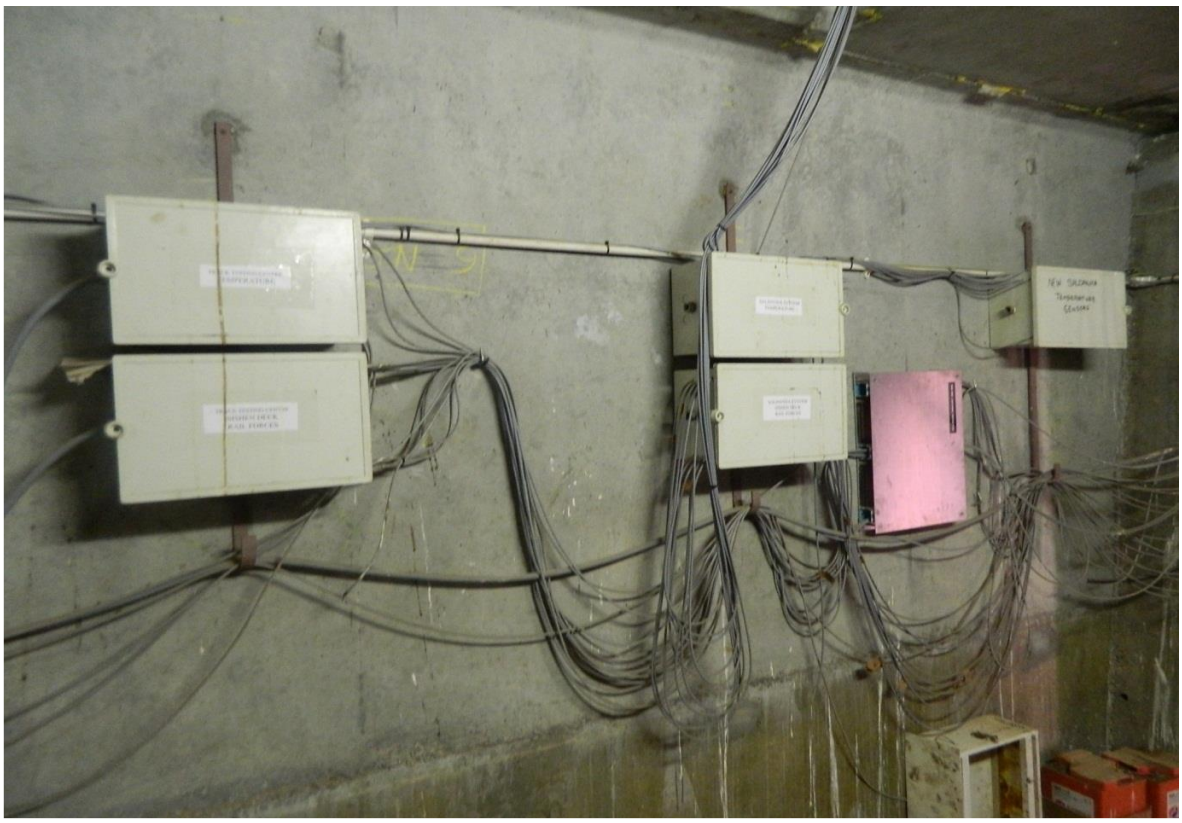
Appendix B Figure 15: Concrete deck deflection measurements sensors on the right hand side of the bridge deck at expansion joint 1 deck for system 1 and 2

Appendix B Figure 16: Concrete deck deflection measurements sensors on the left hand side of the bridge deck at expansion joint 1 for system 1 and 2



Appendix B Figure 17: Concrete deck deflection measurements sensors on the right hand side of the bridge deck at expansion joint 1 for system 1 and 2

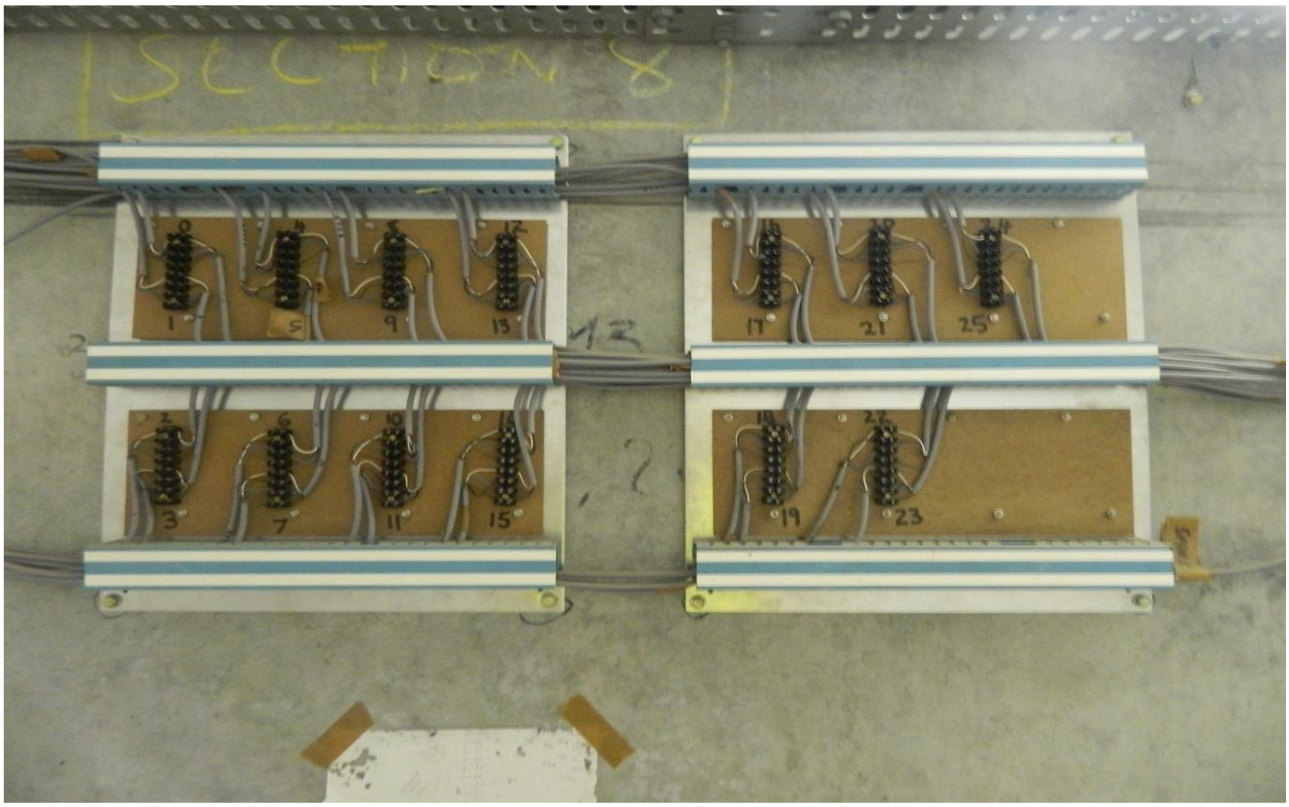
Appendix B Figure 18: Concrete deck deflection measurements sensors on the left hand side of the bridge deck at expansion joint 1 for system 1 and 2



Appendix B Figure 19: Interface box for system 1 mounted on the right hand side of the hollow deck walls

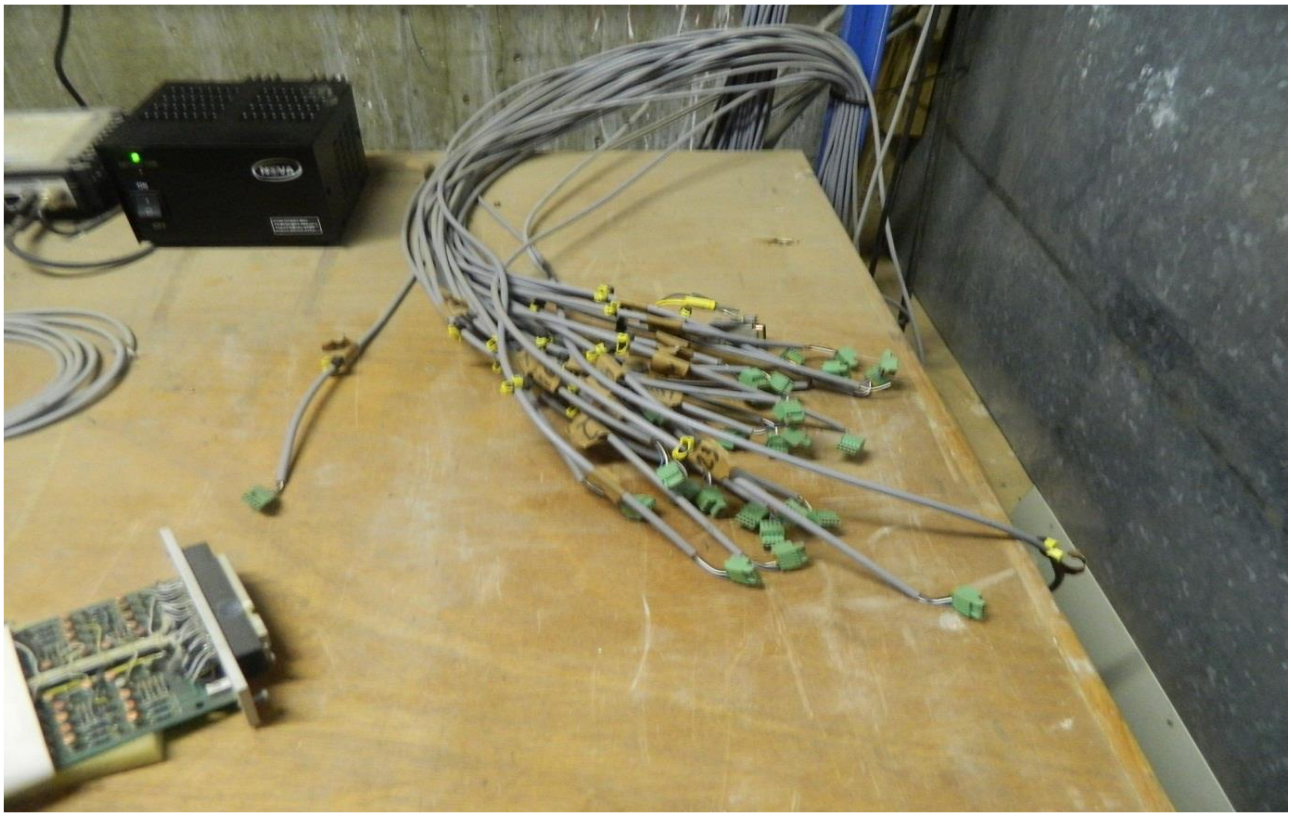
Appendix B Figure 20: Typical connections inside the interface box connection for system 1

Appendix B Figure 21: Interface connection of system 2 mounted on the left hand side of the hollow deck walls

