C1.1: Form of Offer & Acceptance
Offer

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract for the procurement of:

Investigating, designing and constructing a railway embankment, formation and drainange, including culvert installation, near Bomvaas tunnel, between KwaNdengezi and Dassenhoek railway stations (Pietermaritzburg), for a period of 10 months.

The tenderer, identified in the Offer signature block, has

either	examined the documents listed in the Tender Data and addenda thereto as listed in the Returnable Schedules, and by submitting this Offer has accepted the Conditions of Tender.
or	examined the draft contract as listed in the Acceptance section and agreed to provide this Offer.

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

The offered total of the Prices exclusive of VAT is	**R**
Value Added Tax @ 15% is	**R**
The offered total of the Prices inclusive of VAT is	**R**
(in words)	

This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document including the Schedule of Deviations (if any) to the tenderer before the end of the period of validity stated in the Tender Data, or other period as agreed, whereupon the tenderer becomes the party named as the *Contractor* in the *conditions of contract* identified in the Contract Data.

Signature(s) _____ _____

Name(s) _____ _____

Capacity _____ _____

For the tenderer: _____

	(Insert name and address of organisation)	Date
Name & signature of witness		

Tenderer's CIDB registration number:

Acceptance

By signing this part of this Form of Offer and Acceptance, the *Employer* identified below accepts the tenderer's Offer. In consideration thereof, the *Employer* shall pay the *Contractor* the amount due in accordance with the *conditions of contract* identified in the Contract Data. Acceptance of the tenderer's Offer shall form an agreement between the *Employer* and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract, are contained in:

Part C1	Agreements and Contract Data, (which includes this Form of Offer and Acceptance)
Part C2	Pricing Data
Part C3	Scope of Work: Works Information
Part C4	Site Information

and drawings and documents (or parts thereof), which may be incorporated by reference into the above listed Parts.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Returnable Schedules as well as any changes to the terms of the Offer agreed by the tenderer and the Employer during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Form of Offer and Acceptance. No amendments to or deviations from said documents are valid unless contained in this Schedule.

The tenderer shall within two weeks of receiving a completed copy of this agreement, including the Schedule of Deviations (if any), contact the Employer's agent (whose details are given in the Contract Data) to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the *conditions of contract* identified in the Contract Data at, or just after, the date this agreement comes into effect. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the tenderer receives one fully completed original copy of this document, including the Schedule of Deviations (if any).

Unless the tenderer (now *Contractor*) within five working days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the Parties.

Signature(s)		
Name(s)		
Capacity		
for the Employer	Transnet SOC Ltd	
	(Insert name and address of organisation)	
Name & signature of witness		Date

Schedule of Deviations

Note:

1. To be completed by the Employer prior to award of contract. This part of the Offer & Acceptance would not be required if the contract has been developed by negotiation between the Parties and is not the result of a process of competitive tendering.
2. The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permitted in terms of the Conditions of Tender.
3. A tenderer's covering letter must not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid be the subject of agreement reached during the process of Offer and Acceptance, the outcome of such agreement shall be recorded here and the final draft of the contract documents shall be revised to incorporate the effect of it.

No.	Subject	Details
1		
2		
3		
4		
5		

By the duly authorised representatives signing this Schedule of Deviations below, the Employer and the tenderer agree to and accept this Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules, as well as any confirmation, clarification or changes to the terms of the Offer agreed by the tenderer and the Employer during this process of Offer and Acceptance.

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

	For the tenderer:	**For the Employer**
Signature		
Name		
Capacity		
On behalf of	*(Insert name and address of organisation)*	Transnet SOC Ltd

Name & signature of witness		
Date		

PART 2: PRICING DATA

Document reference	Title	No of pages
C2.1	Pricing instructions: Option A	1
C2.2	Activity Schedule	4

C2.1 Pricing Instructions: Option A

1. The *conditions of contract*

1.1. How the contract prices work and assesses it for progress payments

Clause 11 in NEC3 Engineering and Construction Contract, June 2005, (with amendments June 2006 and April 2013) (ECC) Option A states:

Identified and defined terms	11 11.2	(20) The Activity Schedule is the *activity schedule* unless later changed in accordance with this contract. (22) Defined Cost is the cost of the components in the Shorter Schedule of Cost Components whether work is subcontracted or not excluding the cost of preparing quotations for compensation events. (27) The Price for Work Done to Date is the total of the Prices for • each group of completed activities and • each completed activity which is not in a group A completed activity is one which is without Defects which would either delay or be covered by immediately following work. (30) The Prices are the lump sums for each of the activities on the Activity Schedule unless later changed in accordance with this contract.

1.2. Measurement and Payment

1.2.1 The Activity Schedule provides the basis of all valuations of the Price for Work Done to Date, payments in multiple currencies, price adjustments for inflation and general progress monitoring.

1.2.2 The amount due at each assessment date is based on **completed activities and/or milestones** as indicated on the Activity Schedule.

1.2.3 The Activity Schedule work breakdown structure provided by the *Contractor* is based on the Activity Schedule provided by the *Employer*. The activities listed by the *Employer* are the minimum activities acceptable and identify the specific activities which are required to achieve Completion. The activity schedule work breakdown structure is compiled to the satisfaction of the *Project Manager* with any additions and/or amendments deemed necessary.

1.2.4 The *Contractor's* detailed Activity Schedule summates back to the Activity Schedule provided by the *Employer* and is in sufficient detail to monitor completion of activities related to the Accepted Programme in order that payment of completed activities may be assessed.

1.2.5 The short descriptions in the Activity Schedule are for identification purposes only. All work described in the Works Information is deemed included in the activities.

1.2.6 The Activity Schedule is integrated with the Prices, Accepted Programme and where required the forecast rate of payment schedule.

1.2.7 Activities in multiple currencies are separately identified on both the Activity Schedule and the Accepted Programme for each currency.

1.2.8 The tendered total of the prices as stated in the Contract Data is obtained from the Activity Schedule summary. The tendered total of the prices includes for all direct and indirect costs, overheads, profits, risks, liabilities and obligations relative to the Contract.

C2.2 Activity Schedule.

The Tenderer details his Activity Schedule below or makes reference to his Activity Schedule and attaches it to this schedule.

The details given below serve as guidelines only and the Tenderer may split or combine the activities to suit his particular methods.

Activity No	Activity Description	UOM	Quantity	Rate	Total price of each activity (excl. VAT)
A1	**Detail condition assessment of the infrastructure** - Condition assessment and stability check.	sum	1.00		
A2	**Detail condition assessment of the infrastructure:** - Condition assessment Report (Hard copy and soft copy).	sum	3.00		
B1	**Site investigations: Geotechnical Investigation:** - Site geotechnical investigation.	sum	1.00		
B2	**Site investigations: Geotechnical Investigation:** - Geotechnical report. (Hard copy and soft copy).	sum	3.00		
C1	**Site investigations: Topographical Survey** - Topographical Surveys Data of railway line, existing landmarks, surface mapping.	sum	1.00		
C2	**Site investigations: Topographical Survey** - Report and documentation.	sum	1.00		
C3	**Site investigations: Hydrological and Hydraulic report:** - Site Hydrological and Hydraulic investigation.	sum	1.00		
C4	**Site investigations: Hydrological and Hydraulic report:** - Hydrology and Hydraulic report. (Hard copy and soft copy).	sum	3.00		

D1	**Rehabilitation of embankment: Structural Design** - Retaining structure design (retailing wall/piling/gabion wall/etc.) informed by the conditional assessment.	sum	1.00		
D2	**Rehabilitation of embankment: Structural Design** - Structural AFC/Construction Drawings of retaining structure. (Hard copy and soft copy).	sum	3.00		
D3	**Rehabilitation of embankment: Structural Design** - Structural design report. (Hard copy and soft copy).	sum	3.00		
D4	**Rehabilitation of embankment: Structural Design** - BOQ (Bill of Quantities).	sum	1.00		
E1	**Civils Design (Surface and Subsurface drainage)** - Drainage Analysis (surface and subsurface drainage analysis).	sum	1.00		
E2	**Civils Design (Surface and Subsurface drainage)** - Drainage system design report with layout and material specifications.	sum	3.00		
E3	**Civils Design (Surface and Subsurface drainage)** - Civils AFC/Construction drawings. (Hard copy and soft copy).	sum	3.00		
E4	**Civils Design (Surface and Subsurface drainage)** - BOQ (Bill of Quantities).	sum	1.00		
F1	**Rehabilitation of formation Design** - Formation design testing and design (informed by the conditional assessment).	sum	1.00		
F2	**Rehabilitation of formation Design** - Structural AFC/Construction Drawings of retaining structure. (Hard copy and soft copy).	sum	3.00		

