PART C3: SCOPE OF WORK

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SECTION 1

1. DESCRIPTION OF THE *WORKS*

1.1. Executive overview

N-berth, located at the Car Terminal at Port of East London, is 300m in length, which is sufficient to accommodate modern car carriers, but the depth provided remains a limitation (current the depth is only -8.5m CD).

The West Quay is located on the West Bank of the Buffalo River, comprising of N-berth, R-berth and R-extension (Shown in Figure 1). The original West Quay (450m in length) is a gravity-quay wall and was built in the early 19th century and comprised of N-berth (300m) and R-berth (150m). West Quay Extension (R-Extension) was constructed between 1976 – 2005 with caissons (100m in length). In 2005, R-berth and R-extension were strengthened by a 1.5m coping beam (concrete fender panel), allowing vessels access to deeper waters through the provision of a 250m long berth, with a -10.5m (CD) draft.

The Port of East London (PoEL) needs to deepen and strengthen the remainder of the West Quay (N berth) in order to safely accommodate car carries in excess of 200m while also providing the ability to berth two car carriers simultaneously.

Figure 1: Orientation of the Port of East London Car Terminal Berths

Figure 2 below shows the West Quay (R-berth and R-extension occupied) in reference to the Car Terminal facilities on the landside.

Figure 2: West Quay (Car Terminal) - Aerial Photograph captured by TNPA Corporate Affairs

1.2. Employer's objectives

The *Employer*'s objective is to deepen the existing berth pocket to the desired depth, and strengthen the existing gravity-quay structure through the use of concrete fender panels, to allow car carriers access to deeper waters, without compromising the structural integrity of the existing infrastructure.

1.3. General

This specification covers the requirements for:

Package 1: Concrete Fender Panels

- Service Detection
- Water quality testing during construction activities
- The partial demolition of the existing Quaywall
- Supply and installation of steel section to Quaywall face
- Dowelling/anchoring of threaded bars
- Casting of reinforced concrete fender panels and coping beam (extension), using steel formwork
- Replacement/installation of new fenders to the existing quay wall
- The installation of new wharf access ladders, etc.
- Preparation and painting of bollards
- Reconstruction of existing quay surface if damaged during construction (only if not caused by neglect)
- Removal and disposal of material (demolished material, waste, etc.)
- Removal and packing of rock capping blocks at a designated site

- and, any other work arising out of or incidental to the above, or required of the Contractor to Provide the Works.

1.4. Scope of Works

The scope of work for this project entails but not limited to the partial demolition of the existing quay, construction of concrete fender panels, installation of new fenders, installation of wharf access ladders and painting of bollards. The *Contractor* shall propose the skilled staff to be formally mobilised to ensure that the deliverables of this project are met. Furthermore, the *Employer* and *Contractor* shall agree the interface particulars as and when applicable.

The *Employer* shall provide detailed designs of the proposed works; therefore, the *Employer* shall undertake full design responsibility for the total design solution. The main parts of the works which the *Contractor* is to undertake shall be Execution phase deliverables.

1.4.1. Civil/Structural Work

Read in conjunction with the latest version of the construction drawings

- The partial demolition of the existing Quaywall to expose the front face of the quay wall and a portion of the top-surface to install steel sections and dowels, and thereafter cast the concrete fender panels and capping beam.
- Supply and installation of steel sections to Quaywall face as per the associated construction drawings and details of Annexure A3: Structural Steel Specifications
- Installation of threaded bars as detailed in Annexure A4: Dowelling/Anchorage Specification
- Casting of reinforced concrete capping beam and fender panels (extension) as per the requirements of the works information, and Annexure A2: Variations to SANS 1200 G
- Removal of fenders on the existing quay wall.
- Installation of new tyre fenders on concrete fender panels.
- The installation of new wharf access ladders -detailed in Annexure A3: Structural Steel Specifications
- Preparation and painting of existing bollards on the quay.

1.4.2. Standard of Work, Equipment, and Materials

All plant and materials used shall be of high quality and the work shall be of a high standard of workmanship carried out by qualified staff under proper supervision by experienced and competent officers.

Contractor to keep daily records of his Equipment used on Site and the Working Areas (distinguishing between owned and hired Equipment) with access to such daily records available for inspection by the *Project Manager* at all reasonable times.

Working area (provided by *Employer*) for use, then the make good and provide full reinstatement to the land (including all apparatus of the *Employer* and Others in, on or under the land) and surrounding areas to its original standard upon dismantling of such facilities and hand-back to the *Employer*.

Contractor shall plan and arrange a Condition assessment to be done on all working areas with the NEC 3 Supervisor to establish site to ensure existing condition is recorded. Post inspection of the working area after construction is to also be undertaken to ensure the *Contractor* makes reinstate the working areas to the original state.

1.4.3. Testing

Prior to the commencement of the construction activities, the *Contractor* is to carry out service detection to identify all hidden services within the construction area, including, but not limited to, electrical lines, data and communication, water lines.

Once a month during the construction, to ensure environmental sustainability and reduction of impacts, water quality testing should be conducted. It is recommended that the *Contractor* collects and tests water samples to establish baseline water quality figures.

The *Contractor* shall test (pull-out tests) 5 anchored rebars and 5 threaded bars randomly selected by the *Project Manager*, at a test load of 200kN each, to ensure sufficient bonding and anchorage is achieved before casting concrete. The test results shall be recorded and submitted to the *Employer*'s *Engineer* for acceptance.

Any rebar/threaded bar that does not satisfy the acceptance criteria shall be rejected by the *Employer*, and the *Contractor* shall replace it at no additional cost to the *Employer*. The Contractor shall submit to the Employer, after completion of the works, a report containing:

- Prestressing steel manufacturer's mill test report for the rebars incorporated in the installation,
- Grouting records indicating cement/grout type, quantity injected, and the grout pressures
- Performance test results and graphs

Note: Dowelling/Anchorage Specifications are containing in Annexure 4

1.5. List of Standard and Particular Specifications

1.5.1. Standard Specifications

The following specifications shall be read in conjunction with this specification:

SANS 2001	Concrete (Structural)
SANS 121 (SABS ISO 1461)	Hot-dip (galvanised) zinc coatings
SANS 1083	Aggregates from natural sources
SANS 10100	The Structural use of concrete - Part 2: Materials and execution of work
SANS 50297-1 (SABS EN 197-1)	Cement - composition, specifications and conformity criteria. - Part 1: Common cements
SANS 1491-1	Portland cement extenders - Part 1: Ground granulated blast furnace slag
SANS 1491-2	Portland cement extenders - Part 2: Fly ash
SANS 1491-3	Portland cement extenders - Part 3: Condensed Silica Fume

1.5.2. Particular Specifications

Annexure A2	Variations to Standardized Specification SANS 2001: Concrete (Structural)
Annexure A3	Structural Steel Specifications SANS 1200 H
Annexure A4	Dowelling and Anchorage Specification

2. WORK TO BE PERFORMED BY THE *CONTRACTOR* TO PROVIDE THE *WORKS*

The following considerations shall be made in the construction phase:

- A SHEQ pack (Method statement, Risk Assessment and Quality control Pack) is to be submitted minimum 4 weeks before a task-based activity starts (based on latest programs update) for all activities to the *Project Manager* for acceptance prior to activity starting. No activity may proceed without an accepted SHEQ pack by the *Project Manager*
- The *Contractor* shall minimize disruptions of business operations in and around the West Bank precinct.