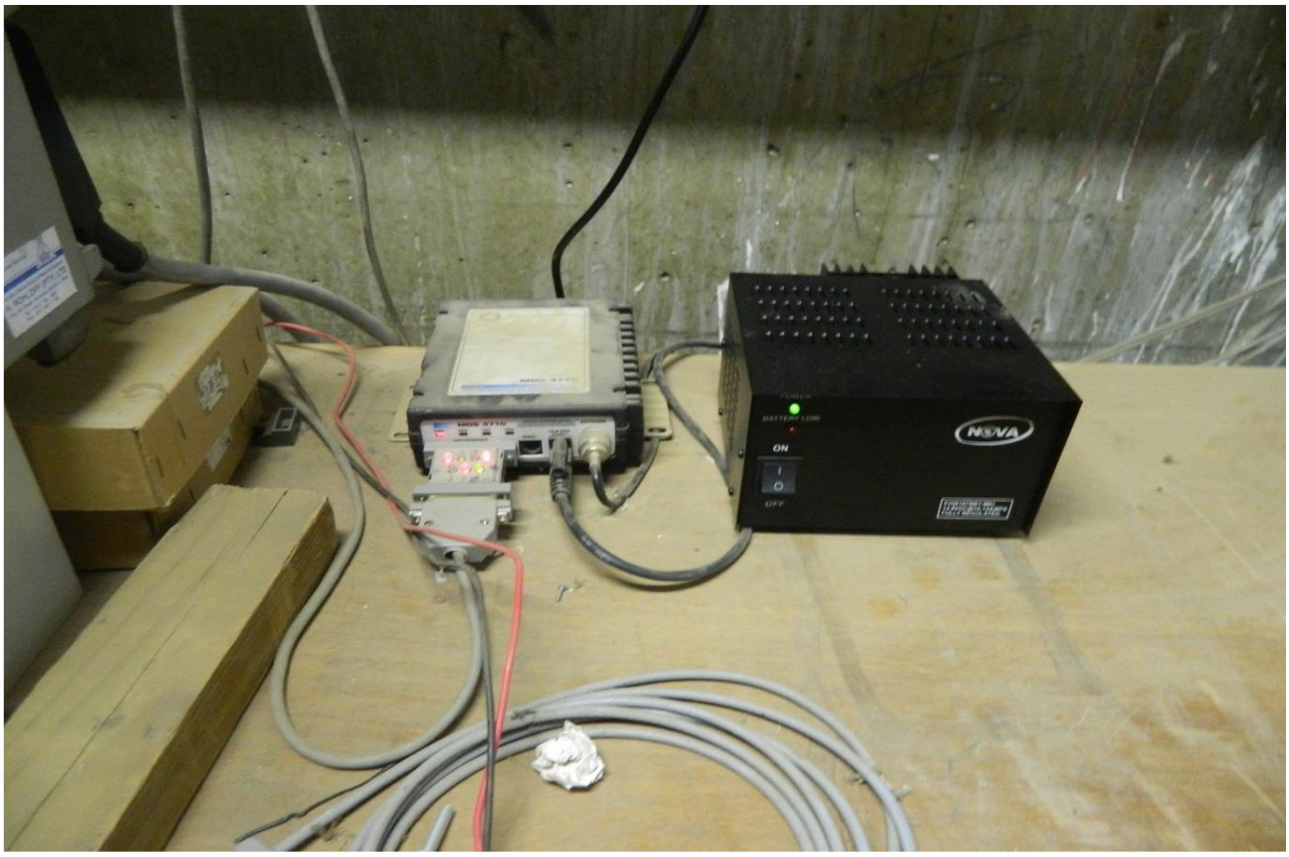


Appendix B Figure 22: Typical connections of the Interface connection of system 2

Appendix B Figure 23: UPM60 Amplifier scanners for system 1



Appendix B Figure 24: Sensor cables and connection plugs for system 2



Appendix B Figure 25: Communication module for system 1

Appendix B Figure 26: Communication antenna

Appendix B Figure 27: Transnet communication module

Appendix B Figure 28: Uninterrupted power supply of the monitoring system

Appendix B Figure 29: Batteries for the uninterrupted power supply of the monitoring system

BBB0804 Version 3

SPOORNET

A DIVISION OF TRANSNET LIMITED

ENGINEERING

SPECIFICATION

WHEEL IMPACT MONITOR & WEIGH IN MOTION (WIM-WIM) SYSTEM

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Date: 21 October 2005

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Transnet

Relevant third parties

BBB0804 Version 2

WHEEL IMPACT MONITOR & WEIGH IN MOTION

(WIM-WIM) SYSTEM

SYSTEM DOCUMENT INDEX

Item	Description	Document No	Version
1	Introduction	BBB0801	1
2	Users Manual	BBB0802	1
3	Hardware Technical Addendum	BBB0803	1
4	***Specification***	***BBB0804***	***3***

BBB0804 Version 3

SPECIFICATION FOR WHEEL IMPACT MONITOR AND WEIGH-IN-MOTION SYSTEM (KNOWN AS THE WIM-WIM SYSTEM)

1 Scope

1.1 This specification covers the supply and commissioning of a WIM-WIM System. The system must be able to monitor signals generated by passing wheels from a strain-gauged rail on standard track and give various reports as listed in specific requirements.

1.2 Data formats of acquired data (raw data) shall be compatible with present RPC3 data formats used by Spoornet Track Testing Centre. Information data (reduced data) will be in ASCII formats as described later below.

2 Compliance

2.1 Where the hardware and software offered complies with the recognised standard of the country of manufacture and not specifically with the standards required by this specification, such hardware and software will be considered at the discretion of Spoornet.

2.2 The supplier must indicate item by item with reference to the paragraph numbers herein, either that his tender complies in every respect with this specification or, if not, precisely how it differs from the specification.

2.3 A broad statement that the software is in accordance with the specification is not acceptable. Failure to comply with the above requirements may preclude a supplier from consideration.

2.4 The supplier is further requested to draw attention to and furnish his detailed comments and views on, any of the requirements of this specification, which in his considered opinion and based on his experience, is unrealistic or not up to date with current measuring techniques. In such instances fully motivated alternative offers must be submitted.

2.5 Additional information, comments or data not specifically called for in this specification, but considered by the supplier to be of possible importance or value for the purpose of assessing the merits or components offered by him, should be furnished.

2.6 In order to facilitate the evaluation, comparison and adjudication of offers, the supplier is requested to suitably bind, mark, index and cross reference the technical enclosures referred to forming part of this tender.

2.7 The tender must be complete in all respect and cover a complete offer for the hardware and software. Tenders or offers in respect of individual hardware and/or software packages are not acceptable and will not be considered.

2.8 The supplier is to verify each clause within this document with "complies" or "does not comply".

Specific Requirements

3 ENVIRONMENT

3.1 The system shall be suitable for operation in 3-kilovolt DC traction, 25-kilovolt AC traction and 50-kilovolt traction areas. The system shall be immune to the traction profiles as specified in the relevant sections of Infrastructure (Signals) standard specification no. CSE-1122-103 CAT E97.

3.2 The system could be installed in a remote area that could be difficult to reach for maintenance purposes.

3.2.1 High humidity, thunderstorms and corrosion should be catered for.

3.4 The system shall operate in ambient temperatures varying from -15° to 70° Celsius, with humidity ranging from 0 to 95% non-condensing.

3.5 All track-mounted and track side equipment shall have comprehensive lighting protection to enable the equipment to withstand, without damage or loss of functionality, severe lighting activity, except for a direct hit. The lighting protection shall comply with the relevant sections of Infrastructure (Signals) standard specification no. CSE-1154-001 CAT E48.

3.6 All track-mounted and trackside equipment shall be capable of withstanding, without damage or loss of functionality, the vibration experienced with the passage of a train. Vibration resistance shall comply with the relevant sections of Infrastructure (Signals) standard specification no. CSE-1154-001 CAT E48.

3.7 Electromagnetic susceptibility limits of the system and all its components shall comply with Infrastructure (Signals) standard specification no. CSE-1154-001 CAT E48.

4 Analog to digital conversion.

4.1 The system shall be able to monitor a minimum of 32 input channels.

4.2 The analog to digital must be of 12 bit or higher resolution.

4.3 The sampling rate must be a minimum of 500 000 samples per second for the system.

4.4 The data must be streamed through to disk continuously to a file size of up to 200 Mbyte at the rate specified in 4.3 without corruption of data.

4.5 The system must be configured such that all channels are controlled by one processor, controller or computer.

4.6 Specified connections to the strain gauge amplifiers must be supplied via "D"-type connectors.

4.7 The A/D system must be capable of handling an input of positive ten volt to negative ten volt. (±10V) Overload protection of ±25 volt must be included in the design of the A/D system.

4.8 All signal conditioning will be done before the signal reaches the A/D system.

4.9 The input impedance of the A/D interface must be greater than 100 K Ohm.(100 000 Ohm)

4.10 The system shall be configured for a ± 10Volt range. Linearity from zero volt to positive or negative 10 volts must be ±0.025% or better.(±1 bit)

4.11 Any offset from zero must be adjustable to zero.

4.12 Offset drift from zero must be 30ppm/°C or better.

4.13 Gain drift must be better than 30ppm/°C.

4.14 With all of the above taken into consideration, the total system inaccuracy must not exceed 0.05% of full scale.

5 Controlling software/hardware for data acquisition.

5.1 The data file format must be compatible to RPC3 multiplexed file format immediately on completion of the data acquisition.

5.2 Set-up parameters for the A/D must include:

5.2.1 Acquisition speed must be expressed in samples/second per channel or Hz per channel.

5.2.2 Length of acquisition time will be determined by time the train takes to pass in conjunction with clause 4.3.

5.2.3 Number of channels to sample.

5.2.4 Scaling per volt input in engineering units.

5.2.5 Channel descriptors (minimum 20 characters)

5.2.6 Engineering units (minimum 8 characters)

5.2.7 This set-up data must be able to be saved to a separate file. (default file holding all variables)

5.3.1 Triggering to start monitoring will be controlled by a trigger circuit not specific to any channel. The circuit shall be designed that it only triggers on a signal pulse and shall not be triggered by any drift. The trigger threshold shall be preset at 0.2 Volt and be adjustable from 0.08Volt to 6 Volt. The system will be such that automatic completion of the test is done after not sensing pulses for 7 seconds. This time must be able to be varied from 5 up to 30 seconds. The system must re-arm itself after reduction of data and transmission of reports. ***Also see:*** Clause 7: Trigger device with respect to variable channel numbers.

Alternative triggering (e.g. through software routines) will be considered, but should be specified and motivated in detail.

5.4 Interrupt from keyboard or stop button shall be provided to break into the system.

5.5 The raw data file of at least the last 100 trains must be available for viewing or dumping at all times on the WIM-WIM system in the field (field diagnostics and research).

5.6 A signal display program must be provided with selectable channels at selectable time windows to view the captured data as described in 5.5. The design of the program must be such that screen graphics is accelerated with the possible aid of a screen accelerator card.

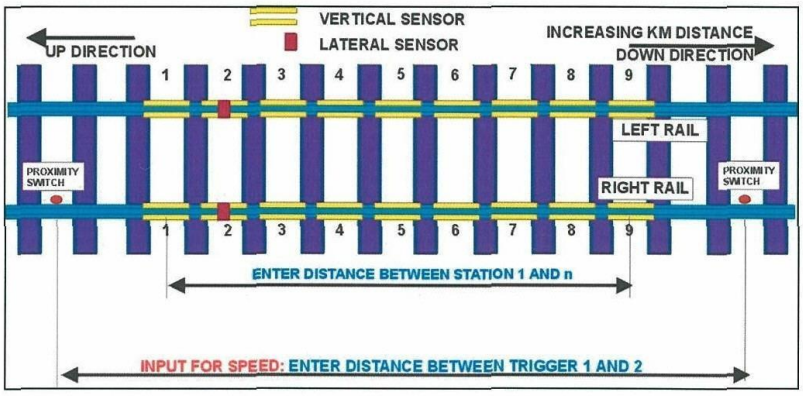
5.7 An additional program or function must be supplied to monitor input values on any channel for all channels on a full screen to check input voltages. This value must be updated every 2 seconds to an

accuracy of 5 mV (millivolt). Faster updating is not acceptable. This display shall display all active channels.

5.8 A watchdog must be provided to prevent hang-up of the system. Self start-up of the total system is required in the event of power loss or system freeze. A watchdog shall be provided and work at specified intervals (default is 60 minutes).

6. Site layout and initial set-up parameters

6.1 Site layout will be done as per figure below. The figure below shows a 9-cell/rail system. However provision must be made for any amount of cells per rail with a minimum of 2 cells/rail to a maximum of the user specified amount (*n*).



6.2 The number of vertical sensors is determined from a minimum of 2 to a maximum of *n* per rail (where *n* is the user specified number of vertical sensors per rail). Left rail sensors will be numbered from 1 to *n*. Right rail sensors are numbered from (*n+1*) to (*2n*).

6.3 The number of lateral sensors per rail is a minimum of 0 to a maximum of 3. Lateral sensors will be mounted in the following order: If 1 sensor is specified, it shall be mounted at vertical station 2. If two sensors are specified, they shall be mounted at stations 2 and 5. The mounting for 3 sensors shall be at stations 2, 5 and 8.

6.4 Numbering of lateral sensors are as follows: Left sensors are channels (*2n+1*) to (*2n+s*), where (*s*) is the number of lateral sensors specified by the user. Right Sensors are then numbered from (*2n+s+1*) to (*2n+2s*)

6.5 All vertical channels must be used in determining mass and identification of wheel impacts. However, only one set of lateral gauges may be used in the calculation of skewing parameters. This therefore requires a toggle for the user to specify which lateral set of sensors to use. Toggle numbers to be 1, 2 and 3 for stations 2, 5 and 8 respectively

7 Trigger device with respect to variable trigger numbers.

7.1 An external mounting with 4 female B&C plugs to accept male B&C shall be provided to accept the up and down trigger signals. This shall cater for variation in number of vertical channels. The four inputs shall be labelled: *TRIG DOWN1, TRIG DOWN2, TRIP UP1* and *TRIG UP2*. These channels shall not induce cross-talk amongst themselves or to other inputs.