F3	**Rehabilitation of formation Design** - Structural design report. (Hard copy and soft copy).	sum	3.00		
F4	**Rehabilitation of formation design Structural Designs** - BOQ (Bill of Quantities).	sum	1.00		
G1	**Culvert upgrade Design:** - All drainage structural works designs and specification for the culverts upgrade (as per hydrology and conditional assessment requirements).	sum	1.00		
G2	**Culvert upgrade Design:** - Drainage Structural AFC/Construction Drawings. (Hard copy and soft copy).	sum	3.00		
G3	**Culvert upgrade Design:** - Drainage design report. (Hard copy and soft copy).	sum	3.00		
G4	**Culvert upgrade Design** - BOQ (Bill of Quantities).	sum	1.00		
H1	**Rock slope protection design:** - Site investigation.	sum	1.00		
H2	**Rock slope protection design:** - Design and analysis.	sum	1.00		
H3	**Rock slope protection design:** - Remedial report. (Hard copy and soft copy).	sum	3.00		
I1	**Construction documentation:** - Health and safety report. (Hard copy and soft copy).	sum	3.00		
I2	**Construction documentation:** - Environmental report. (Hard copy and soft copy).	sum	3.00		
I3	**Construction documentation:** - Method statement.	sum	1.00		
I4	**Construction documentation:** - Quality Control Plan.	sum	1.00		
I5	**Construction documentation:** - Construction Schedule.	sum	1.00		

I6	**Construction Works** - Construction of retaining structure.	sum	1.00		
I7	**Construction Works** - Construction of surface and subsurface drainage systems.	sum	1.00		
I8	**Construction Works** - Rehabilitation of railway formation.	sum	1.00		
I9	**Construction Works** - Construction of culverts upgrade.	sum	1.00		
I10	**Environmental and General Rehabilitation of Site** - Environmental Rehabilitation of work site, including all EIA triggers.	sum	1.00		
I11	**Environmental and General Rehabilitation of Site** - Rehabilitation of Work site, including temporal access roads, laydown areas, etc.	sum	1.00		
I12	**Environmental and General Rehabilitation of Site** - General housekeeping.	sum	1.00		
I13	**Handover documentations:** As-built Drawings, Investigational reports, Design reports, certificates etc. (Hard copy and soft copy).	sum	3.00		
				Total Price to be carried over to the Form of Offer & Acceptance (exclusive if VAT)	
				Add: 15% VAT portion (if applicable)	
				Total Price to be carried over to the Form of Offer & Acceptance (inclusive if VAT)	

PART 3: WORKS INFORMATION

Document reference	Title	No of pages
C3.1	The Scope	24
	Total number of pages	24

Rehabilitation of Embankment and Drainage System near Bomvas tunnel between KwaNdengezi and Dassenhoek Railway Station: Turnkey EPC (Engineering, Procurement, Construction, and Close out)

Works Information

Contract Number:

Revision number: 00

Prepared by:

Nkululeko Mbedle – Principal Engineer	Date

Reviewed by:

Sibusiso Gwamanda – Senior Manager: Engineering	Date

Approved by:

Sandile Magenuka – Project Director	Date

C3.1: SCOPE OF WORKS

Table of Contents

List of Abbreviations

The definitions listed below apply to this document.

Abbreviations	Definition
AFC	Approved for Construction
AASHTO	American association of state highway and transport officials
BSCS	British Soil Classification System
CAD	Computer Aided Drawing
CAS	Condition Assessment Systems
CDS	Contractor document schedule
CESA	Consulting Engineers South Africa
CIDB	Construction industry development board
COLTO	Committee of land and transport officers
CTC	Centralised Traffic Control
DC	Design Criteria / Document Control
DFFE	Department of Forestries, Fisheries and Environment
EAPASA	Environmental Assessment Practitioners Association of South Africa
ECP	Enterprise Change Proposal
ECSA	Engineering Council of South Africa
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement, Construction
HAZOP	Hazard and Operability Studies
IFU	Issued for Use
ISO	International organisation for standardisation
NatCor	Natal Corridor
OHTE	Overhead Track Equipment
ORS	Owner Requirement Specification
PEP	Project Execution Plan
PQP	Project Quality Plan
RN	TFR Rail Network
RNC	TFR Rail Network Construction (Previously known as RME)
RSR	Railway Safety Regulator of South Africa

Abbreviations	Definition
SAICE	South African Institution of Civil Engineering
SANS	South African National Standards
SAT	Site Acceptance Testing
SouthCor	South Corridor
TFR	Transnet Freight Rail
TM	TFR Technology Management
TRH	Technical recommendation for highways
USCS	Universal soil classification system
WULA	Water Use License Application

1. General description of the works.

1.1 *Employer's* objectives

The Employer's objective is to enter into a contract with an *EPC Contractor* to provide a service for the Engineering, Procurement, Construction, and Close-out for the: slope stabilisation, erosion protection works, drainage system and formation rehabilitation along an embankment situated near Bomvaas Tunnel between railway chainage 69.032 and 69.234, on the main railway line between Pietermaritzburg and Durban. This shall be supported by the following comprehensive multidisciplinary services which include but are not limited to:

1.1.1 Project management, engineering management and execution, Procurement management and execution and construction execution planning which also includes but is not limited to Scheduling & planning, Cost engineering & Quantity surveying, Documentation management, Quality Management, Safety management, Risk management and planning, and procurement packaging, execution and management planning.

1.1.2 Plan and execute a comprehensive geotechnical investigation within the required area (at the discretion of *the Contractor to support his design*). Provide geotechnical investigation input/design recommendations for all elements related to the rehabilitation and drainage requirements. Provide detailed designs for construction of all required geotechnical elements related to the proposed developments.

1.1.3 Plan and execute a comprehensive hydrological survey and hydraulic study of area (at the discretion of *the Contractor to support his design*). Provide geotechnical investigation input/design recommendations for all elements related to the rehabilitation and drainage requirements. Provide detailed designs for construction of all required geotechnical elements related to the proposed developments.

1.1.4 Comprehensive Environmental Management and Authorisation including all stakeholder engagements, applications, specialist studies, record of decisions and development of the execution stage management and monitoring plan. This also includes all the engagements with the DFFE.

1.1.5 Comprehensive Civil and Structural designs to 100% Approved for Construction for elements forming the scope of the project and the undertaking of the construction. Comprehensive tacheometric, cadastral and sub surface survey (as required) for the successful completion of the project.

1.1.6 Stakeholder Management which includes identification, analysis and engagements to ultimately support the project outcomes and to solicit the necessary approvals related to the proposed design.

1.1.7 Comprehensive integrated Design Report for all engineering and design.

1.1.8 Procurement Planning, packaging and execution.

1.1.9 Construction Planning and execution.

1.1.10 Quality inspections of earthworks and construction works.

1.1.11 Close out, including handover, correction of defects, signed-off as-built drawings, completion certificates and other documentation.

1.1.12 In fulfilling *the Employer's* requirements, *the Contractor* is required to declare and state all limitations and challenges that are not identified by the Scope of Work.

1.1.13 Any changes to the agreed scope shall be reported to *the* Employer by *the Contractor* immediately to avoid project delays and incorrect outcomes. Scope changes shall be reported and managed as per the Transnet Change control procedures. This also includes all other relevant services of *the Employer's* Framework for project delivery of the Engineering, Procurement, Construction works, and Closeout; and all related supporting services and documentation to ensure compliance to the generally acceptable industry standard for a project of this magnitude.