- The *Project Manager* should accept Project Quality Plan before any activity starts. The *Contractor* shall appoint a Site Agent who shall report to the *Project Manager* during the construction.

2.1. Plant and Materials

2.1.1. Concrete

2.1.1.1. Particular Specifications

The following specifications shall apply:

NB: All in-situ concrete work (mass and reinforced) shall comply with SANS Specification 1200-G ("8 Measurement and Payment" is not applicable) supplemented by the clauses in this section. Where SANS Specification 1200-G and the clauses in this section are in conflict, the clauses in this section shall take precedence.

Where the term "plain concrete" appears in SANS Specification 1200G it shall be read as "mass concrete". Table 2-1 shows the standards and references to which concrete works must comply.

Table 1: Standards and references for concrete *Works*

STRUCTURAL ELEMENT	**CEMENT TYPES I AND III/A (kg/m^3)** **CEMENT TYPES II/B-V AND II/B-W (kg/m^3)**
SANS 1200G	Concrete
SANS 2001: CC1	Construction Works: Concrete Works (Structural)
SANS 1083: 2006	Aggregates from natural sources
SANS 10100-2:2000	The Structural use of concrete – Part 2: Materials and execution of work
SANS 50197-1:2000	Cement – composition, specifications and conformity criteria. Part 1: Common cements
SANS 1491-1:2005	Portland cement extenders – Part 1 Ground granulated blast furnace slag
SANS 1491-2:2005	Portland cement extenders – Part 2 Fly ash
SANS 1491-3:2006	Portland cement extenders – Part 3 Condensed Silica Fume
S437 (Transnet)	Concrete Pavement
SANS 2001: CS1	Construction Works Part CS1: Structural Steel Work
SANS 1200 H:1990	Structural Steel Work
BS 4211	Specification for permanently fixed ladders

BS EN ISO 14122	Safety of Machinery-Permanent means of access to machinery. Stairways, Stepladders, and guard-rails
BS EN 10025	Hot Rolled products of Structural Steel
BS EN 1461	Hot dip galvanized coatings on fabricated iron and steel articles.
BS 6349	Maritime Works

2.1.1.2. Cement

Common cements, complying with SANS 50197-1 shall be used for all concrete work. On no account shall masonry cements be used for concrete work, even if the strength designations are the same as for common cements.

The Supervisor may require samples of cement from anyone, or from every consignment for test purposes. Cement in any consignment from which a sample may have been taken for testing shall not be used until it has been approved by the Supervisor. Allowance must be made for possible delay in that tests may take 10 days to carry out.

Bags of cement shall be stacked in a waterproof, solidly constructed shed with a central door and a floor rendered damp-proof with a tarpaulin. The bags of cement shall be closely stacked (but not against walls) in order to reduce air circulation, in such a manner that the cement is used in the order in which it was received, i.e., first in first out.

2.1.1.3. Alkali Reactive Concrete

Alkali Reactive Aggregates shall not be used in this project. The equivalent Na2O content of the concrete shall not exceed 2,0 kg/m3, where,
%Na2O equivalent = %Na2O + (0,658 x %K2O)

2.1.1.4. Aggregates

Fine and coarse aggregate shall comply with the relevant clauses of SANS 1083. Where aggregates have constituents, which in the opinion of the Project Manager, may give rise to damage due to alkali-aggregate reactions, the provisions of 6.3.3.3. shall be applicable.

Evidence of compliance of the aggregates with the requirements of 6.3.3.1 & 6.3.3.2 shall be furnished as early as practical. No aggregate shall be delivered for use in the works until approval is given.

Sand (fine aggregate) shall comply with the requirements of SANS Specification 1083. Other aggregates may be approved if they have a satisfactory history and/or test results. No aggregate may be used until it has been approved by Supervisor or Project Manager.

Samples having a mass of 25kg (16.5 liters) of the proposed aggregate to be used in the works may be required by the Supervisor for test purposes. Samples having a mass of 25kg shall be forwarded every three months during concreting work and also if the source of supply is changed. Allowance of 14 days must be made to carry out.

2.1.1.5. Admixtures

Admixtures containing chlorides will not be permitted in reinforced concrete.

2.1.1.6. Cover blocks

Cover blocks used to ensure the cover to reinforcement shall be made of cement mortar. Cover/spacer blocks made of plastic will not be permitted.

Cover blocks shall be dense, have a minimum 28-day crushing strength of 50 MPa and shall be cured in water for at least 14 days before being used.

2.1.1.7. Concrete Quality

Prior to the start of any concrete work on site, the *Contractor* shall submit a Quality Control Plan to the *Project Manager*, which will ensure compliance with this Specification and provide acceptable documentary evidence that all specified operations have been carried out satisfactorily.

Where the minimum dimension to be placed during a single pour is larger than 600mm, and the cement content of the reinforced concrete exceeds the following:

Cement Types I and II/ * S: 400 kg/m3

Cement Types II/B-V and II/B-W: 450 kg/m3

The *Project Manager* may require that measures be instituted to reduce heat development in the concrete.

2.1.1.8. Concrete Casting

Due to the complexity of the project, and degree of accuracy required, all concrete works should be cast in-situ and avoid the use of pre-cast concrete members. In-situ casting should be carried out in accordance with the relevant SANS code, and aligned to the requirements set in section 2.1.1.24. Formwork.

2.1.1.9. Unreinforced Concrete

Class A Concrete:

Filling to cavity of hollow walls

2.1.1.10. Unreinforced Concrete cast against excavated surfaces

15 MPa/19mm Concrete

Surface blinding under footings and bases

2.1.1.11. Reinforced Concrete

50MPa/19mm Concrete:

Bases

Fender Panels

Surface beds cast in panels on waterproofing

Cope Beam Panels (Capping Beams)

2.1.1.12. Batching

All cementitious binders shall be batched by full sack, or by mass batching with approved precision weighing equipment.

All aggregates shall be precisely measured by mass using approved precision weigh-batching equipment, unless otherwise permitted by the *Project Manager*.

Should any variation in the composition of the aggregate become apparent, the *Project Manager* shall be notified, and a further sample of aggregate submitted immediately for his/her approval.

2.1.1.13. Concrete Placing

The size, shape and depth of any excavation shall be approved by the *Project Manager* before concrete is placed.

Unless otherwise permitted by the *Project Manager*, no concrete shall be placed until the fixed reinforcement has been accepted by the *Project Manager* and confirmed in writing by way of a release certificate.