7.2 Down direction is classed as triggered from station 1 side and up direction triggered from station (*n*) side. It will be the responsibility of Spoornet Operating to state which direction is up and down. *This shall be determined before installation of cells to the rails.*

8 Software window for Analog to Digital conversion.

8.1 A separate pull-down menu shall be provided for the A/D setups. This is to cater for:
a) Channel Setups,
b) Arming the system and
c) Provision of a window to read the A/D inputs in engineering values.

8.1.1 Channel setups must provide for
a) Channel descriptor 20 alphanumeric characters
b) Scale factor to 3 decimals with (Unit/Volt)
c) Engineering Unit 20 alphanumeric characters
d) Channel offsets Engineering value

8.1.2 Arming of the system – Provision for a single run and provision for continuous operation is to be provided.

8.1.3 The A/D input must be provided to view all 32 channels. This value must be updated every 2 seconds to an accuracy of 5 mV. Faster updating is not acceptable.

9 Analysis Software/Hardware.

9.1 The layout of the measuring site is described below as follows and a system of pages must be provided to accommodate the following inputs:

9.1.1 Input - Number of Load sensors per rail - Variable (N) with 9 as default
Default: Left rail shall always have channel numbers 1->N
Right rail shall always have channel numbers (N+1)->(2N)

9.1.2 Input - Number of lateral sensors per rail - Variable (S) with 1 as default
Default: Left rail shall always have channel numbers (2N+1)->(2N+S)
Right rail shall always have channel numbers (2N+S+1)->(2N+2S)
Note: Only one lateral station will be used in the analysis.

9.2 **Cell Drift removal**: Before analysis commences, a system must be in place to ensure that all drift of signals is removed via software.

10 Vehicle/Loco recognition

10.1 A mini data-base window must be provided to add/edit locomotive or special vehicle wheel spacings.

10.2 Loco recognition shall be such that the program will recognise a specified vehicle in the loco data base at any point within the train, whether front, middle or rear at speeds of above 5km/h.

10.3 A window with the layout sketch must be provided to enter the distance for speed recognition and subsequent locomotive recognition.

10.4 Two proximity devices shall be provided to use as inputs to determine speed and vehicle recognition. These channels will be numbered (*2N+2S+1*) on the down side and (*2N+2S+2*) on the up side. As before, alternative procedures for vehicle/loco recognition will be considered.

11 Filter Routines to be run

11.1 The analysis routine needs the data to be filtered. The data shall be filtered with a 2 pole filter.

11.2 Provision must be made to only filter at 30, 40, 50 and 60Hz. Curves have been developed for speed/attenuation correction. The above curves have been developed for gauge spacing at 425mm centres. The curve data will be provided for inclusion in the program. This shall be included as a database that may be edited to accommodate other gauge spacings.

11.3 If the user enters any other figure than 30, 40, 50 or 60 for the filter frequency, an error message must be generated to correct the user.

11.4 The filtered data is only applicable to the vertical measurements. Analysis on the lateral data must use the original unfiltered signal.

11.5 It is desired to use the unfiltered signal of the proximity sensors for speed and loco recognition. However, in some cases, dependant on site location, it would be required to use the filtered signal of the proximity sensors. It is therefore required that an option be inserted into the setup window to select the filtered or unfiltered signal of the proximity sensor. (Ground loop spikes from locomotives)

12 Mass Measurement Analysis

12.1 The speed of the train must be determined to access the 'Reject and Correlation time table'. Reject time is defined as the time in which only one event may occur. Correlation time is defined as the time window for the master to detect any slave channel values. This table is supplied below.

Speed	Reject	Correlation
1	300	280
15	180	170
30	120	115
45	90	85
60	70	65
75	55	50
90	40	38
105	33	31
120	30	29
135	27	26
150	25	24
165	24	23
180	23	22
195	22	21
210	21	20
225	19	18
240	18	17
270	15	14

12.2 Threshold Peak picking is done at 1ton threshold selecting peaks only with the filtered channel as master and original signal as slave making use of reject and correlation times. This is done for channels 1 to 2N. The threshold value shall be a variable.

12.3 Condition: If Original > Filtered peak + 3 ton, the wheel is classed as flat.
If Original > Filtered peak + 5 ton, wheel on that specific cell may not be used to determine mass of vehicle.
Use of variables must be made for flat classification and also mass classification.

12.4 Determine mass of vehicles with known facts: - average of approved peaks summed from the filtered values and making provision for calibrated in-motion measurements. This table takes care of track stiffness and latent geometric track defects.

12.4.1 The mass of each vehicle is to be determined. A 'dynamic factor table' is to be supplied for both the up and down directions of traffic. Three mass categories are given as shown below:
3 column factors: >90 ton >60 but <90 ton <60 ton

12.4.2 Speed increments are in steps of 5 km/h from 0 to 100km/h terminating with 250km/h.

12.4.3 Calibration factor is expressed as: Dynamic/Static mass, that is, the mass of the vehicle is divided by the dynamic factor as given in the table to obtain the "static mass"

12.4.4 An example table is displayed below. The values within the original set-up should be entered with a default value of 1 for all speeds

Speed	>90 ton	>60 but <90 ton	<60 ton
0	1.006	1.008	1.009
5	1.006	1.008	1.0095
10	1.0065	1.008	1.01
15	1.007	1.0085	1.012
20	1.0085	1.013	1.0163
25	1.0135	1.019	1.021
30	1.0185	1.025	1.025
35	1.0268	1.03	1.028
40	1.033	1.035	1.0315
45	1.037	1.0395	1.034
50	1.0395	1.044	1.036
55	1.0395	1.0455	1.038
60	1.038	1.0435	1.0385
65	1.0345	1.04	1.038
70	1.03	1.035	1.032
75	1.02	1.028	1.0215
80	1.001	1.0175	1.0085
85	0.993	1.005	0.9925

Table 1: Example: Table up direction -KBB

12.4.5 Two Tables to be accessible - one for up direction and one for down direction. The direction of the train does influence the dynamics.

12.4.6 Masses shall be supplied with the following parameters and displayed in a table:
a) Total mass of vehicle
b) Mass of front bogie
c) Mass of rear bogie
d) Mass of left side
e) Mass of right side
f) Mass of each wheel (static and dynamic)

12.5 **Wheel Impact Detection**

12.5.1 Condition: If vehicle is more than 60 ton: serious flat for alarm = 2.1 * filtered wheel load for that vehicle.

If vehicle is less than 60 ton: serious flat for alarm = 4 * filtered wheel load for that vehicle.
The serious ratio levels must be available as inputs (variables)

12.5.2 The maximum value of the wheel as measured from all the cells on the rail shall be displayed. Wheels identified as flat shall be highlighted with yellow. Wheels identified as a serious flat shall be highlighted with red. A table for all wheels shall be available and displayed in a window.

12.6 Total report to be summarised to file and saved to disk with a date stamped file. This file may be saved in binary within a total file with the extension *.FLT, but must be also be available in ASCII format with the extension *.PRN. File formats will be discussed later.

12.7 In some instances a wheel will not be identified by the peak-picking routine. In this case the value of the peak would be below the picking threshold. Each channel must be correlated/checked with the proximity peaks. If the number of the vertical peaks equals the number of peaks of the proximity sensors, no correlation is necessary. If it is not equal, a correlation technique must be used to using the time differences between peaks to correct the position of the vertical peaks. The missing value must then be given a value of zero.

12.8 In addition to 12.7, a summary table of peaks must be provided for all vertical and proximity channels as a display. (Also see output headers in PRN file). It is expected that the correlator routine is able to debug any data set of a fully passed train. If the data is such that the correlator is unable to correct the data, (such as a train coming to a standstill on the measuring bridge causing a timeout), an error message shall be generated – eg "unequal number of peaks detected".

13 Analysis of Skew bogies

13.1 Skewing and flanging are to be calculated only on vehicles weighing more than 60 tons.

13.2 Gauges to measure Skewing wheels will be mounted at stations 2, 5 and 8 on left and right rails of load sensors. Wheel loads will be used as triggers in peak/valley routine to pick both left and right values.

13.3 The original lateral signal must be used for extraction of peaks, with the use of the filtered wheelload sensor.

13.4 Peak/valley in adaptive mode with trigger (load sensor) sensitivity at 1 ton and slaves (lateral sensor) at 0.2 ton for peaks and valleys.

13.5 Rejection and correlation times will be same as for wheel loads. Where a peak and valley is encountered within the reject time, the value with the highest absolute magnitude must be used.

13.6 Many wheels, (the ideal wheel), will not give a lateral signal and thus these readings must then be accepted as zero.

13.7 ***Calculations:***

13.7.1 What we have extracted from the peak/valley program are the actual lateral forces exerted by the individual wheels.

13.7.2 Two major conditions exist.
Condition 1: Skew bogies - no flange contact - all internal frictional, spin and creep forces.
Condition 2: Flanging bogies - Flange contact - the differential forces have been overcome and flange contact is made.

13.8 Calculations: Skew bogie: Front bogie: (lat left 1 + lat right 1) - (lat left 2 + lat right 2)

Rear bogie: (lat left 3 + lat right 3) - (lat left 4 + lat right 4)
Where 1, 2, 3, 4 are the wheel numbers of the vehicle.

Flanging bogie: Axle 1: (Lat left 1 - lat right 1)
Axle 2: (Lat left 2 - lat right 2)
Axle 3: (Lat left 3 - lat right 3)
Axle 4: (Lat left 4 - lat right 4)
Where 1, 2, 3, 4 are the wheel numbers of the vehicle.

13.9 A Maintenance condition exists when:
Skew bogie if value greater than +(mass of vehicle/20) or smaller than -(mass of vehicle/20).
20 to be variable
Flanging bogie: if value greater than +(mass of vehicle/15) or smaller than -(mass of vehicle/15).
15 to be variable
The exception values shall be specified as variables.

13.10 When calculating skew bogies on 6 axle locomotives, use axles 1 & 3 for front and axles 4 & 6 for rear. Do not calculate for flanging on locomotives. Loco skew limits are lower (higher tolerance). Use a value of 4 as default. (-4>alarm>+4) This value to be a variable.

13.11 Generate report to append with report described under masses and wheel impacts.

13.12 Report exceptions as described later.

14 Communication protocol

14.1 Communication shall be based for modem operations via
a) RS232,
b) standard telephone lines and
c) via network.

14.2 The preferred interface for the wheel impact load detector shall be C.C.I.T.T RS-232C V.24 standard. Baudrate, number of data bits, stop and start bits must be configurable to interface with the equipment.
The Baudrate selection shall include
300,1200,2400,4800,9600,19200,38400,57600,115200.
The databits selection shall include
4,5,6,7,8, bits
The stopbits selection shall include
1,1.5,2 bits
The parity bit selection shall include
None, Odd, Even, Mark, Space.
The flow control selection shall include
Xonn/Xoff, Hardware, None.
The designers or manufacturers of the measurement system shall supply the format and the protocol for obtaining this information.

14.3 Network communications: The secondary option of interfacing to a network shall also be provided. Reports shall be routed to the desired user addresses. A program interface shall be provided at the receiver's end to automatically open the newest incoming file, display data or generate an alarm. The contractor shall inform the customer on how this shall operate.

14.4 The WIM-WIM reports shall be available in a separate configurable subdirectory (presently named "Program Files\TLC\Flatwl\Cloud") on the WIM-WIM system.
Priority of conversion/transmission is:

1 *.STP
2 *.MAN
3 *.PRN
4 *.STA

15 Report types and formats

15.1 Within the setup file, maximum number trains to be kept must be stipulated. Any number of files with a specific extension exceeding the "max" to be deleted, keeping only the most recent. This maximum file number must be a variable.

15.2 Within the setup parameters a measurement site ID must be given, as more than one WIM-WIM system will be operational on the SPOORNET integrated system.

15.3 An option must be inserted to which types of files are to be generated and to whom the files must be transmitted.

15.3.1 Three destinations must be catered for. These are:
15.3.1.1 The CTC direct (Modem/network interface)
15.3.1.2 The Maintenance Depot (Modem/network interface)
15.3.1.3 The Universal Database – (Integrated Measurement System) – It will be the responsibility of IMS to collect this data from the WIM-WIM system. (RS232 interface)

15.4 File types to be accommodated are:

15.4.1 *.FLT Binary Flat file with complete train statistics
This file will stay as the master file on the system and shall be able to create any of the files as listed below.
15.4.2 *.TRK Binary Flat file with peak values removed - recalculations cannot be done and is solely for transmission of smaller files.
15.4.3 *.STP ASCII Alarm file – to stop train and warn of overloading
15.4.4 *.STA Status file – this file reports on the status of the WIM-WIM system at time intervals determined by the user.
15.4.5 *.PRN ASCII dump file – this file contains the data to be used by the IMS for integration with AVI (Automated vehicle identification).
15.4.6 *.MAN ASCII file must be created for the maintenance exception report.