1.2 Project Goal.

To Engineer, Procure, Construct, and Close-out the slope stabilisation and slope erosion protection works, drainage and formation rehabilitation along an embankment situated near Bomvas Tunnel, between railway chainage 69.032 and 69.234, on the main railway line between Pietermaritzburg and Durban. This project shall also include a geotechnical, flood hydrology and hydraulic study for the design of surface and subsurface hydraulic structures between railway chainage 68.452 and 69.234. The ultimate outcome is to achieve functional fit for purpose railway line and commission the infrastructure for use by Transnet end-users.

1.3 Project objectives.

- To conduct any necessary studies on the area including condition assessment, hydraulic, geotechnical, and topographical surveys that will guide and successful implementation of the project.
- To stabilise the embankment adjacent to the current railway line.
- To provide adequate drainage and related infrastructure for the long-term sustainability of the line and the embankment.

1.4 The Business Goal.

The optimal functioning of this line is essential for the rail connectivity between the Port of Durban

(South Africa's largest container terminal) and Johannesburg (the economic hub of the region). This line aims to service a wide variety of products and is capable of drastically reducing the high number of trucks transporting goods on the N3 highway between these two cities. Currently, a speed restriction is imposed on trains passing through the area which reduces the capacity of the line. This project is aimed at alleviating the speed restriction so that trains can pass through safely.

2 Site Location.

- The Project work will be carried out on the nata corridor. The embankment in question is situated on the Pietermaritzburg – Durban railway section (of the Natal Corridor) between KwaNdengezi and Dassenhoek which belongs to Transnet Freight Rail (TFR) Chainage: km 68.452 to km 69.234. The site's coordinates are 29°50'30.97"S, 30°47'3.31"E. An aerial view of the site is shown below in Figure 1.
- The site is in close proximity to residential houses situated up the embankment slopes, informal walkway roads exist used by the locals, the site also has one of the railway stations in close proximity, with platforms and a pedestrian bridge, the majority of the work falls within Transnet's rail reserve.

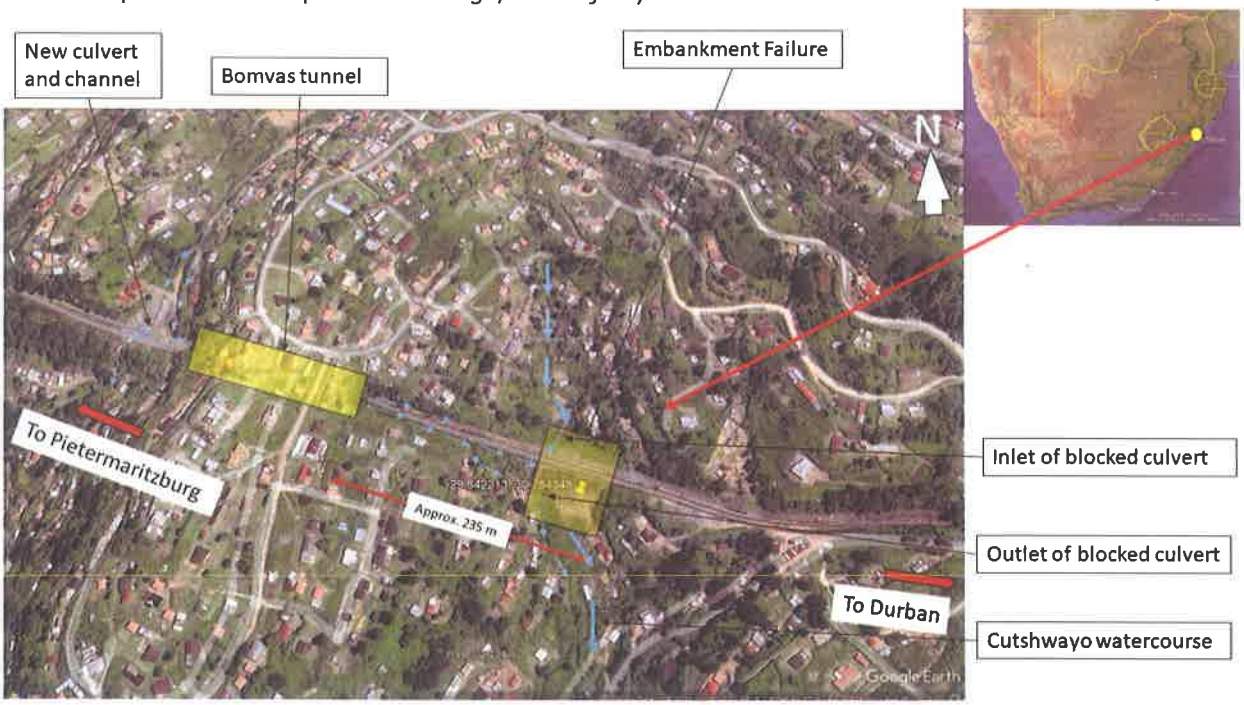

Figure 1: Aerial view of the site showing the position of the failed embankment with respect to the Bomvaas tunnel

3 Site Description and Background.

3.1 The railway embankment (approx. 170 m long) exhibits moderate to severe erosion and slope translational failure over 120 m. Approximately plane translational failure indicates movement of over 3

m from the crest of the initial slope. The farthest failure point of the embankment is approximately 235 m south-east of the Bomvas Tunnel (Figure 1).

3.2 The embankment intersects the Cutshwayo natural watercourse. A blocked concrete culvert (located at chainage 69.107) intersects the embankment. Figure 2 shows information on the railway line and culverts of interest.