2.1.1.14. Construction Joints

Unless otherwise shown on the drawings, the exact position of horizontal construction joints shall be marked on the formwork by means of grout checks in order to obtain truly horizontal joints.

Stub columns, stub walls and stays on footings shall be cast integrally with the footing and not afterwards, even where another class of concrete is being used.

Joint lines shall be so arranged that they coincide with features of the finished work.

Where new concrete is to be cast against a hardened concrete surface, neat cement slurry mixed to a creamy consistency shall be brushed onto the cleaned concrete surface.

Contraction joints shall be smooth and shall have one coat of limewash or PVA applied to the older surface prior to casting the fresher concrete.

2.1.1.15. Movement Joints

All movement joints (to be included on each concrete fender panel) are to be filled in with approved bitumen impregnated soft board or expanded polyethylene strip unless otherwise specified or detailed on drawings. The inclusion of expansion joints on each fender panel is to create an independent system of concrete panels, aimed to reduce the chances of complete failure or collapse of the upgrade.

Descriptions (prices) of movement joints shall be deemed to include formwork, where applicable.

2.1.1.16. Grouting

25 MPa non-shrink cementitious grout where necessary, unless specified otherwise.

2.1.1.17. Curing Compound

Unless otherwise directed by the Project Manager, the curing compound shall be:

- An approved trafficable, resin-based, white pigmented, membrane forming for slopes flatter than 1:1.
- An approved clear, aesthetically acceptable, membrane forming for all other concrete surfaces, including beam and slab soffits.

The curing compound shall comply with specification ASTM C309, except that the maximum permissible water loss in the test shall be 0,40 kg/m2.
Alternatively, the curing compound shall be acceptable if the treated concrete retains 90% or more of its mixing water when subject to the test set out in BS 8110 Part 1 – Chapter 6.6.

2.1.1.18. Curing Compound Application

The total application rate of the curing compound shall be the greater of the supplier's specification or 0.90 l/m2. On textured concrete surfaces, the total application rate shall be 0.90 l/m2.

In cases of concrete surfaces with run-off problems, it may be necessary to apply more than one coat of membrane forming curing compound to obtain the specified total or cumulative application rate.

Curing in accordance with SANS 1200 G shall commence on all concrete surfaces as soon as it is practical in the opinion of the Technical Officer.

On unformed surfaces the curing compound shall be applied after finishing and as soon as the free water on the surface has disappeared and no water sheen is visible, but not so late that the liquid curing compound will be absorbed into the concrete.

On formed surfaces, the exposed concrete shall be wet with water immediately after the forms are removed and kept moist until the curing compound is applied.

Application of the curing compound shall begin once the concrete has reached a uniformly damp appearance with no free water on the surface.

Application of the compound may be done by hand or power spray.

The compound shall be applied at a uniform rate with two applications at right angles to each other to ensure complete coverage.

Pigmented compounds, without a thixotropic agent, shall be adequately stirred to assure even distribution of the pigment during application.
Unless otherwise directed by the Project Manager, the initial 24-hour curing of concrete surfaces not covered by formwork shall be carried out by ponding, covering with constantly wetted sand or mats, or continuous spraying in accordance with SANS 1200 G when the following climatic conditions occur:

- Wind velocity greater than 5m/s; and/or
- Ambient temperature is above 25 °C; and/or
- The relative humidity is below 60%

If plastic shrinkage occurs, the concrete, while still plastic, shall be re-vibrated, floated and re-coated with curing compound as if no curing has previously taken place.

2.1.1.19. Curing Period

The curing period for concrete containing only CEM 1 shall be 7 days.

The curing period for concrete containing CEM 1 plus cement extenders (MGBS, FA) shall be 10 days.

The curing period will start on completion of the concrete pour and for formed surfaces shall include the time for which forms are still in place after the pour.

2.1.1.20. Concrete Records

The *Contractor* shall maintain the following daily records for every part of the concrete structure and shall make these available at all times during the progress of the work for inspection by the *Project Manager*:

- The date and time during which concrete was placed;
- Identification of the part of the structure in which the concrete was placed;
- The mixed proportions and specified strength;
- The type and brand of cement;
- The slump of the concrete;
- The identifying marks of test cubes made;
- Curing procedure applied to concrete placed;
- The times when shuttering was stripped, and props removed;
- The date of dispatch of the cubes to the testing laboratory; and
- The test results

The records shall be delivered to the *Project Manager* each week except in the case of sub-standard concrete when the *Project Manager* shall be informed immediately.

2.1.1.21. Tolerances

Deviations shall be within the limits listed in SANS 1200 G for degree of accuracy II unless otherwise specified.

2.1.1.22. Testing and monitoring

Frequency of sampling and testing shall be as specified in SANS 1200.

2.1.1.23. Cost of Test

The costs of making, storing and testing of concrete test cubes as required under clause 7 'Tests' of SANS 1200-G shall include the cost of providing cube molds necessary for the purpose, for testing costs and for submitting reports on the tests to the Project Manager. The testing shall be undertaken by an independent firm or institution nominated by the Contractor to the approval of the Project Manager (Test cubes are measured separately).

The *Contractor* must provide cubes for every pour irrespective of volume of cubes poured in a day. Any concrete poured in a day from 1 to 40 cubes requires to be tested to ensure 28-day strength is achieved.

If the quantity of concrete from which samples were taken is less than 40 m3, it shall be subject to the testing of a minimum of 2 sets of samples per day from each grade of concrete placed in each independent structure.

If the *Contractor* disputes the results of the tests on concrete cubes, the concrete represented by the cubes will be considered acceptable if the *Contractor*, at his own cost, proves to the satisfaction of the *Project Manager* that the estimated actual strength of cores taken from the structure (at locations marked by the *Supervisor*), determined in accordance with SANS Standard Method SM 856, is not less than the specified strength.

If the strength of the concrete fails to meet the acceptance criteria stipulated, the *Project Manager* may in his sole discretion and in addition to the options listed in SANS 1200 G:

- Accept the concrete subject to approved remedial measures being undertaken by the *Contractor*; or
- Permit the concrete to remain subject to the payment of a penalty.

The penalty referred to will be determined as follows:

Penalty = V x R x F

Where, V = Volume (in the opinion of the *Project Manager*) of concrete of unsatisfactory strength represented by the test result

R = Relevant scheduled rate

$$F = 1 - \sqrt{\frac{Average\ strength\ of\ unsatisfactory\ concrete}{Specified\ strength + 6\ MPa}}$$

Where the relevant scheduled rate (R) includes the cost of formwork or

$$F = 1 - \frac{Average\ strength\ of\ unsatisfactory\ concrete}{Specified\ strength + 6\ MPa}$$

Where the relevant scheduled rate (R) excludes the cost of formwork or where no formwork was involved.