15.5 The STP, STA, MAN and PRN must all have the exact same header format as described below. The contents within the file below the header will differ depending on the exceptions generated.

15.6 An option must be inserted to create the above files or not to create any of the above files within each addresses as specified in 15.3.

15.7 The FLT and TRK files:

The format of the file is to be as determined by the supplier.

15.8 The PRN files:

The format of the PRN file shall be as follows:

Line/Row 1: Measurement Site ID 20 alphanumeric characters
Line/Row 2: Time 5 alphanumeric characters
Line/Row 3: Date 10 alphanumeric characters (CCYY/MM//DD)
Line/Row 4: "NORMAL" or "ALARM!" or "STATUS" Plus REPORT TYPE
6 alphanumeric characters+report type(20 alphanumeric characters)
Line/Row 5: "U" or "D" 1 alphanumeric character

Line/Row 6: Bridge offset values for channels 1 to 16 – (engineering values)
Eg. (0.10,-12.20,0.41,0.21,0.16,1.25,0.26,0.30,0.53,0.76,0.45,0.48,0.72,1.12)
Line Row 7: Bridge offset values for channels 17 to 32 – (engineering values)
Eg. (as above)
Line/Row 8: Wheel counts per channel – for verticals ***1*** to ***2n***
Eg. (824,824,824,824,,,,,,,to ***2n*** verticals)
Line/Row 9: Bridge Effectivity – (Need maintenance ="M" Results good="G"),loco mass, wagon mass, total mass
Line/Row 10: Column/Field Headers
Line/Row 11 to n Data (Columns 1 to 27)

Field headers for row 10 are as follows:
Col 1:Vehicle no (1 to n) (inclusive of locomotives
Col 2:Vehicle descriptor (Loco type i.e "11E" or "W1" to "W***n***" for wagons - 6 alphanumeric characters)
Col 3: Speed
Col 4: Mass – Vehicle
Col 5: Mass – Leading Bogie
Col 6: Mass – Trailing Bogie
Col 7: Mass – Left side
Col 8: Mass – Right side
Col 9: Skew Front Bogie
Col 10: Skew Rear Bogie
Col 11: Gauge spreading Axle 1
Col 12: Gauge spreading Axle 2
Col 13: Gauge spreading Axle 3
Col 14: Gauge spreading Axle 4
Col 15: Dynamic load Wheel 1 Left
Col 16: Dynamic load Wheel 2 Left
Col 17: Dynamic load Wheel 3 Left
Col 18: Dynamic load Wheel 4 Left
Col 19: Dynamic load Wheel 5 Left
Col 20: Dynamic load Wheel 6 Left
Col 21: Dynamic load Wheel 1 Right
Col 22: Dynamic load Wheel 2 Right
Col 23: Dynamic load Wheel 3 Right
Col 24: Dynamic load Wheel 4 Right
Col 25: Dynamic load Wheel 5 Right
Col 26: Dynamic load Wheel 6 Right
Col 27 Lateral Force Wheel 1 Left
Col 28 Lateral Force Wheel 2 Left
Col 29 Lateral Force Wheel 3 Left
Col 30 Lateral Force Wheel 4 Left
Col 31 Lateral Force Wheel 5 Left
Col 32 Lateral Force Wheel 6 Left
Col 33 Lateral Force Wheel 1 Right
Col 34 Lateral Force Wheel 2 Right
Col 35 Lateral Force Wheel 3 Right
Col 36 Lateral Force Wheel 4 Right
Col 37 Lateral Force Wheel 5 Right
Col 38 Lateral Force Wheel 6 Right
Col 39: Alarms - (Alarms and Maintenance Schedule) "F" = Flat : "S" = Skew: "G"=Flanging: "M"=Mass. – If more than one condition exist per vehicle the Alarm becomes a combined code ie. FS = Flat and Skewing.

15.9 The STA File

The format of the "Status Report" is as follows

Line/Row 1: Measurement Site ID 20 alphanumeric characters
Line/Row 2: Time 5 alphanumeric characters
Line/Row 3: Date 10 alphanumeric characters (CCYY/MM//DD)
Line/Row 4: : "NORMAL" or "ALARM!" or "STATUS" Plus REPORT TYPE
6 alphanumeric characters+report type(20 alphanumeric characters)
Line/Row 5: "U" or "D" 1 alphanumeric character
Line/Row 6: Bridge offset values for channels 1 to 16 – (engineering values)
Eg. (0.10,-12.20,0.41,0.21,0.16,1.25,0.26,0.30,0.53,0.76,0.45,0.48,0.72,1.12)
Line Row 7: Bridge offset values for channels 17 to 32– (engineering values)
Eg. (as above)
Line/Row 8: Wheel counts per channel for last train – for verticals 1 to ***2n***
Eg. (824,824,824,824,,,,,,,to ***2n*** verticals)
Line/Row 9: Bridge Effectivity – (Need maintenance ="M" Results good="G") ,loco mass, wagon mass, total mass
Line/Row 10: Last Train Measured plus time of train
(CCYY/MM//DD) + (HH/MM) 10 alphanumeric characters + 6 alphanumeric characters

15.10 The STP File

The STP file only contains the parameters of the vehicles that have generated the exceptions.

The format of the "Alarm Report" is as follows
Line/Row 1: Measurement Site ID 20 alphanumeric characters
Line/Row 2: Time 5 alphanumeric characters
Line/Row 3: Date 10 alphanumeric characters (CCYY/MM//DD)
Line/Row 4: : "NORMAL" or "ALARM!" or "STATUS" Plus REPORT TYPE
6 alphanumeric characters+report type(20 alphanumeric characters)
Line/Row 5: "U" or "D" 1 alphanumeric character
Line/Row 6: Bridge offset values for channels 1 to 16 – (engineering values)
Eg. (0.10,-1.20,0.41,0.21,0.16,1.25,0.26,0.30,0.53,0.76,0.45,0.48,0.72,1.12)
Line Row 7: Bridge offset values for channels 17 to 32 – (engineering values)
Eg. (as above)
Line/Row 8: Wheel counts per channel for last train – for verticals 1 to ***2n***
Eg. (824,824,824,824,,,,,,,to ***2n*** verticals)
Line/Row 9: Bridge Effectivity – (Need maintenance ="M" Results good="G") ,loco mass, wagon mass, total mass
Line/Row 10: Column/Field Headers
Line/Row 11 to n Alarm conditions (Columns 1 to 27)

	Vehicle no	Vech type	--->	to column 27 (Alarm condition)
Row 11	1	W		A
Row 12	131	W		M

Only two conditions may presently be used to create the STP file this is the "F" and the "M" condition.

15.11 The MAN File

The MAN file only contains data of the vehicles generating the exceptions

Format of the maintenance report is as follows:

Line/Row 1: Measurement Site ID 20 alphanumeric characters
Line/Row 2: Time 5 alphanumeric characters
Line/Row 3: Date 10 alphanumeric characters (CCYY/MM//DD)
Line/Row 4: : "NORMAL" or "ALARM!" or "STATUS" Plus REPORT TYPE
6 alphanumeric characters+report type(20 alphanumeric characters)
Line/Row 5: "U" or "D" 1 alphanumeric character
Line/Row 6: Bridge offset values for channels 1 to 16 – (engineering values)
Eg. (0.10,-1.20,0.41,0.21,0.16,1.25,0.26,0.30,0.53,0.76,0.45,0.48,0.72,1.12)
Line Row 7: Bridge offset values for channels 16 to 32 – (engineering values)
Eg. (as above)
Line/Row 8: Wheel counts per channel for last train – for verticals 1 to ***2n***
Eg. (824,824,824,824,,,,,,,to ***2n*** verticals)
Line/Row 9: Bridge Effectivity – (Need maintenance ="M" Results good="G") ,loco mass, wagon mass, total mass
Line/Row 10: Column/Field Headers
Line/Row 11 to n Alarm conditions (Columns 1 to 27)

	Vehicle no	Vech type	--->	to column 27 (Alarm condition)
Row 11	1	W		A
Row 12	133	W		S
Row 13	134	W		SF

16 Verification of alarm condition

An alarm condition may not exist if all peaks on a specific channel create an alarm on each wheel.

17 Verification of Bridge Status

Bridge status must be verified via 2 parameters.
Parameter 1: Drift of measuring cells more than ±5% of full scale from Zero.
Parameter 2: Peak counts do not match
For Parameter 1 – Status Report, Line 9 parameter must be updated from "G" to "M"
For Parameter 2 – PRN report, Line 9 parameter must be updated from "G" to "P"

18 Mass Exception Report

A Parameter table must be created to enter exception parameters.
Exception parameters are only applicable to the wagons (Loco axle loads are usually higher than the line classification (eg 11E = 29t/axle on 26t/axle line)

Parameter 1	Class line	in Ton/Axle	eg 26
Parameter 2	Permissible overload in %		eg 5
Parameter 3	Permissible bogie difference in %		eg 8
Parameter 4	Permissible left/right comparison		eg 3

With the above parameters the following is available
Maximum mass per wagon allowable = 4 axles * 26ton/axle = 104 ton per wagon
If Mass per wagon exceeds 104*1.05=109.2 Alarm condition "M"exists

If any bogie difference irrespective class line differs more than parameter 3
Eg mass of wagon=82 ton; Front bogie=46 ton; Rear bogie=36 ton
Difference = (46-36)/82=12.2% Alarm condition "B" exists

Calculated % difference must be expressed as absolute value before comparison to parameter 3

If left/right mass difference irrespective class line differs more than parameter 4
Eg mass of wagon=82 ton Left =43 ton; right mass=39 ton
Difference = (43-39)/82=4.9% Alarm condition "L"exists
Calculated % difference must be expressed as absolute value before comparison to parameter 4

19 Alarm/maintenance codes for all exceptions

Code	Description	Condition
A	Stop Train	Wheel flat exceeding flat limit for line ---------ALARM
F	Wheel flat	Wheel flat exceeding maintenance limit
S	Skew Bogie	Skew bogie exceeding maintenance limit
G	Flanging Axle	Flanging axle exceeding maintenance limit
M	Mass overload	Overloaded wagon----------ALARM
B	Bogie mass loading	Bogie masses exceeding tolerance
L	Skew loading	Skew load parameters exceeded
P	Peak count integrity error	The program could not identify locomotives and trucks correctly

19.1 The STP file may only accept the A and M parameters
19.2 The MAN file may only accept the A, F, S and G parameters
19.3 The PRN accepts all of the parameters.
19.4 The STA file does not accept any parameters.
19.5 The above codes must be provided as variables. However they must be provided as defaults.

20 Strain gauge amplifiers

20.1. **Scope**
This specification covers the assembly and supply of a Multi-channel amplifier system based on strain gauge signal conditioners. The signal conditioners shall accommodate the high electro-magnetic fields generated under the 11E locomotive fleet on the Coal Line.

20.2. **Compliance**

20.2.1 The 1B31 strain gauge signal-conditioning chip shall be used in the design and construction of the multi-channel system.

20.2.2 The amplifiers shall be housed in a 19" rack. Provision for 32 channels of amplifiers must be made.

20.3 **Quality and performance requirements.**

20.3.1 The materials used in the construction of the amplifiers and their housings must be of the highest standards. It must withstand shock of 20 g for 2ms.

20.3.2 The amplifiers must be capable of continuous operation under the following conditions:
3.2.1 Ambient temperature: -15 to +70 C
3.2.2 Relative humidity:10% to 90% @60C
3.3.3 Altitude:0 to 2000 meter above sea level

20.3.3 All components must be suitable for use in a tropical climate.

20.3.4 All designations, control markings, etc. appearing both inside and outside the amplifiers must be in English.

20.4 **Specific requirements.**

20.4.1 The multi-channel system shall be designed for 32 measuring channels.

20.4.2 A stable power supply shall be included to power all measuring channels at 120, 240, 350 and 700 Ohm Full bridge circuits over the total excitation range

20.4.3 The amplifiers shall accommodate the following measuring transducers:Full Bridge strain gauge transducers for 4-wire circuits.

20.4.4 Excitation voltages must be adjustable from +4 to +9V. All channels are to be pre-set at 8Volt.

20.4.5 It must be able to accommodate cable lengths of 100 meter between the amplifier and the transducer.

20.4.6 Facilities must be provided at the front of the housing for each channel to adjust
a.) excitation
b.) offset voltage – bridge balance offset
c.) gain adjustment (fine)
d.) Amplifier zero.

20.4.7 Input and output plugs must be provided at the rear of the housing . Input plugs shall be 25 pin gold plated and can be shared by the 4 channels per plug. The amplifier outputs shall be accessible via BNC plugs.