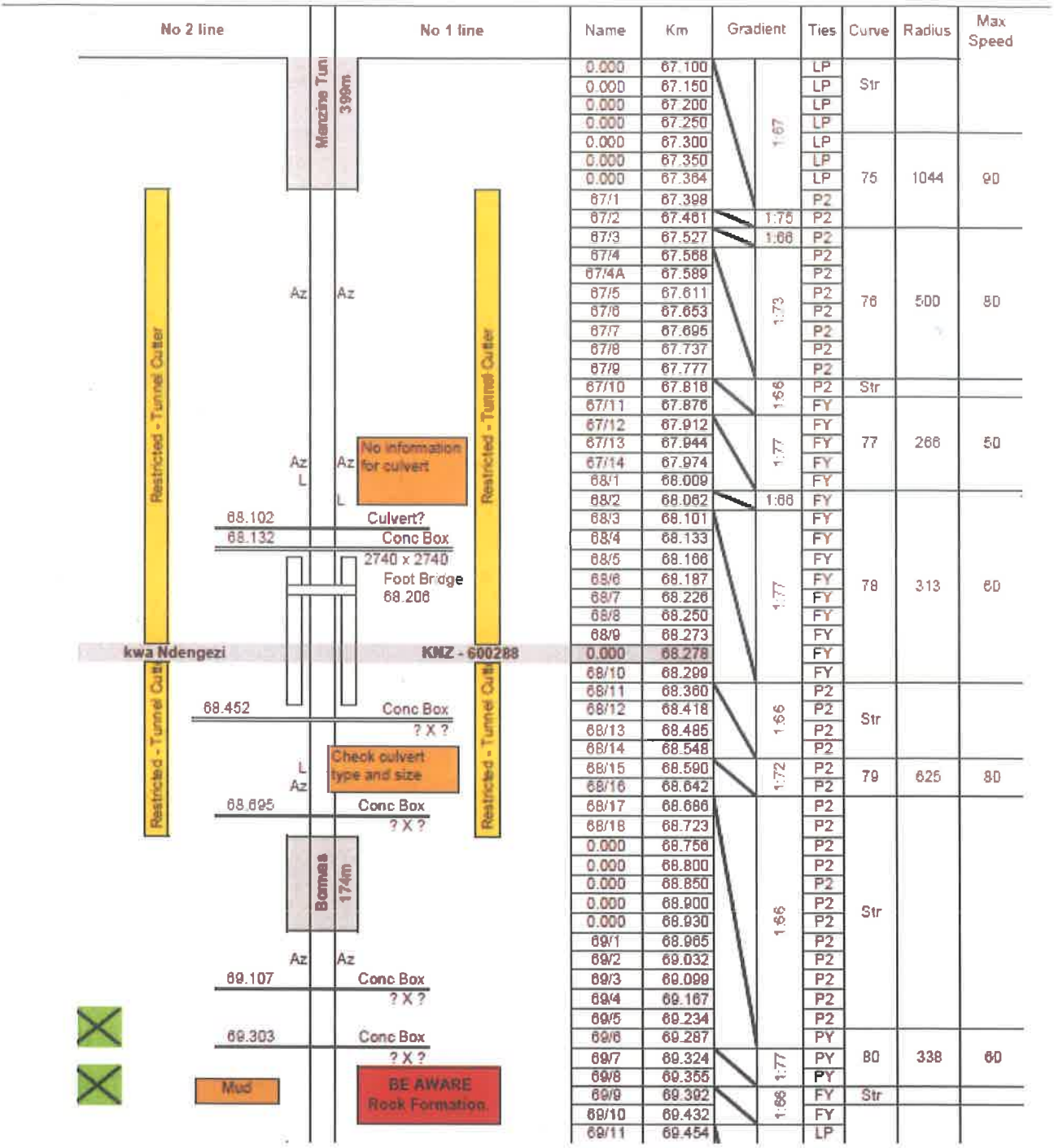

Figure 2: Diagram showing the railway line and chainage of culverts between chainage 68.299 and 69. 454 (between KwaNdengezi and Dassenhoek station).

3.3 The farthest failure point of the embankment is approximately 235 m south-east of the Bomvas Tunnel (Figure 1). The embankment intersects the Cutshwayo natural watercourse. A blocked concrete culvert (located at chainage 69.107) intersects the embankment.

3.4 *The Employer* has access to historical localised topographical survey data and geotechnical investigation data that is limited to portions of the site, no other forms of reports exist for the site.

3.5 No geotechnical and geological investigations and surveys have been conducted on the site, however, from the naked eye, the site is covered with vegetation and reddish to brown deemed to be naturally occurring soil, with multiple sections of rock outcrops can be seen at various locations along the section.

3.6 The hidden and buried services on the site include old/redundant or blocked culverts, potential municipal water supply and, sewer pipes running parallel the line and, electrical and telecommunications cables. *The Employer* has not obtained cadastral surveys of the site, however, such services will be identified and marked on site.

4 Description of the Works.

4.1 *The Contractor* is required to undertake the following works:

4.1.1. Conduct a condition assessment, hydrological, geotechnical, and topographical surveys of the study area.

4.1.2. The design and rehabilitation of the embankment between km 69.032 and 69.234. This is an immediate objective for the safe running of trains.

4.1.3. The design and construction and/or rehabilitation of surface and subsurface drainage structures between km 68.452 and 69.234.

4.1.4. Implementation of the railway formation rehabilitation works between 68.452 and 69.234. Transnet will be responsible for the removal and reinstatement of the perway within the above-mentioned chainage.

4.1.5. Design a solution for rock slope protection works between 68.452 and 69.107 (the implementation of this solution is not part of this scope).

4.1.6. Bill of Quantities (BoQ) and specifications for construction.

4.1.7. Construction of the approved designs and construction supervision of items 4.1.2 to 4.1.4

4.1.8. Item 4.1.3. and 4.1.4. above are not immediate objectives, however, they must be integrated into the immediate solution. The long-term objective is to improve the resilience of the study area to future flood events. The analysis and design must be conducted for flood return periods of 50 and 100 years. Both options/prices (for design and construction) must be (presented separately on the BoQ) to *the Employer* who will thereafter decide on the return period for implementation.

4.1.9. Implementation of Environmental Rehabilitations of site and any additional items, which *the contractor* deems necessary for the successful completion of the works, should be covered in a separate letter to *The Employer*. All additional items are to be priced and submitted with the tender, for consideration. *The contractor* must ensure that he/she has inspected the site and that he/she is aware of the site conditions. He/she should, with *The* Employer's permission and if he/she deems it necessary, undertake any additional investigations and exploratory work to establish site conditions.

4.2 Based on the scope, *the Contractor* is required to develop a program to be submitted for review and approval by *the Employer's Agent* (*Employer's* Team Representatives).

4.3 Prior to the commencement with the project scope, *the Contractor* is required to obtain the approval from *the Employer*.

4.4 *The Contractor* produces a body of work for the engineering, procurement (materials, specialist services, sub-contractors and plant and equipment), construction and commissioning work which complies with *the* Employer's requirements. The success of the design deliverables shall be measured through the successful outcome of the approvals process; *the Contractor* takes accountability to drive forward the Environmental management and permitting process with DFFE (if necessary).

4.5 For this project *the Contractor* generates an organogram showing appropriate disciplines and their roles.

4.6 *The Contractor* complies with the relevant Transnet specifications, drawings, standards, templates (where they exist), typical designs, approvals, guidelines, policies and procedures. *The Employer* provides relevant Transnet documentation upon request (Form BBB0322 to be submitted to *the Employer's Agent*).

4.7 *The Contractor* sources all relevant government regulations, international standards and national standards from the relevant authorities.

4.8 *The Contractor* complies with the ECSA, CESA and CIDB Code of Conduct.

5 Detailed Project Scope.

In line with *the Employer's* requirements *the Contractor* shall define and develop the scope for the completion of this project.

Each project deliverable will be evaluated and measured by t*he Employer's Agent / Employer's team* as per the defined quality and deliverables.

5.1. General Instructions.

5.1.1. Engineering Designs and documentation up to 100% design accuracy to the level of AFC drawings, final specifications and completed works information up to implementation of the rehabilitation of the embankment and the construction of the drainage infrastructure. This must be supported by the geotechnical investigation, topographical surveys, hydrology studies and condition assessment.

5.1.2. Prepare and implement a Quality Plan inclusive of Engineering, Procurement, Construction checklists. Completed checklists to be included with each submission of drawings, reports, construction documentation etc. Full quality records to be submitted upon final hand over

of *the Contractor's* work.

5.1.3. *The Contractor* shall propose skilled staff with relevant qualifications, experience and ECSA Professional registrations to be formally mobilized to ensure deliverables are met. Furthermore, *the Employer* (including *Employer's Team*) and *Contractor* shall agree on the project plan and program, risk assessments, method statement, applicable latest drawings, communication plan applicable and specific to this Design and Construction scope of work, key deliverables and project timelines.

5.1.4. Undertake engineering specialist studies for the related rehabilitation and construction works which includes but is not limited to:

a. Geotechnical, hydrological and topographical surveys and condition assessments of infrastructure within the study area.
b. Hydrology study for storm water and drainage.
c. Provide a fully detailed report with recommendations for *the Employer's* acceptance.
d. Detailed project schedule with the project cash flow
e. Construction methodology including the resource plan.
f. Geotechnical investigations and borrow pit locations
g. Environmental management and authorisation including Water Use Licence (if required).
h. Stakeholder management
i. Hazard and Operability Studies (HAZOP)

5.1.5. No free-issue Plant and Materials are supplied to *the Contractor.*

5.1.6. Submit a proposed list of key critical Plant and Materials (including details of the suppliers, make/model, etc.) for acceptance by *the Employer's Agent* prior to procurement.