2.1.1.24. Formwork

i. Rough formwork (degree of accuracy ii)

Rough Formwork to Sides:

- Outer face of walls flushes with perimeter of concrete structure.
- Edges not exceeding 300mm high

ii. Smooth formwork (degree of accuracy ii)

Smooth Formwork to sides:

- Inner face of shaft walls.
- Edges not exceeding 300mm high

Note: The *Contractor* is to ensure formwork is waterproof and sealed properly, which should be tested before casting, especially during periods of high tides, to ensure no contamination of surrounding water, as per the associated environmental guidelines and standards. The *Contractor* should include a provision (priced) in the bid documents for pumping out water during high tide when necessary.

Note: In summary, concrete can only be poured in a dry condition and not trimmed.

2.1.1.25. Movement Joints (Movement Joints is also Section 2.1.1.15.)

Expansion joints with soft board between vertical concrete surfaces:

- 20mm Joints not exceeding 300mm high

2.1.1.26. Saw Cut Joints

- Sealant/Grouting on backing chord to manufacturer's specification.
- Horizontal toggle construction joints through concrete including thick cement slurry to one face.
- Surface beds not exceeding 300mmm thick.

2.1.1.27. Reinforcement

High tensile steel reinforcement to structural concrete work:

- In various diameters and lengths
- Mild steel reinforcement to structural concrete work
- In various diameters and lengths
- High tensile steel reinforcement to structural concrete work

Fabric reinforcement:

- Fabric reinforcement type as specified on structural drawings

2.1.1.28. Forming Key to Concrete for Plaster, and Other Finishes

Where rough formwork has been used, surfaces of concrete to receive plaster, mosaic tiles and other finishes, shall, immediately after the formwork has been removed, be well wetted and wire brushed whilst the concrete is still green and then shushed over with 2:1 cement grout to form a key for the finish, all to the approval of the *Supervisor*. The shushing is to be allowed to set hard before the finish is applied.

Where smooth formwork is used, surfaces of the concrete to receive plaster, mosaic tiles and other finishes shall be hacked, on the distinct understanding that hacking of concrete shall be at no extra cost to the *Employer.*

Surfaces of concrete receiving plaster or other finishes shall not be plastered or finished until the *Supervisor* has signified his opinion in writing that the surfaces are suitable to receive plaster or other finishes.

2.1.1.29. Sleeve Pieces and Ties

Where it is necessary to leave plugs or holes in beams, slabs or any other reinforced concrete, all such plugs or holes must be situated in positions approved by the *Supervisor* before concreting. Where it is necessary to carry pipes, bolts, wires or any other fittings through reinforced concrete members, approved pipe sleeves must be provided and placed in position before concreting.

Where waste, ventilation water, heating or other pipes under 100mm diameter pass through concrete slabs and beams, galvanised mild steel sleeve pieces or diameters shown or required shall be cast into such concrete slabs and beams.

Chases shall be formed in edges of slabs or slots shall be formed in the slabs, or sizes required, where two or more pipes pass through together.

2.1.1.30. Bagged Finish to Concrete

Concrete surfaces to receive bagged finish shall be prepared by removing sharp projections and making good defects with 3:1 cement mortar. Finish by rubbing over the whole area with wet rough sacking and cement grout to obtain an even surface.

2.1.1.31. Power Floated Finish

Power floated finish to floors etc. means that surfaces shall be floated c\mechanically to a smooth and even finish before the concrete has set. Small areas inaccessible to the machine are to be floated by hand. Under no circumstances is cement mortar to be added while floating the concrete.

2.1.1.32. "No Fines" Concrete

"No-fines" concrete, for grading flat concrete roofs and the like to falls, shall be in the proportion of 12 parts 19 iron cubical stone to 1 part cement mixed with 20 liters water per bag of cement and be laid to falls of not less than 15mm per linear meter for mastic asphalt and not less than 20mm per linear meter for sheet roof covering. For heavy load applications special mix designs may be required.

i. Fillets against up stands

Form triangular fillets, size 100 x 100mm, in corners with walls, kerbs, etc. neatly mitred at angles, stopped where necessary and finished smooth ready to receive waterproofing.

2.1.2. Structural Steel

All structural steelworks shall comply to SANS 2001: CS1 and SANS 1200 H: 1990. All structural steel to be grade S355JR, according to sans 1431:2007:

- Ultimate Tensile strength 450 MPa,
- Minimum Yield stress 300 MPa

2.1.3. Stainless Steel

Stainless steel is grade 316L and in compliance with AISI.

2.1.4. Galvanized Steel

Galvanizing is carried out in compliance with SANS ISO 1461. The coating thicknesses shall be 25% greater than the standard in table 2, in accordance with SANS Specific Permit Conditions 1336/2494.

2.2. Temporary *works*, Site services & construction constraints

The following procedures relating to temporary works, site services and construction constraints shall be taken into consideration. The *Contractor* shall:

- Comply with all Site entry, permits and regulations as required by the Employer. Site entry permits for all the site personnel shall be applied for and obtained from the security department at CRD building after the Contractors stuff have been inducted by the *Employer.* All hot work permits shall be obtained from TNPA Chief fire officer before any hot work activity can commence.
- Ensure that all its personnel on site are inducted and comply to Site safety regulations in accordance with the OHSA Act.
- Keep daily records of its personnel engaged on the Site and Working Areas with access to such daily records for inspection by the Employer at all reasonable times.
- Provide progress photographs bi-weekly to the *Project Manager* in digital format (PDF format) conveyed by email.

2.2.1. Contractor's Plant and Equipment.

The *Contractor* shall provide all Plant and Equipment required to provide the works and the *Employer* shall not provide any Plant and/or Equipment. The *Contractor* shall keep a tool and material checklist on hand for entering and exiting the Port, for inspection by the *Project Manager* and *Port Security*.

The *Contractor* shall provide, all facilities necessary to undertake the works, including establishment of such Equipment, storage facilities and personnel that is necessary to execute the *works*.

2.2.1.1. Temporary Structure:

The Contractor shall design and construct a suitable temporary structure to facilitate construction activities that require safe access and working over water bodies (adjacent Port interior channel). The structure serves as a reliable platform to ensure the health and safety compliance during construction, while minimizing environmental impacts. The *Contractor* shall ensure the design of the temporary structure is approved by a registered ECSA (Pr.Eng. or Pr. Tech.Eng.) professional.

Key features of the temporary structure should include, but not limited to:

- The platform should be engineered to provide exceptional stability and a robust load-bearing capacity, and should be constructed with durable materials capable of supporting machinery, equipment, and personnel, to ensure safe and uninterrupted work operations.
- Modular Design, allowing for easy assembly, disassembly and reconfiguration, as well as efficient transportation and storage.
- Anti-slip surface to enhance traction, even in wet conditions, to minimize slipping risks and to ensure a secure working environment for construction personnel.
- Guardrails and safety features (which meet or exceed industry safety standards)
- Easy access and egress: the platform should incorporate well-planned access points, including ramps or gangways to facilitate safe entry and exit for workers and equipment.
- Stability in water conditions: the temporary structure should take into account potential variations in water level, wave action, and tidal currents.
- Environmental Considerations: the temporary structure should be designed with a focus on environmental compliance and sustainability, to minimize disturbance to the surrounding water ecosystem, adhere to environmental regulations, and encompass debris containment systems.