20.4.8 Output to be measured from the amplifier shall be -10 volt to +10 volt.

20.4.9 Each card must have facilities to adjust filters from 10 Hz to 3kHz. Filters are to be pre-set at 250Hz for all channels. Filters are to be 2-pole.

20.4.10 Each card must have facilities to adjust gain from 0.2mv/v to 2mv/v (gain of 5000 to 500) Gains are to be pre-set at 1.8mv/v (gain of 555) for channels 1 to 28 and 0.4mv/v (gain of 2500) for channels 29 to 32. This must be designed such that the fine gain adjustment can adjust the gain to 5% either side of the desired pre-set gain values.

20.4.11 Noise levels are not to exceed 5mV for full and half bridge strain gauges with either 120 or 350Ohm gauges at a gain setting of 1000 (1mV/V)at a nominal frequency of 250Hz under laboratory conditions and not more than 12mV at a gain setting of 2500 (0.4mv/v).

20.4.12 Special attention must be given to protection of the system from EMC by ensuring that all cards are protected. No cross-talk between channels shall be traceable.

20.4.13 Design of the system will be such that no degradation of the specifications of the 1B31 occurs. Resistors used should all be 5ppm/degC and trim pots 100ppm/degC or better.

20.4.14 Input protection and de-coupling of the power supply must be implemented for the 1B31.

20.5 Proposed layout of Signal Conditioning System

20.5.1 The inputs to and outputs from the amplifiers should be routed via the rear of the housing. This shall be designed such that the cards can be removed freely from the front end.

20.5.2 Outputs from the amplifiers shall all be accessible via the rear by means of BNC outputs.

20.5.3 The front end shall be equipped with a removable panel to gain access for amplifier tuning pods.

20.5.4 In addition, a screwdriver suitable for tuning the pods shall be attached to a mounted clip to the front panel.

20.5.5 The rear panel shall be labelled describing the respective inputs and outputs.

20.5.6 The front panel shall be labelled "WIM-WIM" in bold letters

20.5.7 Power input shall be labelled "220V" at rear.

20.5.8 Screening plates between amplifier cards shall be compulsory. Any ribbon cable used within the system shall be of the screened type.

20.6 **Additional outputs and inputs required from the system**

20.6.1 In addition to strain gauge sensors, the system operates with the aid of 4 proximity sensors – these sensors shall be supplied by the contractor – TURCK model CP40

20.6.2 Power to drive these sensors must be supplied by the supplier of this system. (12V). Four such outputs shall be available.

20.6.3 In addition, provision for 2 inputs from these sensors shall be provided. The system shall be designed such that the outputs from these sensors can be connected to channel numbers (2N+2S+1) and (2N+2S+2) for data acquisition. In addition, provision must also be made to connect these sensors to the trigger circuitry – (see clause 6.4 and 9.1.2) The outer sensors shall only be coupled to the trigger system.

20.6.4 Provision must also be made, that in the event of not implementing the proximity sensors, any other channel output could be connected to the trigger circuitry.

21 Distribution Media and system documentation.

21.1 The software shall be bundled such that an automatic installation of software takes place. A complete installation set-up on disk/CD shall be provided for the system.

21.2 A complete system documentation - with respect to operation of the system shall be provided.

21.3 All additional manuals, drivers and sundries that were supplied with the individual components to build the system shall be supplied with the system.

21.4 All necessary software licences must be provided.

22 Hardware.

22.1 Refer clause 2.7 and clause 3.

22.2 The minimum requirements for the system shall be such that the maximum time for the system to analyse all the relevant data shall not exceed 5 minutes after a train has passed. Communication shall be part of multi-tasking.

22.3 The supplier shall design the systems such that clause 3 is met.

23 Guarantees and Service Maintenance

23.1 A high level of maintenance of the equipment in the Johannesburg area must be guaranteed. If such equipment cannot be repaired locally, the supplier must state so.

23.2 The supplier must state by which year it is anticipated that this equipment will be out of production, and for how long spares will be available thereafter.

23.3 The supplier must guarantee a dependable and rapid service system with sufficient spares and accessories for immediate delivery, and secondly that this service be guaranteed for five (5) years from date of delivery.

23.4 A minimum guarantee of 12 months after date of acceptance of the equipment is required.

10 Legal review

A Proposal submitted by a Respondent will be subjected to review and acceptance or rejection of its proposed contractual terms and conditions by Transnet's Legal Counsel, prior to consideration for an award of business.

11 Security clearance

Acceptance of this bid could be subject to the condition that the Successful Respondent, its personnel providing the goods and its subcontractor(s) must obtain security clearance from the appropriate authorities to the level of CONFIDENTIAL/ SECRET/TOP SECRET. Obtaining the required clearance is the responsibility of the Successful Respondent. Acceptance of the bid is also subject to the condition that the Successful Respondent will implement all such security measures as the safe performance of the contract may require.

12 National Treasury's Central Supplier Database

Respondents are required to self-register on National Treasury's Central Supplier Database (CSD) which has been established to centrally administer supplier information for all organs of state and facilitate the verification of certain key supplier information. Transnet is required to ensure that price quotations are invited and accepted from prospective bidders listed on the CSD. Business may not be awarded to a respondent who has failed to register on the CSD. Only foreign suppliers with no local registered entity need not register on the CSD. The CSD can be accessed at https://secure.csd.gov.za/.

For this purpose, the attached SBD 1 form must be completed and submitted as a mandatory returnable document by the closing date and time of the bid.

13 Tax Compliance

Respondents must be compliant when submitting a proposal to Transnet and remain compliant for the entire contract term with all applicable tax legislation, including but not limited to the Income Tax Act, 1962 (Act No. 58 of 1962) and Value Added Tax Act, 1991 (Act No. 89 of 1991).

It is a condition of this bid that the tax matters of the successful Respondents be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the Respondents tax obligations.

The Tax Compliance status requirements are also applicable to foreign Respondents/ individuals who wish to submit bids.

Where Consortia / Joint Ventures / Sub-contractors are involved, each party must be registered on the Central Supplier Database and their tax compliance status will be verified through the Central Supplier Database.

Transnet urges its clients, suppliers and the general public to report any fraud or corruption to

TIP-OFFS ANONYMOUS:

Ethics Helpdesk (Pty) LTD.
Ethics Management System ™

You can choose to be Anonymous or Non-Anonymous on ANY of the platforms
PLEASE RETAIN YOUR REFERENCE NUMBER

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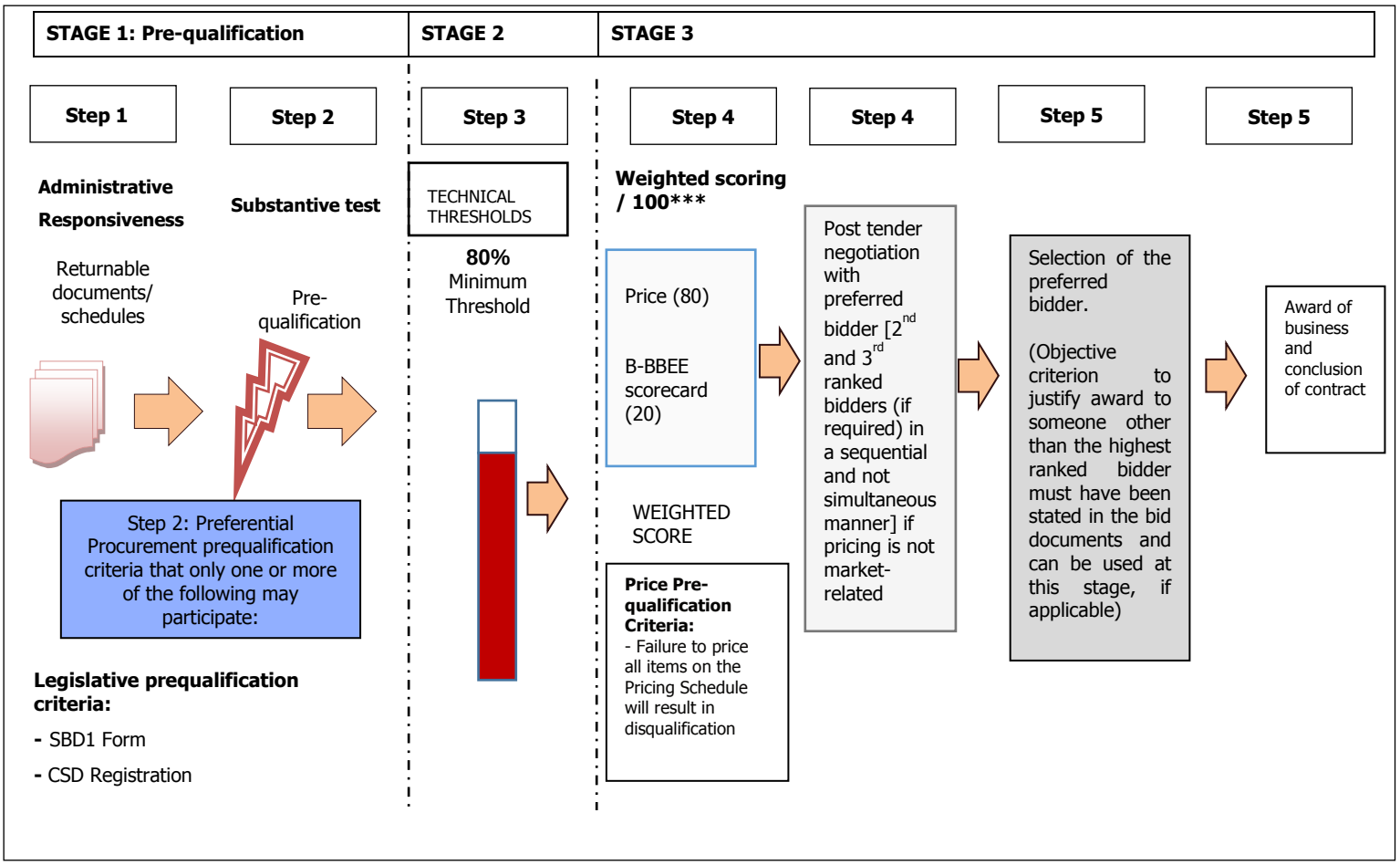
SECTION 3

EVALUATION METHODOLOGY, CRITERIA AND RETURNABLE DOCUMENTS

1. EVALUATION CRITERIA

Transnet will utilise the following methodology and criteria in selecting a preferred Supplier/s, if so required:



1.1 STEP ONE: Test for Administrative Responsiveness

The test for administrative responsiveness will include the following:

Administrative responsiveness check	RFQ Reference
• Whether the Bid has been lodged on time	
• Whether all Returnable Documents and/or schedules [where applicable] were completed and returned by the closing date and time	*Section 3*
• Verify if the Bid document has been duly signed by the authorised respondent	*All sections*

The test for administrative responsiveness [Step One] must be passed for a Respondent's Proposal to progress to Step Two for further pre-qualification

1.2 STEP TWO: Test for Substantive Responsiveness to RFQ

The test for substantive responsiveness to this RFQ will include the following:

Check for substantive responsiveness	RFQ Reference
• Whether any general pre-qualification criteria set by Transnet, have been met	*All sections including: Section 2*
• Whether the Bid contains a priced offer	*Section 4 - Quotation Form*

The test for substantive responsiveness [Step Two] must be passed for a Respondent's proposal to progress to Step Three for further evaluation

1.3 STEP THREE: Technical/Functionality Criteria

Minimum Threshold 80% for Technical Criteria

The test for the Technical and Functional threshold will include the following:

Technical Criteria	% Weightings	Scoring guideline
Technical Specification Compliance (Section 9)	80%	100 = Service Provider complies with all specification noted on page 6 and 7 of 37 of this RFQ document. Plus OEM / MOU and NRCS certificate is attached 0 = Alternative Offer to Specification 0 = Does not meet minimum requirements
Delivery Lead-time (Section 10)	20%	100 = 1 Week or less delivery lead-time from date of receiving purchase order 90 = 2 Weeks delivery lead-time from date of receiving purchase order 70 = 3 Weeks delivery lead-time from date of receiving purchase order 40 = 4 Weeks delivery lead-time from date of receiving purchase order 0 = 5 Weeks or more delivery lead-time from date of receiving purchase order / No documentation provided.
Total Weighting:	**100%**	

Respondents are to note that Transnet will round off final technical scores to the nearest 2 (two) decimal places for the purposes of determining whether the technical threshold has been met.