5.1.7. Assess the site its current condition to supply the optimal required design accordingly.

5.1.8. Minimises disruptions to the current operations and maximise construction during occupations.

5.2. Geotechnical works.

The Contractor's Geotechnical Scope of Services is anticipated to include:

5.2.1 Engineering

a. A desktop study of geological maps and/or historical geotechnical investigations, fieldwork (at the discretion of *the Contractor*), laboratory testing (at the discretion of *the Contractor*) and reporting (*Geotechnical Investigation and Design Report(s)*) that include the following minimum requirements (if/where applicable):
b. General descriptions of the site (e.g., climate, general geology, etc.) and fieldwork conducted.
c. Description of existing sub-soil and/or rock conditions/types, including possible fault lines, areas of instability, problematic soils (e.g., soils with dispersive, highly erosive, collapsible, expansive or compressible properties), etc.
d. Data evaluation/interpretation of the field and laboratory test results.
e. Material classification and recommended use (e.g., COLTO/COTO, TRH14, USCS, AASHTO, S410).

f. Groundwater measurements and in-situ permeability.
g. Recommendations for foundations of culverts, including allowable bearing pressure and assessment of settlement.
h. Recommendations for the design and construction of surface and sub-surface drainage/stormwater control.
i. Layer works recommendations and possible upgrades and/or rehabilitation work on existing soil.
j. Slope stability analysis, detailed design and construction of earth retaining structures/lateral support/slope stability measures (if/where required).
k. Recommendations and execution of temporary works for deep excavations.
l. Analysis of the conditions of the railway track subgrade and earthworks.
m. Recommendations for formation layerworks/subgrade treatment of railway earthworks, including possible upgrades and/or rehabilitation work on existing formation (in terms of the S410 Specification).
n. Recommendations and execution for excavation works.
o. Identification of a suitable borrow pit/quarry/commercial source, in close proximity to the proposed sites, to supply suitable material for construction works (e.g., pavement layerworks, railway formation works, etc.), including licensing validation.
p. Identification of precautionary measures to consider regarding the geotechnical conditions of the proposed developments.

5.2.2 Procurement

Procurement, appointment, and management of experienced geotechnical service providers, such as drilling subcontractors and civil engineering laboratories.

5.2.3. Construction

Implementation of the proposed design including documentation for construction/ implementation and construction methodology of *the Contractor's* designs, including, but not limited to: Construction drawings, Detailed *Bill of Quantities,* Technical Specifications, Design report, Design Criteria and *Works Information/Scope of Works* (detailing how *the Contractor* should go about executing/ implementing the designs).

5.3. Civil and Earthworks:

The Contractor's Civil, and earthworks Scope of Services is to:

5.3.1. Engineering

Develop a detailed full suite Civil Engineering Designs documentation up to 100% design accuracy to the level of AFC drawings, final specifications and completed works information up to Construction for the drainage infrastructure.

a. Concept/Preliminary design
    i. Site investigations and Topographical surveys and conditional assessment report (with recommendations)

ii. Preparation of Design Criterion
iii. High level Design Calculations
iv. Preparation of Concept Drawing
v. Coordination Meetings
vi. Presentation for Approval of Concept
vii. Estimates

b. Design Development/Detailed design
   i. Detailed design calculations
   ii. Preparation of submission drawings
   iii. Preparation of IFC Drawings
   iv. Coordination of Designs
   v. Technical Design Meetings
   vi. Risk Assessment Meetings
   vii. Hazard and Operability Studies (HAZOP)
   viii. Squad Check
   ix. Approval of Design Drawings by *the Employer's team*
c. Technical Documentation
   i. NEC3 Works Information
   ii. Equipment List
   iii. Bills of Quantities
   iv. Specific Technical Specifications
   v. Approval of documents by *the Employer's team*
   vi. Coordination of Documentation
   vii. Design Review
   viii. Design Report
d. Issue for Construction
   i. Approved drawings
   ii. Modification of AFC Drawings
   iii. Attendance of Site Meetings
e. Close Out
   i. Preparation of as-built Drawings
   ii. Hand Over Meetings

5.3.2. Procurement

The Procurement, appointment and management of experienced civil engineering service providers such as design subconsultants and construction subcontractors, materials, equipment, and labour for construction execution.

5.3.3. Construction

The construction works to be carried out under this scope comprises but not limited to the following:

a. Establishment of site offices (Facilities for the site office and staff)
b. Site clearance
c. Earthworks
    i. Cut/Undercut
    ii. Fill (from stockpiles)
    iii. Fill (from borrow pits)
    iv. Import from commercial sources
    v. Finishing Work (Top soiling side slopes of embankments, Hydroseeding side slopes of embankments, Rounding of edges in cuttings and fills).
    vi. Site Inspections - Walk Abouts
d. Service road
    i. Clear and grub
    ii. Cut and Fill
    iii. Import from commercial sources
e. Drainage
    i. Stormwater Drainage (surface drainage incl. U-drains, concrete channels and earth channels, cut-off drains and side drains, etc.)
    ii. Culverts
    iii. Sub-surface Drainage
f. Fencing and barriers (where necessary)
g. Project close out plan
    i. As-built drawings.
    ii. Appropriate document management.
    iii. Hazard study action close out.
    iv. Risk action close out.
    v. ORS verification.
    vi. Certification / sign off certificates.

5.4. Structures Works

The Structures *Works* includes but it is not limited to:

5.4.1. Engineering

a. Conduct a condition site assessment of the existing infrastructure within the study area not limited to culverts extension, and OHTE structural support requirements.
b. Develop a full detailed design not limited to culverts extension, structural support requirements, depending on the outcome of the condition assessment, hydrological studies and design requirements.
c. Design any temporary works that will enable construction of the proposed design. Any temporary works that may be necessary should be approved by *the Employer's team* prior to construction. Any temporary work submitted is required in a format of both calculations and drawings. The temporary works shall be structurally adequate and the foundations adequate with no settlement.

5.4.2. Procurement

The Procurement, appointment and management of experienced civil engineering service providers such as design subconsultants and construction subcontractors, materials, equipment, and labour for construction execution.

5.4.3. Construction

The works to be constructed under this scope comprises of the following, depending on the outcome of the condition assessment, hydrological studies and design requirements:

a. Rebuild or extension of culverts (layerworks, foundation, culvert, wingwalls and headwalls)
b. Earth retaining structures (if required)
c. Prepare and submit as-built drawings to *the Employer's Agent*.

5.4.4. General

a. Professional responsibility
   i. *The Contractor* is wholly responsible for all design coordination, integration and liaison activities involving all the Works, and shall take all measures necessary and make all arrangements for activities such as meetings, inspections, endorsements, and any other activities required for the timeous completion of the Works and to the appropriate quality. When these activities require the involvement of *the Employer's* (Professional Engineering) *team* or any other stakeholders, *the Contractor* is required to make these arrangements with due consideration of *the* Employer's Professional Engineering team's availability and the availability of other stakeholders.
   ii. *The Contractor* shall thus be wholly accountable and responsible for all aspects of his designs, including the implementation of all Statutory Safety, Health and Environmental Regulations of South Africa AND the particular requirements, specifications, and regulations of *the Employer* pertaining to Health and Safety, Environment, Quality and Engineering.
   iii. *The Contractor* shall be wholly accountable and responsible for the implementation of the aspects of his designs including commissioning, putting into service and handover of his constructed designs to *the Employer*, and his duly appointed ECSA registered Engineers shall be held accountable and responsible for these aspects of the Works for the lifetime duration of the Works.

b. Completion, testing, commissioning and correction of Defects

i. The work to be done by the Completion Date or before the Completion Date *the Contractor* shall have done everything required to provide the Works before the Completion Date and in any case before the dates stated. *The Employer's Agent* cannot certify Completion until the Works have been done and is also free of Defects, which would have, in his opinion, prevented *the Employer* from using the works and others from doing their work.

ii. *The Contractor* is permitted to carry out the following works after Completion:

- The rectification of minor defects identified prior to the Completion Date. Any work that affects the track standard, safety or work related to the running of trains will not be seen as a minor defect.

iii. Materials facilities and samples for tests and inspections during construction.

iv. *The Contractor* is to provide all facilities at his own cost. Control and acceptance testing in accordance with project specifications (SANS 1200).

v. *The Contractor* ensures that *the Employer's Agent* has a full and accurate dossier of As-built documents that represent the status of the completed works (to include Plant within the works) to present to *the Employer.*

vi. Access given by *the Employer* for correction of Defects
In accordance with the Conditions of Contract as well as operational procedures.

vii. *The Contractor* complies with all the constraints and procedures of *the Employer* where *the Employer's Agent* arranges access *for the Contractor* after Completion:

5.5. Health and Safety Works:

The *Health and Safety* Works include but not limited to:

5.5.1. Undertake design safety reviews of all design deliverables that address the constructability of the works with *the Employer's Agent.*

5.5.2. Prepare and present design documents to *the Employer* at the HAZOP review meetings as a minimum:

5.5.3. Source the services of the Construction Health and Safety Agent to assist in the development of the health and safety deliverables, namely:

a) Health and Safety Baseline Report.

b) Health and Safety Specifications based on the Baseline Report.

c) Occupational Health Baseline Report.

d) Project Health and Safety Management Plan.

e) Design for Health and Safety report, considering the implications of the HAZOP 3 study to the designs.

f) Health and Safety Legal and other requirements register.

g) Schedule of project health and safety cost estimate/budget.