2.2.1.2. Plant and/ or Equipment provided by the Employer.

None.

2.2.1.3. The Employer provides the following facilities for the Contractor:

- Access permit to the Port
- The *Employer* will endeavor to provide the appointed *Contractor* with all available information that may facilitate the progress of the project. However, in cases where such information is not available, the Contractor shall point out to the Employer for advice on steps to be taken.

- The *Employer* provides connection points for services such as water, power etc. The *Contractor* is responsible for his own connection to the *Employer's* services AND for the reticulation of his services from the connection point. The cost of meters, connections, reticulation and all other usage costs associated with the provision of services are for the *Contractor's* account.

2.3. Completion, testing, commissioning, and correction of Defects

The *work* to be done by the Completion Date:

On or before the Completion Date the *Contractor* shall have done everything required to Provide the Works, including removal of his establishment and equipment from the site. The *Project Manager* cannot certify Completion until all the work has 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.

2.3.1. As-built drawings

The *Contractor* must submit redline drawings to the *Project Manager* that represents the status of the completed work.

2.3.2. Tests and Commissioning

The *Contractor* shall provide adequate and competent personnel for testing and commissioning of every installation and for the full duration of the commissioning process.

The commissioning shall include interaction between other systems and others where interdependence of installations is encountered.

The commissioning process shall, after all testing's has been completed be the final proving ground of the systems and during this procedure the installations shall be subjected to all possible inputs and actions which may be encountered under operational conditions.

The Contractor shall prove the full operation, working and compliance of the installation in accordance with the specifications.

A detailed programme of the planned commissioning procedures shall be submitted to the *Project Manager* and Employer's Engineers at least 14 days before commissioning commences.

2.3.3. Access for correction of defects:

Should the Contractor have to return to the Site after Completion of the works to conduct an improvement or repair, the Contractor shall arrange all staff members required to perform the work and shall also carry the costs of such access.

2.4. Construction

2.4.1. Contractor's Site

The *Employer* will make available a portion of land at the entrance of the Quay for the Contractor's site offices and laydown area in the location shown in the associated construction drawings.

The berthing of vessels at the adjacent Quay (R-extension) will continue throughout the contract period and the *Contractor* will have to make provisions in construction sequence and schedule to account for the movement of these vessels, to ensure minimal disturbance to operations, and damage to surrounding vehicles. The berthing of vessels at R extension is estimated to be every three days (one vessel after three days) for a duration of 18hours per visit.

2.4.2. Sequence of Construction

The *Contractor* is allowed to sequence construction to best suit the defined schedule. The sequence of construction shall take into account any long lead items and movement of traffic and vessels within the construction area.

The adjacent berth, R-extension, is an operational berth used for Ro-Ro vessels frequently. The *Contractor* should ensure the project (Deepening and Strengthening of N-berth) is sequenced in such a manner that it does not interfere with total operations. Operational risks during construction (i.e., maintaining existing port operations) should be mitigated, and minimized completely, if possible.

2.4.2.1. Surveys

i. *Topographic Survey*

The *Supervisor* will provide benchmarks points for the contractor to set up the *works.* The contractor shall carry any additional topography surveys required.

ii. *Instrumentation*

The *Contractor* shall provide all relevant instrumentations in working condition, suitable for the Works. Maintenance and calibration of instrumentation shall be carried out in accordance with the manufacturer's instructions by qualified persons at the *Contractor's* expense.

2.4.2.2. Site Clearance

i. *Materials*

Site clearance shall include clearing, grubbing, removal and disposal, where required, of loose blocks/rocks, concrete slabs and any structure or object not to be retained under the Works or which is not suitable for reuse in the Works. Site clearance shall be carried out as necessary throughout the site. The *Contractor* shall retain all mass capping rocks and stockpile them at the foreshore area located inside the Port, 2km from construction site.

ii. *Obstruction to the Site*

The *Project Manager* may give instructions that specific items shall not be removed during site clearance operations. Should the *Contractor* find it necessary to temporarily remove such item in order to execute his work safely, the Contractor shall obtain a written consent from the *Project Manager* to do so and reposition the items to its correct position as soon as the task is completed.

iii. *Programme*

The *Contractor* shall programme his work such that site clearance does not delay permanent *Works'* construction.

iv. *Disposal of Materials*

All surplus materials generated by site clearance shall be disposed of to the satisfaction of the *Project Manager*. Burning of material on-site shall not be permitted at any time. The *Contractor* shall make arrangements for disposal off the site to an approved licensed dumping site.

Hazardous waste shall be carefully handled, packed and removed safely off site to an appropriate licensed site in accordance with National and Local legislations.

Topsoil or material containing natural organic matter shall be stockpiled as ordered by the *Project Manager* for reuse and/or rehabilitation. Sandy material free of boulders and debris shall be disposed of on the eastern beach just east of the eastern breakwater within 15km radius. Gravel, pebbles, cobbles and boulders shall be disposed of on the designated spoil site on the eastern upper stockpile or spoil sites as designated by the *Project Manager*

v. *Site Demolition*

All demolition work shall be carried out in accordance with BS 6187:2011 Code of Practice for Demolition or SABS 1200C. Particular attention shall be paid to the safety of the public and the provisions of fencing, barriers and signs for this purpose contained in Clause 12 of the BS 6187:2011 Standard.

The *Contractor* shall demolish, remove and dispose of the structures shown on the Drawings and any other obstructions which have not been designated to remain, including but not limited to, removal of brick face, mass capping, and trimming of mass concrete. Debris shall be disposed of in accordance with the Works Specification and current Regulations and Legislation.

The methods used for demolition shall be such as to:

- Cause the minimum of disturbance to adjoining structures or to the occupiers of adjacent buildings and properties and the general public, due to vibration, air or structure borne noise, dust, water, projectiles, equipment or other causes.
- Not damage vehicles or property of occupiers or other persons on or near the Site.
- Not damage elements, structures, facilities and the like that are to remain.
- Maximize recycling of demolished materials.
- Prevent debris or deleterious materials entering the surrounding waterbody.
- Not make use of any explosives.

The *Contractor* shall be deemed to have fully ascertained all details of the structures to be demolished through a site inspection, and review of the provided as-built information. The *Contractor* will not be compensated in the event that his

assumptions on the nature and condition of structures to be demolished at Tender are inaccurate.