The minimum threshold for technical/functionality [Step Three] must be met or exceeded for a Respondent's Proposal to progress to Step Four for final evaluation

1.4 STEP FOUR: Evaluation and Final Weighted Scoring

a) **Price Criteria** [Weighted score 80 points]:

Evaluation Criteria	RFQ Reference
• Commercial offer	*Section 4*

Transnet will utilise the following formula in its evaluation of Price:

$$PS = 80\left(1 - \frac{Pt - Pmin}{Pmin}\right)$$

Where:

Ps = Score for the Bid under consideration

Pt = Price of Bid under consideration

Pmin = Price of lowest acceptable Bid

b) **Broad-Based Black Economic Empowerment criteria** [Weighted score 20 points]

- B-BBEE - current scorecard / B-BBEE Preference Points Claims Form
- Preference points will be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table indicated in Section 7 of the B-BBEE Preference Points Claim Form.

1.5 STEP FIVE: Post Tender Negotiations (if applicable)

- Respondents are to note that Transnet may not award a contract if the price offered is not market-related. In this regard, Transnet reserves the right to engage in PTN with the view to achieving a market-related price or to cancel the tender. Negotiations will be done in a sequential manner i.e.:
  - first negotiate with the highest ranked bidder or cancel the bid, should such negotiations fail,
  - negotiate with the 2nd and 3rd ranked bidders (if required) in a sequential manner.
- In the event of any Respondent being notified of such short-listed/preferred bidder status, his/her bid, as well as any subsequent negotiated best and final offers (BAFO), will automatically be deemed to remain valid during the negotiation period and until the ultimate award of business.
- Should Transnet conduct post tender negotiations, Respondents will be requested to provide their best and final offers to Transnet based on such negotiations. A final evaluation will be conducted in terms of 80/20 and the contract will be negotiated and awarded to the successful Respondent(s).

1.6 STEP SIX: Award of business and conclusion of contract

- Immediately after approval to award the contract has been received, the successful or preferred bidder(s) will be informed of the acceptance of his/their Quotation by way of a Letter of Award. Thereafter the final contract will be concluded with the successful Respondent(s).
- Otherwise, a final contract will be concluded and entered into with the successful Bidder at the acceptance of a letter of award by the Respondent.

2. Validity Period

Transnet requires a validity period of 90 [NINETY] Business Days from the closing date of this RFQ, excluding the first day and including the last day.

Bidders are to note that they may be requested to extend the validity period of their bid, on the same terms and conditions, if the internal evaluation process has not been finalised within the validity period. However, once the adjudication body has approved the process and award of the business to the successful bidder(s), the validity of the successful bidder(s)' bid will be deemed to remain valid until a final contract has been concluded.

3. Disclosure of contract information

Prices Quoted

Respondents are to note that, on award of business, Transnet is required to publish the tendered prices of the successful and unsuccessful Respondents *inter alia* on the National Treasury e-Tender Publication Portal, (www.etenders.gov.za), as required per National Treasury Instruction Note 01 of 2015/2016.

Johannesburg Stock Exchange Debt Listing Requirements

Transnet may also be required to disclose information relating to the subsequent contract i.e. the name of the company, goods/services provided by the company, the value and duration of the contract, etc. in compliance with the Johannesburg Stock Exchange (JSE) Debt Listing Requirements.

Domestic Prominent Influential Persons (DPIP) OR Foreign Prominent Public Officials (FPPO)

Transnet is free to procure the services of any person within or outside the Republic of South Africa in accordance with applicable legislation. Transnet shall not conduct or conclude business transactions, with any Respondents without having:

- Considered relevant governance protocols;
- Determined the DPIP or FPPO status of that counterparty; and
- Conducted a risk assessment and due diligence to assess the potential risks that may be posed by the business relationship.

As per the Transnet Domestic Prominent Influential Persons (DPIP) and Foreign Prominent Public Officials (FPPO) and Related Individuals Policy available on Transnet website https://www.transnet.net/search/pages/results.aspx?k=FPIDP#k=DPIP, Respondents are required to disclose any commercial relationship with a DPIP or FPPO (as defined in the Policy) by completing the following section:

The below form contains personal information as defined in the Protection of Personal Information Act, 2013 (the "Act"). By completing the form, the signatory consents to the processing of her/his personal information in accordance with the requirements of the Act. Consent cannot unreasonably be withheld.

Is the Respondent
(Complete with a "Yes" or "No")

A DPIP/FPPO		**Closely Related to a DPIP/FPPO**		**Closely Associated to a DPIP/FPPO**	

List all known business interests, in which a DPIP/FPPO may have a direct/indirect interest or significant participation or involvement.

No	**Name of Entity / Business**	**Role in the Entity / Business** (Nature of interest/ Participation)	**Shareholding %**	**Registration Number**	**Status** (Mark the applicable option with an X)	
					Active	**Non-Active**
1						
2						
3						

Respondents declaring a commercial relationship with a DPIP or FPPO are to note that Transnet is required to annually publish on its website a list of all business contracts entered into with DPIP or FPPO. This list will include successful Respondents, if applicable.

4. Returnable Documents

Returnable Documents means all the documents, Sections and Annexures, as listed in the tables below. There are three types of returnable documents as indicated below and Respondents are urged to ensure that these documents are returned with their bids based on the consequences of non-submission as indicated below:

Mandatory Returnable Documents	***Failure to provide all these Mandatory Returnable Documents at the Closing Date and time of this RFQ will result in a Respondent's disqualification.***
Returnable Documents Used for Scoring	***Failure to provide all Returnable Documents used for purposes of scoring a bid, by the closing date and time of this bid will not result in a Respondent's disqualification. However, Bidders will receive an automatic score of zero for the applicable evaluation criterion.***
Essential Returnable Documents	***Failure to provide essential Returnable Documents will result in Transnet affording Respondents a further opportunity to submit by a set deadline. Should a Respondent thereafter fail to submit the requested documents, this may result in a Respondent's disqualification.***

All Returnable Sections, as indicated in the header and footer of the relevant pages, must be signed, stamped and dated by the Respondent.

a) Mandatory Returnable Documents

Respondents are required to submit with their bid submissions the following **Mandatory Returnable Documents,** and also to confirm submission of these documents by so indicating [Yes or No] in the tables below:

Mandatory Returnable Documents	**Submitted [Yes/No]**
SECTION 1: SBD1 Form	
SECTION 4 : Quotation Form with **all items priced**	

b) Returnable Documents Used for Scoring

In addition to the requirements of section (a) above, Respondents are further required to submit with their Proposals the following **Returnable Documents Used for Scoring** and also to confirm submission of these documents by so indicating [Yes or No] in the table below:

RETURNABLE DOCUMENTS USED FOR SCORING	**SUBMITTED [Yes or No]**
SECTION 09: Technical Specification Compliance	
SECTION 10: Delivery Lead-time	

c) Essential Returnable Documents:

Over and the above the requirements of section (a) and (b) mentioned above, Respondents are further required to submit with their Proposals the following **Essential Returnable Documents** and also to confirm submission of these documents by so indicating [Yes or No] in the table below:

ESSENTIAL RETURNABLE DOCUMENTS & SCHEDULES	**SUBMITTED [Yes or No]**
Valid and original (or a certified copy) proof of Bidder's compliance to B-BBEE requirements stipulated in Section 7 of this RFQ	
In the case of Joint Ventures, a copy of the Joint Venture Agreement or written confirmation of the intention to enter into a Joint Venture Agreement	
Tax Clearance Certificate or electronic access PIN obtained from SARS's new Tax Compliance Status (TCS) system [Consortia / Joint Ventures must submit a separate Tax Clearance Certificate/PIN for each party]	
SECTION 5: Certificate of Acquaintance with RFQ Documents	
SECTION 6: RFQ Declaration and Breach of Law Form	
SECTION 7: B-BBEE Preference Claim Form	
SECTION 8: PROTECTION OF PERSONAL INFORMATION	
Proof of CSD Registration (TO BE ATTACHED)	
Supplier Declaration Form	

5. Continued validity of returnable documents

The successful Respondent will be required to ensure the validity of all returnable documents, including but not limited to its valid proof of B-BBEE status, for the duration of any contract emanating from this RFQ. Should the Respondent be awarded the contract [**the Agreement]** and fail to present Transnet with such renewals as and when they become due, Transnet shall be entitled, in addition to any other rights and remedies that it may have in terms of the eventual Agreement, to terminate such Agreement immediately without any liability and without prejudice to any claims which Transnet may have for damages against the Respondent.

SECTION 4
QUOTATION FORM

I/We_____

hereby offer to supply the goods/services at the prices quoted in the Price Schedule below, in accordance with the conditions related thereto.

I/We agree to be bound by those terms and conditions in:

- the Standard RFQ Terms and Conditions for the Supply of Goods or Services to Transnet; and
- any other standard or special conditions embodied in this Request for Quotation.

I/We accept that unless Transnet should otherwise decide and so inform me/us, this Quotation [and, if any, its covering letter and any subsequent exchange of correspondence], together with Transnet's acceptance thereof shall constitute a binding contract between Transnet and me/us. I/We further agree that if, after I/we have been notified of the acceptance of my/our Quotation, I/we fail to deliver the said goods/service/s within the delivery lead-time quoted, Transnet may, without prejudice to any other legal remedy which it may have, cancel the order and recover from me/us any expenses incurred by Transnet in calling for Quotations afresh and/or having to accept any less favourable offer.

Price Schedule

I/We quote as follows for the goods required, on a "delivered nominated destination" basis, excluding VAT:

Item No:	Description of Goods	Unit of Measure	Qty	Unit price (Excl. VAT)	Total Price (Excl. VAT)
1	**UPPINGTON:**				
1.1	Calibration of Assized Weigh Bridge (ASW) at km 804	Each	1		
1.2	Traveling & Accommodation for Calibration of Assized Weigh Bridge (ASW) at km 804	Each	1		
1.3	Calibration of Skew Boggie (SKB) at km 804	Each	1		
1.4	Traveling & Accommodation for Calibration of Skew bogie (SKB) at km 804 (ASW) at km 804	Each	1		
2.	**SALDANHA:**				
2.1	Calibration of Assize Weigh Bridge (ASW) at km 6	Each	1		
2.2	Supply and Installation of new field junction box and cables for the ASW at km 6	Each	1		
2.3	Traveling & Accommodation for Calibration of Assize Weigh Bridge (ASW) at km 6	Each	1		
2.4	Remove, install sensor for rail replacement & calibrate of WIM WIM175	Each	1		
2.5	Traveling & Accommodation for WIM WIM & Bridge Monitoring System. Nearest Town is VREDENDALL	Each	1		
2.6	Remove, install sensor for rail replacement & Calibrate of Bridge Monitoring System	Each	1		
2.7	Traveling & Accommodation for & Bridge Monitoring System. Nearest Town is VREDENDALL	Each	1		
			Sub total:		
			VAT 15%:		
			Total:		

Delivery Lead-Time from date of purchase order: _____ [days/weeks]

Respondents are to note that Transnet will round off final pricing scores to the nearest 2 (two) decimal places.

Notes to Pricing:

a) Respondents are to note that if the price offered by the highest scoring bidder is not market-related, Transnet may not award the contract to that Respondent. Transnet may-

   (i) negotiate a market-related price with the Respondent scoring the highest points or cancel the RFQ;

   (ii) if that Respondent does not agree to a market-related price, negotiate a market-related price with the Respondent scoring the second highest points or cancel the RFQ;

   (iii) if the Respondent scoring the second highest points does not agree to a market-related price, negotiate a market-related price with the Respondent scoring the third highest points or cancel the RFQ.

   If a market-related price is not agreed with the Respondent scoring the third highest points, Transnet must cancel the RFQ.

b) All Prices must be quoted in South African Rand, inclusive of VAT

c) To facilitate like-for-like comparison bidders must submit pricing strictly in accordance with this price schedule and not utilise a different format. Deviation from this pricing schedule will result in a bid being disqualified.

d) Please note that should you have offered a discounted price(s), Transnet will only consider such price discount(s) in the final evaluation stage if offered on an unconditional basis.

e) To facilitate like-for-like comparison bidders must submit pricing strictly in accordance with this price schedule and not utilise a different format. Deviation from this pricing schedule will result in a bid being disqualified.

f) Please note that should you have offered a discounted price(s), Transnet will only consider such price discount(s) in the final evaluation stage if offered on an unconditional basis.