5.6. Environmental Authorizations and Rehabilitation Works:

The *Environmental Authorizations* Works include but not limited to:

5.6.1. *The Contractor* shall obtain all environmental permits and licenses required for this project, using the One Environmental System as far as practicable.

5.6.2. *The Contractor* shall be responsible for the below deliverables through a professionally registered Environmental Specialist (EAPASA or SACNASP where required) for the entire scope of the project, namely:

a) Environmental Baseline Survey Report.
b) Environmental Legal and Risk Register.
c) Environmental and Social Governance Report.
d) Sustainable Design Report
e) Review and update the Project Execution Plan and Project Design Criteria.
f) All documents/reports that form part of Project Permits and Licenses Applications.
g) Implement Environmental Rehabilitation works based on the directive of the environmental authorisations as per item 5.6.1.

5.6.3. All documents should be reviewed and approved by *the Employer's* Environmental Specialist. All permits and licenses should be done in close consultation with *the Employer's* Environmental Specialist.

5.7. Quality Management System:

5.7.1. *The Contractor* shall execute the works in accordance with the project specification QAL-STD-001 (General Quality Requirements *for Contractors* and Suppliers).

5.7.2. *The Contractor's* Quality Management System shall conform to the requirements of ISO 9001:2015 Standard.

5.7.3. *The Contractor* shall submit Project Quality Plan (PQP) proposal to *the Employer* for review before commencement of work on site. Works on site may only continue once these proposals are accepted by *the Employer*.

5.7.4. The proposal shall detail *the Contractor's* quality management system as it applies to all aspects of supply or service provision, including design, procurement, manufacturing, construction, installation, erection, and commissioning.

5.7.5. *The Contractor* shall make allowance for the provision of suitably qualified quality control staff to manage and carry out inspection on all supplier/subcontractor activities in all disciplines included within the Works Information.

5.7.6. The PQP shall demonstrate the clear understanding of the scope of work. This means that the write up must pe project specific.

5.7.7. The PQP includes *the Contractor's* statement that outlines strategy, methodology, resource allocation, QA and quality control co-ordination activities to ensure that the works meet the standards stated in the Works Information.

5.7.8. PQP is generally in narrative form detailing the Project Specific QA and QC systems and controls required by *the Contractor* for the specific works.

5.7.9. PQP requirements are detailed in the project standard and shall include, but not be limited to:

a) Quality objectives
b) Quality risks
c) Quality management during procurement, engineering and construction
d) Quality roles and responsibilities of all resources involved in the quality management implementation.
e) All quality activities relevant to the works, identifying all procedures, reviews, audits, control, and records used to control and verify compliance with the specified contractual requirements
f) Listing of all special processes such as welding, non-destructive testing (where applicable), cube testing, compaction etc.
g) List of all proposed method statements for Site-based work activities.
h) Include a description of *the Contractor's* organization. The organization structure shall indicate resources committed to implementation of PQP requirements
i) Non-conformance management including root cause analysis.
j) Lines of communications during contract period.

6. List of Drawings, Reports and Reporting.

As part of the deliverables *the Contractor* provides all engineering surveys, drawings, designs, reports and documentation in native and pdf format (raw data and final design data) as part of the engineering deliverables. This applies for all phases of the project.

Each submission of drawings issued by *the Contractor* to *the Employer* is required to be soft copies (PDFs and native files) and hard copies as per TFR drawing specifications. The drawings must be signed off by a professionally registered person, Pr. Eng. or Pr.Tech.Eng.

6.1. Review and Acceptance of documents

6.1.1 First Submission of Documentation

i. The first revision is revision 'A', with subsequent revisions being 'B', 'C', 'D', etc. during the pre-construction phase, thereafter the first revision during the construction phase commences at revision '0' and increments sequentially i.e. '1', '2', '3', etc.
ii. A first submission at revision 'B' is not acceptable and revision numbers must not be skipped.

6.1.2 Review of Documentation

i. Acceptance of documentation by the Project will in no way relieve *the*

Contractor of their responsibility for the correctness of information, or conformance with the requirements. This responsibility rests solely with *the Contractor*.

ii. Once documentation has been reviewed by *the Employer*, all comments are consolidated, and a review code is assigned on the review stamp to the original reviewed/marked-up drawing/document by *the Employer's Agent*.

6.1.3 Return of Reviewed Documentation

i. The original reviewed/marked-up drawing/document is scanned to PDF format and a copy is returned to *the Contractor* indicating further instructions from *the Employer's Agent*.

ii. Return of the reviewed documentation is either in hard copy format, in which case the original reviewed/marked-up drawing/document is returned, or return is electronically via the DC email address.

iii. Electronic documentation shall be returned via the DC email address.

6.1.4 Review Period

i. *The Contractor* shall allow the Project two (2) weeks to review and respond to *the Contractor's* submission of documentation, i.e., from time of receipt by the Project to the time of dispatch by the Project. However, work shall proceed without delay in the event of late return of the documentation by the Project with prior notification in writing by *the Contractor*.

6.1.5 Revised Documentation

ii. On receipt of the reviewed documentation *the Contractor* shall make any modifications requested/marked-up and resubmit the revised documentation within the time specified on *the Contractor's* Documentation Schedule (CDS). Queries regarding comments/changes should be addressed with *the Employer's Agent* prior to re-submittal.

iii. Any re-submittals, which have not included the changes/comments identified, will be marked with the applicable review code and returned to *the Contractor* to be corrected and re-submitted. *The Contractor* shall re-issue the revised documentation incorporating all comments on a new revision and other specified details not included in the previous issue within 2 working days of receipt of the marked-up documentation.

iv. All revised data shall be submitted in its entirety and shall reflect the revision control numbers and shall also indicate which documentation the revised documentation supersedes, if applicable.

v. In the case of drawings every sheet has its own revision number and is revised as an individual document.

vi. In the case of documents, all sheets under cover of one document number shall be under the same revision number and be resubmitted, even if the revision is a minor one.

6.2. Submittal of AFC/IFU/Final/As-Built Documentation

6.2.1. Once the 'For Review' submission has been accepted by *the Employer's Agent* by means of assigning the review code C1 or C2 to the documentation, *the Contractor* shall submit the 'IFC/IFU' version and change the revision number from alphabetical to numerical, starting with revision '0'.

6.2.2. Documentation issued from revision '0' onwards must be signed off by *the Contractor*, and shall contain 'wet' signatures of the relevant authorized signatories, i.e., PR Engineer's signature, revision block signatures (i.e., 'BY, CHK'D, APP'D') as well as any other relevant signatures required in the '*Contractor*' block next to the title block decal

6.3. As-built drawings

6.3.1. *The Contractor* provides the following:

a. In undertaking the Works (including all incidental services required), *the Contractor* shall conform and adhere to the requirements of the *Contractor* Document Submittal Requirements Standard.
b. *The Contractor* prepares three (3) marked up hard copies of the latest revision of *the Contractor* documents/drawings to represent the As-Built/Final status.
c. The mark-ups shall be in RED pencil or pen and be complete and accurate. *The Contractor* submits the same to *the Employer's Agent* under cover of a *Contractor's* Transmittal Note.
d. Drawings and charts larger than A4 are folded and those greater than A3 are enclosed in an A4 plastic pocket of adequate strength.
e. The address, phone numbers, fax numbers and reference numbers of all Sub-Contractors is provided.
f. Unless otherwise stated in the CDS, the required number of copies of all As-Built/Final/Data Packs shall be 3 x hard copies (Full size) and a USB memory stick with Adobe Acrobat (.pdf) and Native formats

6.4. *The Contractor* uses Bentley MicroStation V8i or a later version (preferably the CONNECT Edition) to generate and update CAD drawings which have no rasters attached.