The *Contractor* shall erect an appropriate boundary/perimeter fence to demarcate the construction zone and ensure maximum precaution to mitigate risks of damage to surrounding vehicles, and operations, and should be priced for accordingly by the *Contractor* in their submission. The minimum requirements is a mesh wire fence and sand bags stockpiled behind the fence to avoid damages to the vessel cargo.

vi. *Methods and Procedures*

In developing demolition methods and procedures, the *Contractor* should consider and address, but not be limited to, the following issues:

- Health, safety and Environmental issues;
- Watering during demolition to reduce the generation of dust, and air pollution
- Stability of the structure;
- The possibility of lack of integrity of the pile to deck connections;
- The shape, size and weight of the structure;
- The method and location of disposal.

vii. *Underground Structures*

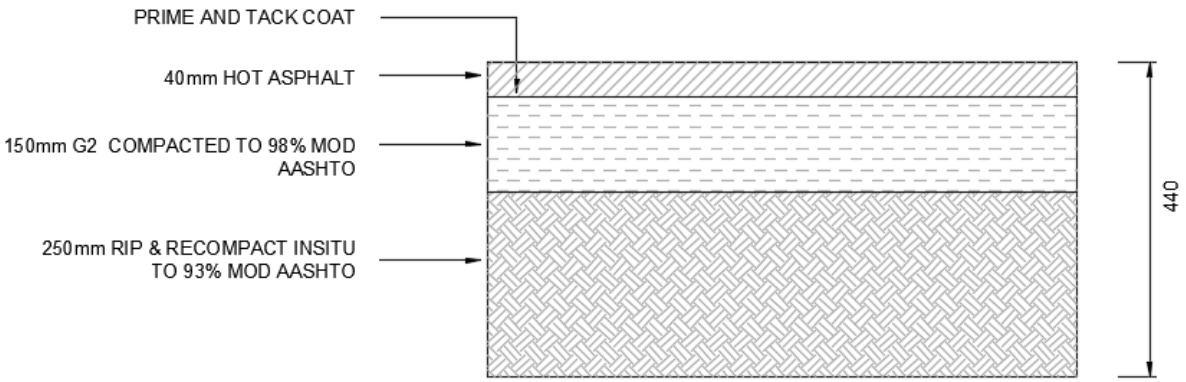
The *Contractor* shall satisfy himself that all structures underground have been identified and clearly marked on the Drawings and his method of demolition will not adversely affect the structures that are not marked for demolition.

viii. *Existing Services*

The *Contractor* shall locate the existing services accurately and mark them on the Drawings. Only after obtaining the express consent of the *Project Manager* shall the *Contractor* commence demolition of identified and clearly marked services.

ix. *Existing Quay Surface*

The *Contractor* shall ensure any damaged surface within the construction site, caused by construction activities is repaired, resurfaced, and made good to the satisfaction of the *Project Manager* and should be priced for accordingly. This does not include damages as a result of neglect during construction activities by the *Contractor*. See layer-works detail below for guidance to the reconstruction of quay surface.



x. *Access Ladders*

Existing ladders on the quayside should be safely removed and disposed off-site to an appropriate site in accordance with National and Local legislations.

xi. *Existing Fenders*

Existing tyre fenders on the quayside should be safely removed and stockpiled at a designated site (tyre storage located within a 2km radius) located inside the Port, 2km from construction site.

2.4.2.3. Services and Fittings

i. *Access Ladders*

Ladders at the locations specified on the drawings shall comply with the recommendations of BS 4211 and BS EN ISO 14122, and be fabricated with side rails of the full length of the ladder without any joint. The side rails shall be finished straight and square. All holes for rungs and edges shall be free of burrs and filled flush with side rails.

Ladder rungs, stringers and supporting brackets for fixed ladders shall be from steel complying with BS EN 10025 and galvanised in accordance with BS EN 1461.

Ladders shall extend 1.0m below the lowest water level.

Safety chains shall be in accordance with the BS 6349.

ii. *Tyre Fenders*

Tyre fenders at the locations specified on the drawings shall be supplied and installed by the *Contractor*, and should include, but not limited to the properties below:

- Tyre fenders 3m in diameter
- Earth-mover tyres
- Good energy absorption qualities (>730 Joules)

iii. *Bollards*

The *Contractor* is required to prepare and paint the existing bollards located on the top surface of the quay wall, and should encompass the following elements within the scope (but not limited to):

- Inspection of bollards for damages, corrosion, and loose parts
- Removal of existing paint or coating using appropriate tools and techniques such as chipping and sandblasting
- Repair any damages or corrosion by sanding or filling affected areas.
- Clean the bollards thoroughly to remove dirt, grime, and any other contaminants.
- Choose a suitable paint that is resistant to weather conditions and corrosion (to be accepted by the Project Manager)
- Apply a primer coat to ensure good adhesion and protect the bollards
- Apply the selected paint evenly and uniformly to all bollards
- Apply multiple coats if necessary, to achieve the desired finish and durability (Allow sufficient drying time between coats as per the manufacturer's recommendations)
- Inspect the painted bollards for uniformity, smoothness, and coverage, and ensure the final finish meets the specified requirements of the Project Manager and Supervisor.

2.5. Tolerances

2.5.1. Concrete Structures

Tolerances on the various concrete elements are as follows:

Reinforced Concrete:	Degree of accuracy II
Precast Concrete:	Degree of accuracy I

2.6. Testing and Surveys

2.6.1. Testing of Plant and Materials

All testing of Plant and Materials is carried out in accordance with the relevant SANS 1200 Standard Specifications unless otherwise specified in the documents bound in these specifications.

2.7. Plant and Materials Standards and Workmanship

2.7.1. Investigation, Survey and Site Clearance

The *Contractor* is required to protect existing services prior to construction for the full extent of the site.

2.7.2. Drawings issued by the Employer

This is the list of drawings issued by the *Employer* at or before the Contract Date and which apply to this contract.

Table 2: Drawings issued by the *Employer*

Drawing Number	Drawing Title
TBA – 1 - 000 – S – LA - 0002 – 01-OA – SE	FENDER TYPE A,TYPE B,TYPE C AND TYPE D LAYOUT PLAN AND FRONT ELEVATION
TBA – 1 – 000 - C -RD – 0001 – 01-OA – EM	FENDER PANEL TYPE-A REINFORCEMENT DRAWING
TBA – 1 - 000 – 0 -SE – 0003 – 01 – OA – EM	FENDER PANEL TYPE-A CONCRETE DRAWING
TBA – 1 - 000 – 0 -SE – 0004 – 01 – OA – EM	FENDER PANEL TYPE-B CONCRETE DRAWING
TBA – 1 – 000 - C -RD – 0002 – 01-OA – EM	FENDER PANEL TYPE-B REINFORCEMENT DRAWING
TBA – 1 - 000 – 0 -SE – 0005 – 01 – OA – EM	FENDER PANEL TYPE-C CONCRETE DRAWING
TBA – 1 – 000 - C -RD – 0003 – 01-OA – EM	FENDER PANEL TYPE-C REINFORCEMENT DRAWING
TBA – 1 – 000 - C -RD – 0004 – 01-OA – EM	FENDER PANEL TYPE-D REINFORCEMENT DRAWING
TBA – 1 - 000 – 0 -SE – 0006 – 01 – OA – EM	FENDER PANEL TYPE-D CONCRETE DRAWING
TBA – 1 - 000 – S – LA - 0007 – 01-OA – SE	LADDER DETAILS (6 ON OFF)
TBA – 1 - 000 – S – LA - 0003 – 01-OA – SE	NEW PROPOSED BERTH POCKET
TBA – 1 - 000 – S – LA - 0001 – 01-OA – EM	CONCRETE FENDER: PLAN LAYOUT AND CROSS SECTION
TBA – 1 - 000 – S – LA - 0004 – 01-OA - SE	PROPOSED SITE PLAN LAYOUT

SECTION 2

3. MANAGEMENT AND START UP

3.1. Management meetings

The Contract will be managed through the New Engineering Contract, NEC 3 Engineering Construction, Option B: Priced Contract with a Bill of Quantities (BOQ). Meetings of a specialist nature may be arranged as specified elsewhere in this Scope, or if not so specified by persons and at times and locations (East London or virtual) to suit the Parties, the nature, and the progress of the study. The person arranging the meeting within five (5) working days of the meeting shall submit records of these meetings to the *Project Manager*.