SECTION 5

CERTIFICATE OF ACQUAINTANCE WITH RFQ DOCUMENTS

By signing this certificate the Respondent is deemed to acknowledge that he/she has made himself/herself thoroughly familiar with, and agrees with all the conditions governing this RFQ. This includes those terms and conditions contained in any printed form stated to form part hereof, including but not limited to the documents stated below. As such, Transnet will recognise no claim for relief based on an allegation that the Respondent overlooked any such condition or failed properly to take it into account in calculating tendered prices or any other purpose:

1. Transnet's General Bid Conditions
2. Standard RFQ Terms and Conditions for the supply of Goods or Services to Transnet
3. Transnet's Supplier Integrity Pact
4. Non-disclosure Agreement
5. Supplier Declaration Form and all supporting documents (first time vendors only). Alternatively, for all existing vendors, please complete the table below under the heading "Existing vendors".

Existing vendors: existing vendors are required to confirm whether all the information (e.g. company address, contact details, banking details, etc.) relating to the existing vendor number is still correct at the time of submission of this bid or update their information in the table below:

Transnet Operating Division [e.g. TFR, TE, etc.]	**Vendor Number**	**Information still current [tick if applicable]**	**Information change [indicate detail of change/s & attach appropriate proof]**

Should the Bidder find any terms or conditions stipulated in any of the relevant documents quoted in the RFQ unacceptable, it should indicate which conditions are unacceptable and offer alternatives by written submission on its company letterhead, attached to its submitted Bid. Any such submission shall be subject to review by Transnet's Legal Counsel who shall determine whether the proposed alternative(s) are acceptable or otherwise, as the case may be. A material deviation from the Standard terms or conditions could result in disqualification.

Bidders accept that an obligation rests on them to clarify any uncertainties regarding any bid to which they intend to respond, before submitting the bid. The Bidder agrees that he/she will have no claim based on an allegation that any aspect of this RFQ was unclear but in respect of which he/she failed to obtain clarity.

The bidder understands that his/her Bid will be disqualified if this Certificate of Acquaintance with RFQ documents included in the RFQ as a returnable document, is found not to be true and/ or complete in every respect.

SIGNED at _____ on this _____ day of _____ 20___

SIGNATURE OF WITNESSES ADDRESS OF WITNESSES

1 _____ _____

Name _____ _____

2 _____ _____

Name _____ _____

SIGNATURE OF RESPONDENT'S AUTHORISED REPRESENTATIVE: _____

NAME: _____

DESIGNATION: _____

SECTION 6
RFQ DECLARATION AND BREACH OF LAW FORM

NAME OF ENTITY: _____

We _____ do hereby certify that:

1. Transnet has supplied and we have received appropriate responses to any/all questions [as applicable] which were submitted by ourselves for RFQ Clarification purposes;
2. We have received all information we deemed necessary for the completion of this Request for Quotation [**RFQ**];
3. We have been provided with sufficient access to the existing Transnet facilities/sites and all relevant information relevant to the Supply of the Goods as well as Transnet information and Employees, and have had sufficient time in which to conduct and perform a thorough due diligence of Transnet's operations and business requirements and assets used by Transnet. Transnet will therefore not consider or permit any pre- or post-contract verification or any related adjustment to pricing, service levels or any other provisions/conditions based on any incorrect assumptions made by the Respondent in arriving at his Bid Price.
4. At no stage have we received additional information relating to the subject matter of this RFQ from Transnet sources, other than information formally received from the designated Transnet contact(s) as nominated in the RFQ documents;
5. We have complied with all obligations of the Bidder/Supplier as indicated in the Transnet Supplier Integrity Pact which includes but are not limited to ensuring that we take all measures necessary to prevent corrupt practices, unfairness and illegal activities in order to secure or in furtherance to secure a contract with Transnet;
6. We are satisfied, insofar as our entity is concerned, that the processes and procedures adopted by Transnet in issuing this RFQ and the requirements requested from Bidders in responding to this RFQ have been conducted in a fair and transparent manner;
7. We declare that a family, business and/or social relationship **exists / does not exist** [delete as applicable] between an owner / member / director / partner / shareholder of our entity and an employee or board member of Transnet including any person who may be involved in the evaluation and/or adjudication of this Bid;
8. We declare that an owner / member / director / partner / shareholder of our entity **is / is not** [delete as applicable] an employee or board member of the Transnet;
9. In addition, we declare that an owner / member / director / partner / shareholder/employee of our entity **has / has not been** [delete as applicable] a former employee or board member of Transnet in the past 10 years. I further declare that if they were a former employee or board member of Transnet in the past 10 years that they **were/were not** involved in the bid preparation or had access to the information related to this RFQ; and
10. If such a relationship as indicated in paragraph 7, 8 and/or 9 exists, the Respondent is to complete the following section:

FULL NAME OF OWNER/MEMBER/DIRECTOR/
PARTNER/SHAREHOLDER/EMPLOYEE: ADDRESS:

_____

_____

Indicate nature of relationship with Transnet:

_____

[Failure to furnish complete and accurate information in this regard will lead to the disqualification of a response and may preclude a Respondent from doing future business with Transnet]. ***Information provided in the declarations may be used by Transnet and/or its affiliates to verify the correctness of the information provided.***

11. We declare, to the extent that we are aware or become aware of any relationship between ourselves and Transnet [other than any existing and appropriate business relationship with Transnet] which could unfairly advantage our entity in the forthcoming adjudication process, we shall notify Transnet immediately in writing of such circumstances.

BIDDER'S DISCLOSURE (SBD4)

12 PURPOSE OF THE FORM

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

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

13 Bidder's declaration

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

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

Full Name	Identity Number	Name of State institution

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

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

13.2.1. If so, furnish particulars:

……

……

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

13.3.1. If so, furnish particulars:

……

……

14 DECLARATION

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

14.1 I have read and I understand the contents of this disclosure;

14.2 I understand that the accompanying bid will be disqualified if this disclosure is found not to be true and complete in every respect;

14.3 The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium[1] will not be construed as collusive bidding.

14.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.

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

14.5 The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.

14.6 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.

14.7 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.

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 12, 13 and 14 ABOVE IS CORRECT.

I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

BREACH OF LAW

12. We further hereby certify that *I/we* ***have/have not been*** [delete as applicable] found guilty during the preceding 5 [five] years of a serious breach of law, including but not limited to a breach of the Competition Act, 89 of 1998, by a court of law, tribunal or other administrative body. The type of breach that the Respondent is required to disclose excludes relatively minor offences or misdemeanours, e.g. traffic offences. This includes the imposition of an administrative fine or penalty.
    Where found guilty of such a serious breach, please disclose:
    NATURE OF BREACH:
    _____
    DATE OF BREACH: _____
    Furthermore, I/we acknowledge that Transnet SOC Ltd reserves the right to exclude any Respondent from the bidding process, should that person or entity have been found guilty of a serious breach of law, tribunal or regulatory obligation.

SIGNED at _____ on this _____ day of _____ 20___

For and on behalf of _____ duly authorised hereto	AS WITNESS:
Name:	Name:
Position:	Position:
Signature:	Signature:
Date:	Registration No of Company/CC _____
Place:	Registration Name of Company/CC _____

SECTION 7

B-BBEE PREFERENCE POINTS CLAIM FORM

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

Transnet will award preference points to companies who provide valid proof of their B-BBEE status using either the latest version of the generic Codes of Good Practice or Sector Specific Codes (if applicable).

NB: BEFORE COMPLETING THIS FORM, BIDDERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF B-BBEE, AS PRESCRIBED IN THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017.

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1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to all bids:

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

1.2 The value of this bid is estimated to not exceed R50 000 000 (all applicable taxes included) and therefore the 80/20 preference point system shall be applicable. Despite the stipulated preference point system, Transnet shall use the lowest acceptable bid to determine the applicable preference point system in a situation where all received acceptable bids are received outside the stated preference point system.

1.3 Either the 80/20 preference point system will be applicable to this tender.

1.4 Preference points for this bid shall be awarded for:

(a) Price; and

(b) B-BBEE Status Level of Contribution.

1.5 The maximum points for this bid are allocated as follows:

	POINTS
PRICE	**80**
B-BBEE STATUS LEVEL OF CONTRIBUTOR	**20**
Total points for Price and B-BBEE must not exceed	**100**

1.6 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.

1.7 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

(a) **"all applicable taxes"** includes value-added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies;

(b) **"B-BBEE"** means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;

(c) "**B-BBEE status level of contributor"** means the B-BBEE status received by a measured entity based on its overall performance using the relevant scorecard contained in the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic

Empowerment Act;

(d) **"bid"** means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the supply/provision of services, works or goods, through price quotations, advertised competitive bidding processes or proposals;

(e) **"Broad-Based Black Economic Empowerment Act"** means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);

(f) **"EME"** means an Exempted Micro Enterprise as defines by Codes of Good Practice under section 9 (1) of the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);

(g) **"functionality"** means the ability of a bidder to provide goods or services in accordance with specification as set out in the bid documents;

(h) **"Price"** includes all applicable taxes less all unconditional discounts.

(i) **"Proof of B-BBEE Status Level of Contributor"** means:

1) B-BBBEE status level certificate issued by an unauthorised body or person;

2) A sworn affidavit as prescribed by the B-BBEE Codes of Good Practice;

3) Any other requirement prescribed in terms of the B-BBEE Act.

(j) **"QSE"** means a Qualifying Small EEnterprise in terms of a Codes of Good Practice under section 9 (1) of the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);

(k) **"rand value"** means the total estimated value of a contract in South African currency, calculated at the time of bid invitations, and includes all applicable taxes and excise duties.

3. POINTS AWARDED FOR PRICE

3.1 THE 80/20 PREFERENCE POINT SYSTEMS

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

80/20

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

Where

Ps = Points scored for comparative price of bid under consideration

Pt = Comparative price of bid under consideration

Pmin = Comparative price of lowest acceptable bid

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

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:

B-BBEE Status Level of Contributor	Number of points (90/10 system)	Number of points (80/20 system)
1	10	20
2	9	18
3	6	14
4	5	12
5	4	8
6	3	6

7	2	4
8	1	2
Non-compliant contributor	0	0

4.2 The table below indicates the required proof of B-BBEE status depending on the category of enterprises:

Enterprise	**B-BBEE Certificate & Sworn Affidavit**
Large	Certificate issued by SANAS accredited verification agency
QSE	Certificate issued by SANAS accredited verification agency Sworn Affidavit signed by the authorised QSE representative and attested by a Commissioner of Oaths confirming annual turnover and black ownership (only black-owned QSEs - 51% to 100% Black owned) [Sworn affidavits must substantially comply with the format that can be obtained on the DTI's website at www.dti.gov.za/economic_empowerment/bee_codes.jsp.]
EME[1]	Sworn Affidavit signed by the authorised EME representative and attested by a Commissioner of Oaths confirming annual turnover and black ownership Certificate issued by CIPC (formerly CIPRO) confirming annual turnover and black ownership Certificate issued by SANAS accredited verification agency only if the EME is being measured on the QSE scorecard

4.3 A trust, consortium or joint venture (including unincorporated consortia and joint ventures) must submit a consolidated B-BBEE Status Level verification certificate for every separate bid.

4.4 Tertiary Institutions and Public Entities will be required to submit their B-BBEE status level certificates in terms of the specialized scorecard contained in the B-BBEE Codes of Good Practice.

4.5 A person will not be awarded points for B-BBEE status level if it is indicated in the bid documents that such a bidder intends sub-contracting more than 25% of the value of the contract to any other enterprise that does not qualify for at least the points that such a bidder qualifies for, unless the intended sub-contractor is an EME that has the capability and ability to execute the sub-contract.

4.6 A person awarded a contract may 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 person concerned, unless the contract is sub-contracted to an EME that has the capability and ability to execute the sub-contract.

4.7 Bidders are to note that the rules pertaining to B-BBEE verification and other B-BBEE requirements may be changed from time to time by regulatory bodies such as National Treasury or the DTI. It is the Bidder's responsibility to ensure that his/her bid complies fully with all B-BBEE requirements at the time of the submission of the bid.

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 CONTRIBUTION CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 6.1

6.1 B-BBEE Status Level of Contribution: . = ……(maximum of 20 points)

(Points claimed in respect of paragraph 6.1 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.

[1] In terms of the Implementation Guide: Preferential Procurement Regulations, 2017, Version 2, paragraph 11.11 provides that in the Transport Sector, EMEs can provide a letter from accounting officer or get verified and be issued with a B-BBEE certificate by SANAS accredited professional or agency as the Transport Sector Code has not been aligned to the generic Codes. EMEs in the Transport Sector are not allowed to provide a Sworn Affidavit as the generic codes are not applicable to them.