6.5. *The Contractor* properly links and edits any rasters to CAD drawings using Bentley Descartes (preferably CONNECT Edition). All rasters are in TIF format. Red and yellow works on rasters are done using the TFR prescribed colour mask using packbit compression and 256 colours for the TIF. When drawings are finalised as-built, removed equipment and wiring are erased on the rasters and not hidden.

6.6. *The Employer* requires *the Contractor* to arrange and plan for schedule monthly project meetings to give detailed project progress.

7. Applicable Regulations and Standards.

All work done as part of this project must take cognisance of and incorporate relevant Transnet norms and standards.

In line with Transnet project requirements. *The Contractor* is required to adhere to but not limited to the documents listed in the table below.

Table 2. Regulations and Standards

Document Title	Document	Revision – Current revision
NATIONAL or INTERNATIONAL STANDARDS		
Railway Safety Regulations		2014
Standard Method of Testing Roads	TMH1	1986
South African National Building Regulations Act (103)		1977
The National Railway Safety Regulator Act 2002 (Act 16, 2002)		2002
Construction Regulations		2014
Design of Highway Bridges and Culverts in South Africa	TMH7	1989
Railway safety management Part 2-2-1: Technical requirements for engineering and operational standards – Track, civil and electrical infrastructure – Level crossings	SANS 3000-2-2-1	2012
British Soil Classification System (BSCS)	BS 5930	1981
Guidelines for Soil and Rock Logging in Southern Africa, 2nd Impression 2001 eds. A.B.A Brink and R.N.H. Bruin, Proceedings, Geoterminilogy The Scope organized by AEG, SAICE & SAIEG	2002	
SANS 1200 suite of documents (where applicable)	Code of practice for use with standardised specification of civil engineering	

Document Title	Document	Revision – Current revision
Earthworks	SANS 1200D	
Earthworks (Pipe Trenches)	SANS 1200DB	
Earthworks (Roads Sub-grade)	SANS 1200DM	
Earthworks (Railway, Siding)	SANS 1200DB	
Concrete (Structural)	SANS 1200F	*
Concrete (Small the Scope)	SANS 1200GA	*
Precast Concrete	SANS 1200GE	*
Structural Steel	SANS 1200H	*
Bedding (Pipes)	SANS 1200LB	*
Storm water Drainage	SANS 1200LE	*

Document Title	Document	Revision – Current revision
Structural Use of Concrete	SANS 10100	*
Basis of Structural Design (Loading Code)	SANS 10160	*
Structural Use of Steel	SANS 10162	*
Pre-cast concrete box culvert	SANS 986	
The design of foundations for buildings	SANS 10161	
Portland and rapid hardening Portland cement	SANS 1491	
Detailing of steel reinforcement for concrete	SANS 10144	
Welded steel fabric for reinforcement of concrete	SANS 1024	
Construction works: Structural steelwork.	SANS 2001-CS1	
Concrete works (structural).	SANS 2001-CC1	
Strip footings, pad footings and slab-on-the-ground foundations for masonry walling.	SANS 2001-CM2	
Aggregates for concrete	SANS 1083	
Application of national building regulations	SANS 10400	
Standard Specification for Roads & Bridge The Scope for State Road Authorities (COLTO)	Series 6000	*
Transnet Freight Rail Standards Specifications and Other Documentation		
Civil Engineering, Perway and Geotechnical		
South African Transport Services Bridge Code	SATS Bridge Code	1983
SA Transport Service's Geotechnical Services Handbook		1986
South African Transport Services Engineering Survey Work	SATS E13	1985
BS 5930:1999 - *Code of Practice for Site Investigations*		1999
SAICE, January 2010 – *Site Investigation Code of Practice*		2010
SANRAL, 2010 – Standards *Specifications for Subsurface Investigations*		2010
SANRAL Drainage Manual	Sixth Edition	*
Specification for the Supply of Stone	S406	2006
Specification for Erosion and Scour Control	S411	*
Specification for Sub-surface Drainage and Geo-textile Separation Layers	S412	*
Specification for Concrete Work	S420	1999
Specification for No-fines Concrete	S423	1986

Document Title	Document	Revision – Current revision
Specification for Pre-Cast DrainageChannels	S432	*
South African Storm Rainfall, Department of Water Affairs and Forestry	TR102	*
Regional Maximum Flood Peaks in Southern Africa, Department of Water Affairs (replaced Report TR105)	TR137	*
Storm water Management Best Practice Guidelines	BPG 1	*
Specification for Railway Track Work	E 10 1-14	August 1996
Fencing	S13	1986
Specification for Steel Works	S309	1985

Document Title	Document	Revision – Current revision
Occupational Health, Safety and Environment		
Mine Health and Safety Act (Act 29 of 1996)		1996
Occupational Health and Safety Act (Act 85of 1993) & Construction Regulations		1993
Explosive Act (Act 26 of 1956)		1956
Mineral Act (Act 50 of 1991)		1991
National Environmental Management Act 107		1998
National Water Act 36		1998
E7/1 - SPECIFICATION FOR GENERAL AND WORKS ON, OVER, UNDER OR ADJACENT TO RAILWAY LINES AND NEAR HIGH VOLTAGE EQUIPMENT	BBD8210	May 2011
Quality Management System		
Quality Management System requirements	ISO 9001:2015	2015

8. Project Key Deliverables.

The project deliverables will be evaluated and measured as per Appendix H for Construction and the baseline project master schedule.

8.1. The project key deliverables include but not limited to:

8.1.1 Investigational reports (geotechnical report, hydrological and topographical survey, conditional assessment etc)

8.1.2 Basic engineering designs

8.1.3 Detailed engineering designs

8.1.4 Design reports

8.1.5 Procurement

8.1.6 Construction

8.1.7 Testing and Commissioning certificates

8.1.8 As-built drawings

8.2. Environmental key deliverables but not limited to:

8.2.1 Environmental Baseline Report

8.2.2 Environmental Legal and Risk Register

8.2.3 Environmental and Social Governance Report

8.2.4 Sustainable Design Report

8.2.5 Review and update the Project Execution Plan and Project Design Criteria

8.2.6 All documents/reports that form part of Project Permits and Licenses Applications

8.2.7 Environmental Authorisations, permits and licenses

8.2.8 Environmental Monitoring Plan (construction phase)

8.2.9 Environmental Audits

8.3. Health and Safety Deliverables but not limited to:

8.3.1 Preliminary Risk Analysis

8.3.2 HAZOP study

8.3.3 Risk Assessment

8.3.4 Pre-start up safety review

8.3.5 Construction safety plan

In fulfilling the project objectives, timelines and scope *the Contractor* is required to ensure availability of competent and skilled personnel prior to commencing with any work.

PART 4: SITE INFORMATION

Core clause 11.2(16) states

"Site Information" is information which

- describes the Site and its surroundings and
- is in the documents which the Contract Data states it is in.

In Contract Data, reference has been made to this Part 4 of the contract for the location of Site Information.

1. Description of the Site and its surroundings

1.1. General description

1.1.1. Site Locality

The Project work will be performed on the Pietermaritzburg – Durban railway section between KwaNdengezi and Dassenhoek which belongs to Transnet Freight Rail (TFR) Chainage: km 68.452 to km 69.234. The site's coordinates are 29°50'30.97"S, 30°47'3.31"E.

1.2. Existing buildings, structures, roads, etc. on the Site

If the *works* have interfaces or hook up points with existing facilities or comprise refurbishment of existing facilities, provide full details of these so that the tendering contractor can plan his design and construction to integrate with them as the Works Information requires. As built drawings of the existing facilities usually provide the necessary information; such drawings can be listed here stating where they are located for the *Contractor*'s use.

An aerial view of the site is shown below in Figure 1. Figure 2 shows information on the railway line and culverts of interest. The railway embankment (approx. 170 m long) exhibits moderate to severe erosion and slope translational failure over 120 m. Approximately plane translational failure indicates movement of over 3 m from the crest of the initial slope.