The *Employer* and the *Contractor* will conduct a Kick-off Meeting, Technical Meetings, progress meetings, SHE Meetings (initiated and chaired by the *Contractor,* and the invite shall be extended to the *Client* through the *Project Manager*) and Risk Workshops/Reduction meetings. All meetings shall be recorded using minutes or a register prepared and circulated by the person who convened the meeting. The Contractor 's key personnel (Construction Manager, Health and Safety Manager, Planner/Scheduler, Environmental Officer, Quality Officer) are expected to attend meetings with the objective to resolve problems/challenges including making available to either party, any data that may have bearing in the matter discussed in accordance with this contract.

The *Contractor* shall attend management meetings, bringing with supporting key personnel at the *Project Manager or Engineering Manager's* request as set out above. All meetings shall be held in either East London or virtual depending on the applicability. At these meetings the *Contractor* shall present all relevant data including, but not limited to, safety, health and environmental issues, progress reports, quality plans, sub-Contractor management reports.

It is the *Employer's* specific intention that the Parties and their agents use the techniques of partnering to manage the contract by holding meetings designed to pro-actively and jointly manage the administration of the contract with the objective of justifying the opposing effects of risk for both Parties Regular meetings of a general nature may be convened and chaired by the *Project Manager* as follows:

Title and purpose	**Approximate time & interval**	**Location**	**Attendance by:**
Contract Management Meeting - progress and feedback.	Every two weeks on a day and time mutually to be agreed.	Port of East London or Virtual	*Employer*, *Contractor*, *Supervisor* and *Project Manager.*
Risk Reduction meetings and Compensation Events.	Weekly on a day and time mutually to be agreed.	Port of East London or Virtual	*Employer*, *Contractor*, *Supervisor* and *Project Manager.*
Site Inspections.	Ad hoc.	Port of East London	*Employer*, *Contractor*, *Supervisor, Safety Personnel,* and *Project Manager.*
Contractor SHE Meetings.	Held Monthly with *Contractors*. Day and time to be agreed.	Port of East London or Virtual	*TNPA Safety Management; Contractor Safety Manager and Contractor management / Supervision and Project Manager.*
Safety, Health and Environment Induction Training.	Once off Induction programme prior to commencing any work on site and each time for a new start.	Port of East London	*Contractor* (appropriate key persons), *Contractor Supervisor* (as necessary and appropriate delegates), *Foreman* and G*eneral Workforce*.

3.2. Documentation Control

The *Contractor* shall submit all documentation complying with the *Employer*'s standards and requirements.

a) The *Employer* will issue relevant documentation to the *Contractor*, but control, maintenance and handling of these documents will be the *Contractor*'s responsibility, at their expense and managed with a suitable document control system.
b) All project documents issued to 3rd Parties and to the *Employer* must be submitted through the *Employer*'s Document Control Department.

c) In undertaking the study all documentation requirements for the study shall be dealt with in accordance with document DOC-STD-0001 (*Contractor* Documentation Submittal Requirements).
d) The Documentation Schedule (CDS) is as contemplated in DOC-STD-0001.
e) The *Contractor* documentation "Starter kit," as contemplated in DOC-STD-0001, will be issued at the kick-off meeting following award.
f) All contract correspondence is issued through document control. All hardcopy communication will be delivered to the *Employer* via the Lead Document Controller. In the event of urgent communication, electronic communication can be transmitted to the *Project Manager*.
g) Each supplier of documentation and data to the Project is responsible for ensuring that all documentation and data submitted conforms to the Project Standards and data Quality requirements in terms of numbering, uniqueness, quality, accuracy, format, completeness, and currency of information. Data not meeting the Project Standards and data Quality requirements will be cause for rejection and returned to the *Contractor* for corrective action and re-submission.
h) Should any change be made to documentation or data, which has already been submitted to the Project, then new or revised documentation or data shall be issued to replace the outdated information.
i) It is the responsibility of all Project participants undertaking work on the Project to ensure they obtain and comply with the relevant requirements to suit their deliverables.
j) The *Contractor* is to ensure that the latest versions of the required application software and a suitable 'IT' Infrastructure are in place to support the electronic transmission of documentation.
k) All native files are to be submitted to the *Employer*. Electronic files submitted to the Project shall be clear of known viruses and irrelevant "instructions." The supplier of documentation is required to always have, the latest generation of virus protection software and up-to-date virus definitions.
l) The required number of copies shall as a minimum be three (2) (1x original + 1 x hard copy), with the corresponding PDF and 'Native' file formats upon final submission.
m) The *Contractor* shall apply "wet signatures" to the original Documentation before scanning the signed original and prior to formal submission.
n) Final issues of all documentation shall be supplied to the Project in "wet signature" format along with the associated corresponding electronic 'native files and PDF renditions.

o) The *Contractor* shall ensure adequate resources are available to manage and execute the Document Control function as per the requirements of the Project.

3.3. Health and Safety Management

The Principal Contractor ensures that its Contractors comply with TNPA requirements (refer to Legal Register, Baseline Risk Assessment and HS Specification).

The Employer will acknowledge the achievement of specific safety milestones set for the project with regards to incident statistics, incident recording, safety observation and conversations (SOC's) participation, safety initiatives, etc.

The Principal Contractor makes the Health and Safety specification available to its employees and Contractors in the language of this contract and other local languages as required.

The Principal Contractor conducts a method statement, risk assessment and safe work procedures pack per activity prior to carrying out that activity on the Site to the approval of the Project Manager.

The lines of communication of the various personnel acting on behalf of the Project Manager, who communicates directly with the Principal Contractor, and his key persons with respect to the H&S specification, are contained within (Health and Safety Project Specification).

The Principal Contractor shall appoint a full time CHSM per shift, registered with SACPCMP for the duration of the works, the number of which depending on the scope, complexity, and high-risk activities involved, as required by the Construction regulations of 2014, regulation 8(5). The Health and Safety Manager must be on site when work commences at the start of the day and must remain on site until all activities for that day (including the activities of Contractors) have been completed.

The Construction Manager is responsible, within the context of the H&S project Specification, for health and safety on the site and reports to the Project Manager. The CM specific tasks are detailed in the Health and Safety Project Specification. The CM to be registered within the specific category with SACPCMP.