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:

i) What percentage of the contract will be subcontracted.....%
ii) The name of the sub-contractor.....
iii) The B-BBEE status level of the sub-contractor.....
iv) Whether the sub-contractor is an EME or QSE
(Tick applicable box)

YES		NO	

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

	Designated Group: An EME or QSE which is at last 51% owned by:	**EME √**	**QSE √**
	Black people		
	Black people who are youth		
	Black people who are women		
	Black people with disabilities		
	Black people living in rural or underdeveloped areas or townships		
	Cooperative owned by black people		
	Black people who are military veterans		
	OR		
	Any EME		
	Any QSE		

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-BBEE status level of contribution indicated in paragraphs 4.1 and 6.1 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we acknowledge that:

i) The information furnished is true and correct;

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

iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 4.1 and 6.1, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;

iv) 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-

(a) disqualify the person from the bidding process;

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

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

(d) if the successful bidder subcontracted a portion of the bid to another person without disclosing it, Transnet reserves the right to penalise the bidder up to 10 percent of the value of the contract;

(e) 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

(f) forward the matter for criminal prosecution.

WITNESSES 1. …….. 2. ……	…… SIGNATURE(S) OF BIDDERS(S) DATE: …….. ADDRESS …….. ……..

SECTION 8

PROTECTION OF PERSONAL INFORMATION

1. The following terms shall bear the same meaning as contemplated in Section 1 of the Protection of Person information act, No.4 of 2013.("POPIA"):

   consent; data subject; electronic communication; information officer; operator; person; personal information; processing; record; Regulator; responsible party; special information; as well as any terms derived from these terms.

2. Transnet will process all information by the Respondent in terms of the requirements contemplated in Section 4(1) of the POPIA:

   Accountability; Processing limitation; Purpose specification; Further processing limitation; Information quality; Openness; Security safeguards and Data subject participation.

3. The Parties acknowledge and agree that, in relation to personal information that will be processed pursuant to this RFQ, the Responsible party is "Transnet" and the Data subject is the "Respondent". Transnet will process personal information only with the knowledge and authorisation of the Respondent and will treat personal information which comes to its knowledge as confidential and will not disclose it, unless so required by law or subject to the exceptions contained in the POPIA.

4. Transnet reserves all the rights afforded to it by the POPIA in the processing of any of its information as contained in this RFQ and the Respondent is required to comply with all prescripts as detailed in the POPIA relating to all information concerning Transnet.

5. In responding to this bid, Transnet acknowledges that it will obtain and have access to personal information of the Respondent. Transnet agrees that it shall only process the information disclosed by Respondent in their response to this bid for the purpose of evaluating and subsequent award of business and in accordance with any applicable law.

6. Transnet further agrees that in submitting any information or documentation requested in this RFQ, the Respondent is consenting to the further processing of their personal information for the purpose of, but not limited to, risk assessment, assurances, contract award, contract management, auditing, legal opinions/litigations, investigations (if applicable), document storage for the legislatively required period, destruction, de-identification and publishing of personal information by Transnet and/or its authorised appointed third parties.

7. Furthermore, Transnet will not otherwise modify, amend or alter any personal data submitted by the Respondent or disclose or permit the disclosure of any personal data to any third party without the prior written consent from the Respondent. Similarly, Transnet requires the Respondent to process any personal information disclosed by Transnet in the bidding process in the same manner.

8. Transnet shall, at all times, ensure compliance with any applicable laws put in place and maintain sufficient measures, policies and systems to manage and secure against all forms of risks to any information that may be shared or accessed pursuant to this RFQ (physically, through a computer or any other form of electronic communication).

9. Transnet shall notify the Respondent in writing of any unauthorised access to information, cybercrimes or suspected cybercrimes, in its knowledge and report such crimes or suspected crimes to the relevant authorities in accordance with applicable laws, after becoming aware of such crimes or suspected crime. The Respondent must take all necessary remedial steps to mitigate the extent of the loss or compromise of personal information and to restore the integrity of the affected personal information as quickly as is possible.

10. The Respondent may, in writing, request Transnet to confirm and/or make available any personal information in its possession in relation to the Respondent and if such personal information has been accessed by third parties and the identity thereof in terms of the POPIA. The Respondent may further request that Transnet correct (excluding critical/mandatory or evaluation information), delete, destroy, withdraw consent or object to the processing of any personal information relating to the Respondent in Transnet's possession in terms of the provision of the POPIA and utilizing Form 2 of the POPIA Regulations.

11. In submitting any information or documentation requested in this RFQ, the Respondent is hereby consenting to the processing of their personal information for the purpose of this RFQ and further confirming that they are aware of their rights in terms of Section 5 of POPIA.

Respondents are required to provide consent below:

YES		**NO**	

12. Further, the Respondent declares that they have obtained all consents pertaining to other data subject's personal information included in its submission and thereby indemnifying Transnet against any civil or criminal action, administrative fines or other penalty or loss that may arise as a result of the processing of any personal information that the Respondent submitted.

13. The Respondent declares that the personal information submitted for the purpose of this RFQ is complete, accurate, not misleading, is up to date and may be updated where applicable.

Signature of Respondent's authorised representative: _____

Should a Respondent have any complaints or objections to processing of its personal information, by Transnet, the Respondent can submit a complaint to the Information Regulator on https://www.justice.gov.za/inforeg/, click on contact us, click on complaints.IR@justice.gov.za

SECTION 9 – Technical Specification compliance: Pre-Qualifying Quality (Functionality) Criteria

Note to tenderers:

Tenderers are required to submit proof of the following (Proof must be attached to this section);

a) That the service provider is the Original Equipment Manufacturer (OEM) and if not

b) A Memorandum of Understanding (MOU) with the OEM proving association with them.

c) NRCS Certificate

Index of documentation attached to this schedule:
.....
.....

The table below is for information purposes only to indicate the method of scoring that will be followed to evaluate the programme submitted by the Tenderer:

Scoring will be as follows:

Technical Specification compliance: (Proof to be attached)
0 = Does not meet minimum requirements
0 = Alternative Offer to Specification.
100 = Service Provider complies with all specification noted on page 6 and 7 of 37 of this RFQ document. In addition, OEM / MOU and NRCS certificate is attached.

The undersigned, who warrants that he/she is duly authorised to do so on behalf of the Tenderer, confirms that the contents of this schedule are within my personal knowledge and are to the best of my belief both true and correct.

Signed ..... Date .....

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

Tenderer .....

SECTION 10 - Delivery Lead Time: Pre-Qualifying Quality (Functionality) Criteria

Note to tenderers:

Tenderers are required to provide Transnet Freight Rail with a Memo of how and when (time frame) delivery will be handled once the purchase order has been received (taking into consideration the Ore Corridor shutdown period, 28 September 2022 to 07 October 2022, as per the specification of this tender)

Index of documentation attached to this schedule:

.....

.....

The table below is for information purposes only to indicate the method of scoring that will be followed to evaluate the programme submitted by the Tenderer:

Scoring will be as follows:

Delivery Lead Time: (Proof to be attached)	
0 = 5 Weeks or more delivery lead time from date of receiving purchase order / No documentation provided.	
40 = 4 Weeks delivery lead-time from date of receiving purchase order.	
70 = 3 Weeks delivery lead-time from date of receiving purchase order.	
90 = 2 Weeks delivery lead-time from date of receiving purchase order	
100 = 1 Week or less delivery lead-time from date of receiving purchase order	

The undersigned, who warrants that he/she is duly authorised to do so on behalf of the Tenderer, confirms that the contents of this schedule are within my personal knowledge and are to the best of my belief both true and correct.

Signed ..... Date .....

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

Tenderer .....

SUPPLIER DECLARATION FORM

Supplier Declaration Form						
Important Notice: all organisations, institutions and individuals who wish to provide goods and/or services to organs of the State must be registered on the National Treasury Central Supplier Database (CSD). This needs to be done via their portal at https://secure.csd.gov.za/ **before applying to Transnet**.						
CSD Number (MAAA xxxxxxx):						
Company Trading Name						
Company Registered Name						
Company Registration No Or ID No If a Sole Proprietor						
Company Income Tax Number						
Form of Entity	CC	Trust	Pty Ltd	Limited	Partnership	Sole Proprietor
	Non-profit (NPO's or NPC)	Personal Liability Co	State Owned Co	National Govt	Provincial Govt	Local Govt
	Educational Institution	Specialised Profession	Financial Institution	Joint Venture	Foreign International	Foreign Branch Office

Did your company previously operate under another name?	Yes		No	
If **YES** state the previous details below:				
Trading Name				
Registered Name				
Company Registration No Or ID No If a Sole Proprietor				

Form of Entity	CC	Trust	Pty Ltd	Limited	Partnership	Sole Proprietor
	Non-profit (NPO's or NPC)	Personal Liability Co	State Owned Co	National Govt	Provincial Govt	Local Govt
	Educational Institution	Specialised Profession	Financial Institution	Joint Venture	Foreign International	Foreign Branch Office

Your Current Company's VAT Registration Status	
VAT Registration Number	
If **Exempted from VAT registration,** state reason and submit proof from SARS in confirming the exemption status	
If your business entity is not VAT Registered, please submit a current original sworn affidavit (see example in Appendix I). Your Non VAT Registration must be confirmed annually.	

Company Banking Details			Bank Name		
Universal Branch Code			Bank Account Number		
Company Physical Address					
				Code	
Company Postal Address					
				Code	
Company Telephone number					
Company Fax Number					
Company E-Mail Address					
Company Website Address					
Company Contact Person Name					
Designation					
Telephone					
Email					
Is your company a Labour Broker?		Yes		No	
Main Product / Service Supplied e.g. Stationery / Consulting / Labour etc.					
How many personnel does the business employ?	Full Time		Part Time		
Please Note: Should your business employ more than 2 full time employees who are not connected persons as defined in the Income Tax Act, please submit a sworn affidavit, as per Appendix II.					

Most recent Financial Year's Annual Turnover	<R10Million **EME**		>R10Million <R50Million **QSE**		>R50Million **Large Enterprise**	

Does your company have a valid proof of B-BBEE status?					Yes		No		
Please indicate your Broad Based BEE status (Level 1 to 9)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Majority Race of Ownership									

% Black Ownership		% Black Women Ownership		% Black Disabled person(s) Ownership		% Black Youth Ownership	
% Black Unemployed		% Black People Living in Rural Areas		% Black Military Veterans			

Please Note: Please provide proof of B-BBEE status as per Appendix C and D:

- Large Enterprise and QSEs with less than 51% black ownership need to obtain a B-BBEE certificate and detailed scorecard from an accredited rating agency;
- EMEs and QSEs with at least 51% black ownership may provide an affidavit using the templates provided in Appendix C and D respectively;
- Black Disabled person(s) ownership will only be accepted if accompanied with a certified letter signed by a physician on the physician's letterhead confirming the disability;
- A certified South African identification document will be required for all Black Youth Ownership.

Supplier Development Information Required				
EMPOWERING SUPPLIER An Empowering Supplier is a B-BBEE compliant Entity, which complies with at least three criteria if it is a large Entity, or one criterion if it is a Qualifying Small Enterprise ("QSE"), as detailed in Statement 400 of the New Codes. In terms of the requirements of an Empowering Supplier, numerous companies found it challenging to meet the target of 25% transformation of raw materials or beneficiation including local manufacturing, particularly so, if these companies imported goods or products from offshore. The matter was further compounded by the requirement for 25% of Cost of Sales, excluding labour cost and depreciation, to be procured from local producers or suppliers.	YES	○	NO	○
FIRST TIME SUPPLIER A supplier that we have not yet Traded within Transnet and will be registered via our database for the 1st time.	YES	○	NO	○
SUPPLIER DEVELOPMENT PLAN Supplier Development Plan is a plan that when we as Transnet award a supplier a long-term contract depending on the complexity of the Transaction. We will negotiate supplier development obligations that they must meet throughout the contract duration. e.g. we might request that they (create jobs or do skills development or encourage procurement from designated groups. (BWO, BYO & BDO etc.).	YES	○	NO	○
DEVELOPMENT PLAN DOCUMENT Agreed plan that will be crafted with the supplier in regards to their development (It could be for ED OR SD in terms of their developmental needs they may require with the company.	YES	○	NO	○ *If Yes- Attach supporting documents
ENTERPRISE DEVELOPMENT BENEFICIARY A supplier that is not yet in our value chain that we are assisting in their developmental area.	YES	○	NO	○
SUPPLIER DEVELOPMENT BENEFICIARY A supplier that we are already doing business with or transacting with and we are also assisting them assisting them in their developmental area e.g. (They might require training or financial assistance etc.)	YES	○	NO	○
GRADUATION FROM ED TO SD BENEFICIARY When a supplier that we assisted with as an ED beneficiary then is awarded, a business and we start Transacting with.	YES	○	NO	○
ENTERPRISE DEVELOPMENT RECIPIENT A supplier that isn't in our value chain as yet but we have assisted them with an ED intervention	YES	○	NO	○