The farthest failure point of the embankment is approximately 235 m south-east of the Bomvas Tunnel (Figure 1). The embankment intersects the Cutshwayo natural watercourse. A blocked concrete culvert (located at chainage 69.107) intersects the embankment.

The site is in close proximity to residential houses situated up the embankment slopes, informal walkway roads exist used by the locals, the site also has one of the railway stations in close proximity, with platforms and a pedestrian bridge, the majority of the work falls within Transnet's rail reserve.

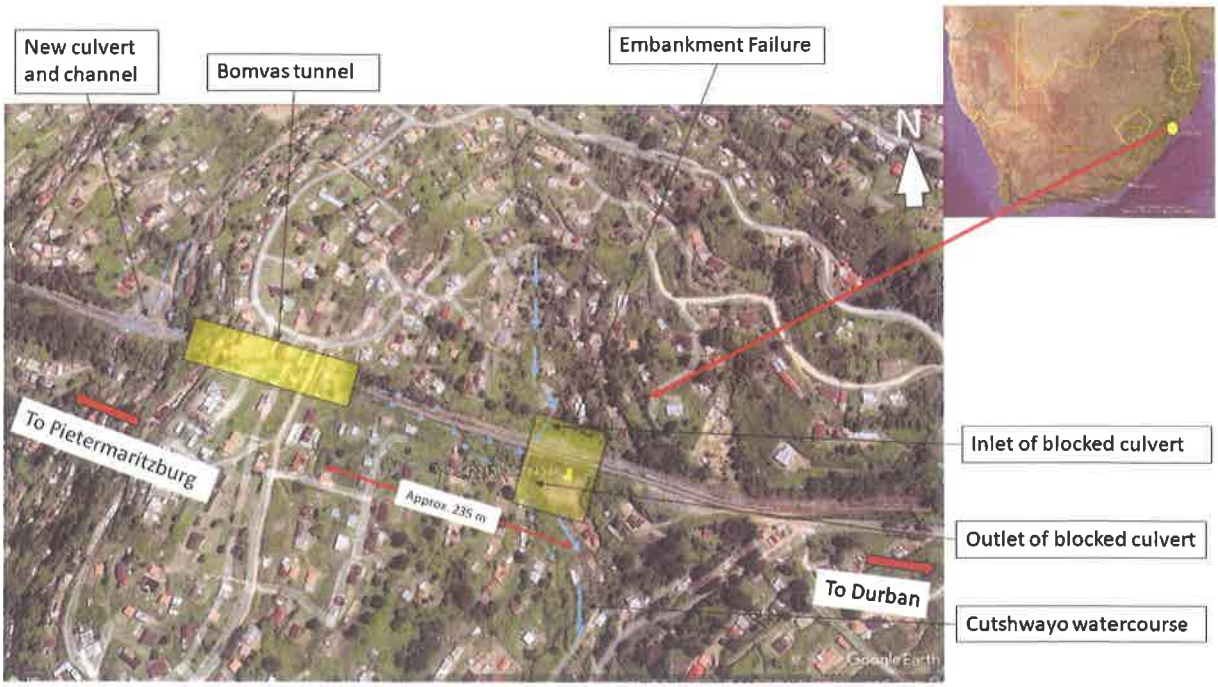

Figure 1 – Aerial view of the site showing the position of the failed embankment with respect the Bomvas tunnel.

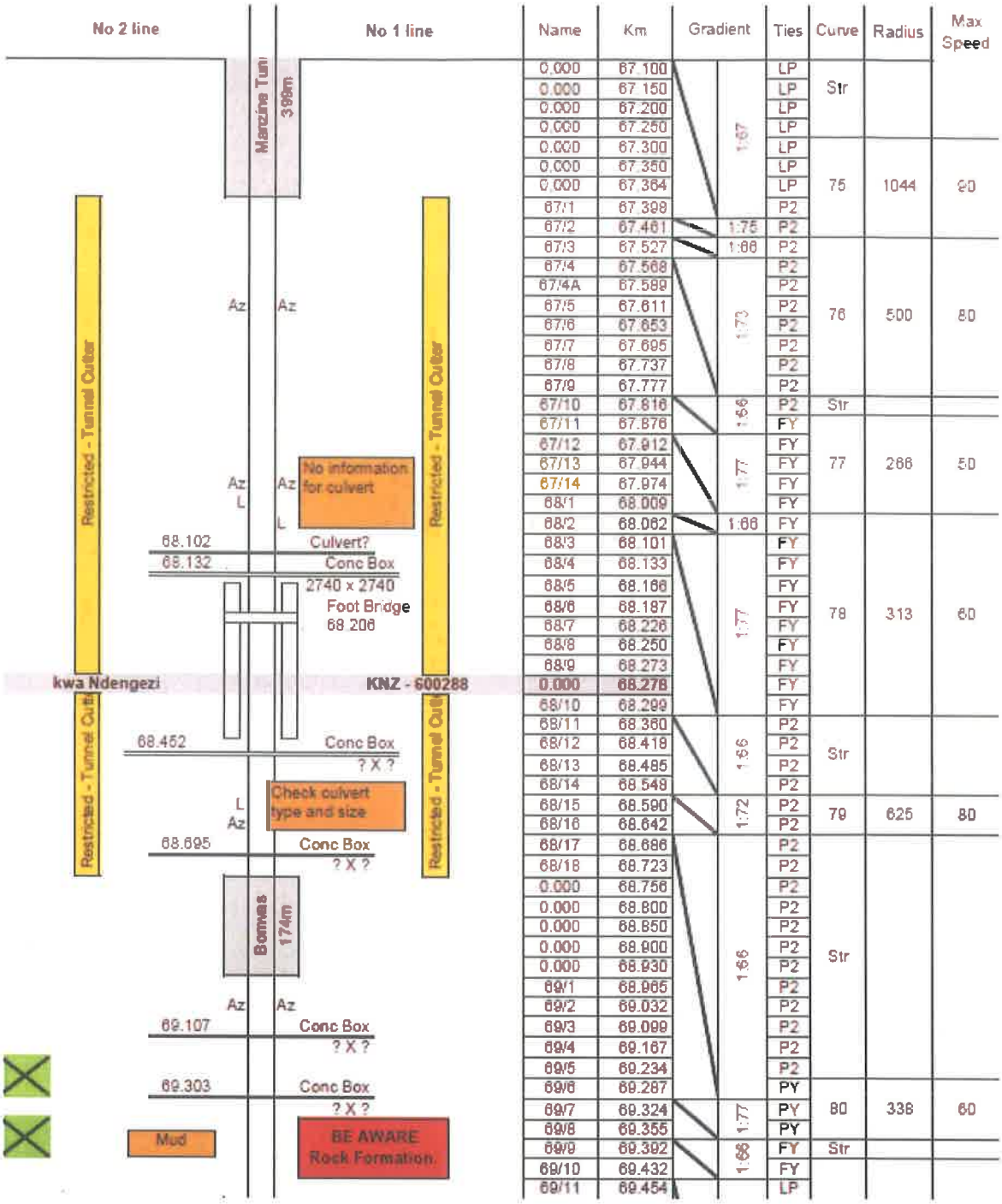

Figure 1: Diagram showing the railway line and chainage of culverts between chainage 68.299 and 69. 454 (between KwaNdengezi and Dassenhoek station).

1.3. Subsoil and surface information

No geotechnical and geological investigations and surveys have been conducted on the site, however, from the naked eye, the site is covered with vegetation and reddish to brown soil, deemed to be naturally occurring. Various sections rock outcrops can be seen along the section.

1.4. Hidden services.

The hidden and buried services on the site include old/redundant or blocked culverts, potential municipal water supply and sewer pipes running parallel the line and electrical and telecommunications cables. The Client has not obtained cadastral surveys of the site, however, such services will be identified and marked on site.

1.5. Other reports and publicly available information.

The client has access to historical localised topographical survey data and geotechnical investigation data that is limited to portions of the site, no other forms of reports exist for the site.