All items of plant, equipment and vehicles travelling within the site shall be equipped with fully operational amber rotating flashing lights. All vehicles shall be roadworthy and shall at all times adhere to all traffic signage and speed limits.

All workers of the Principal Contractor will undergo entry medicals before the commencement of the project and thereafter on an annual basis inclusive of exit medicals.

Medicals to include drug testing. Medicals to be done by an Occupational Medical Practitioner (OMP).

Mandatory trainings as per legislative requirements must be completed by relevant Principal Contractor employees before the commencement of the project.

All will comply with PPE requirements as mentioned in this document as well as Health and Safety Project Specification taking note that only long sleeve pants and shirts are allowed to be worn on site in addition to the compulsory project PPE requirements.

Transportation of employees will not be allowed at the back of LDV's, even those fitted with a canopy.

All permit costs required for any activities relating to the project shall be for the Principal Contractors/Contractors account.

All employees and visitors to undergo daily alcohol testing by a trained person and calibration certificates to be available upon request.

The Principal Contractor shall further comply with all applicable legislative requirements and standards with respect to his own activities and others on the site.

Upon appointment of the Principal Contractor, the TNPA HS Agent will apply for a CWP to the DoEL. No construction work will commence until such time that the department issues the TNPA HS Agent with a Construction Work Permit (CWP) number.

A site access certificate will be issued to the Principal Contractor once the HS file has been approved and inductions will then be arranged via the Project Manager.

3.4. Environmental constraints and management

All work is to be conducted in accordance with the principles of the National Environmental Management Act, 1998 (Act no 107 of 1998) as well as all other applicable legislation, regulations and accepted environmental good practice.

The Transnet Construction Environmental Management Plan (CEMP) (ENV-STD-001 Rev04) and Standard Environmental Specification (SES) (ENV-STD-002 Rev04) dated November 2017 will be implemented for the project.

The CEMP and SES provide an integrated approach to environmental management. This approach is designed to guide the appropriate allocation of human resources, assign responsibilities, develop procedures and ensure project compliance with regulatory and best practice requirements. The CEMP and SES outline the minimum acceptable standard

for the Project that shall be complied with at all times. The requirements of these documents shall be applicable to the main Contractor and all appointed service providers.

The Contractor must sign the declaration of understanding as a commitment to abide with the CEMP, SES and the Employer's Environmental Governance Framework. Sufficient environmental budget must be allocated to meet all the project environmental requirements for the duration of the contract.

The *Contractor* must appoint a suitably qualified Environmental Officer with a relevant environmental qualification and a minimum of 3 years relevant construction environmental management experience.

The roles and responsibilities of the Contractor's EO are clearly outlined in the CEMP. The appointed EO is required to be on site daily. The EO must be a dedicated resource to the environmental discipline and may not be shared with any other discipline on site such as Health and Safety or Quality.

The *Contractor* will be required to submit an environmental file to the Project Manager post award of tender. Particular requirements of the Employer will be made known on award of the contract. A Site access certificate shall not be granted until the environmental file has been approved by the Employer.

The *Contractor* shall be responsible for rehabilitation/reinstatement and cleaning of all areas (where required), to the satisfaction of the Employer's Project Environmental Specialist or Environmental Officer as detailed in the CEMP and SES, upon completion of the works.

Water quality monitoring will be required to be undertaken during construction activities.

The appointed Contractor will be required to develop and implement an environmental method statement for construction and dredging activities that include a requirement for water quality monitoring.

A guideline to the breakdown of Environmental Management costs has been provided below:

Table 3: Environmental Management Cost Breakdown

#	Cost Element	Unit Cost (R)	# of Units	Total Cost (R)
1	Systems Documentation			
2	Meetings & Administration			
3	Environmental Management Training			
4	Environmental Management Plan			

5	Environmental Officer			
6	Environmental Method Statements			
7	Environmental Green File			
8	Spill Kit			
9	Waste Management (General and Hazardous)			
10	Environmental Awareness and training			

3.5. Quality assurance requirements

The *Contractor* shall ensure that all contractual deliverables required to be executed and completed are given due consideration to meet the client's Technical Specifications, Drawings and General Quality Requirements for Contractors and Suppliers **(QAL-STD-0001).**

The *Contractor's* Quality Management System (QMS) shall conform with the requirements of ISO 9001:2015 to ensure and demonstrate that material, workmanship, procedures, and services conform to the specified requirements.

The *Contractor* submits his Quality documents to the Employer as part of his programme under ECC Clause 31.2 to include details of:

- Project Quality Plan for the contract SHALL cover project scope and be aligned to QAL-STD-0001 General Quality Requirements for Contractors and Suppliers.
- Quality Manual that is aligned to ISO 9001:2015 QMS requirements.
- Project Specific Quality Data Book Index
- Quality Officer with Quality Diploma/Certificate, ISO 9001:2015 QMS Understanding and Implementation and Auditing trainings, with a minimum of 3 years' experience in similar projects.
- Quality Control Plan MUST cover all Engineering disciplines and clearly identify all inspection, test, verification requirements to meet contractual obligations, specification and drawings as required by the project scope.

Project Quality Plan

The Project Quality Plan (PQP) shall outline the quality strategy, methodology, quality resource allocation, Quality Assurance and Quality Control co-ordination activities to ensure that the scope meet the standards stated in the Scope Information.

The Contractor's PQP shall provide a description of how documents provided by the *Employer* to the Contractor are to be managed. The *Contractor* develops and maintains a comprehensive register of documents that will be generated throughout the contract including all quality related documents as part of its Quality Plan.

The *Employer* indicates those documents required to be submitted for information, review or acceptance and the *Contractor* indicates such requirements within his register of documents.

The register shall indicate the dates of issue of the documents with the *Employer* responding to documents submitted by the *Contractor* for review or acceptance within the period for reply prior to such documents being used by the Contractor.

Quality Manual

A copy of the *Contractor's* Quality Manual will be requested for review by the *Employer* followed, by a Quality Management Systems (QMS) audit at the *Contractor's* Head Office to obtain evidence that a satisfactory quality management system is being maintained.

Quality Data Book Index

The *Contractor* shall submit a project specific quality data book index that lists all the project deliverables as per the contract requirements.

Quality Officer

The *Contractor* shall provide a suitably experienced quality representative as a key person, for all aspects of the Works, including general Site activities, with a staff complement that is adequate to perform the requirements of the PQP. The *Contractor* shall submit the CV of his nominated quality representative for evaluation as a key person.

Quality Control Plan

(a) The *Contractor* shall provide a Quality Control Plan (Inspection and Test Plan) specifying his proposed quality control activities for the entire scope of supply and scope of works. The Quality Control Plan shall incorporate, as a minimum, an **INSPECTION CHECK LIST**. The Quality Control Plan shall reference the procedures, codes and standards which apply to the listed activities, the acceptance criteria, the records to be produced and similarly it shall incorporate all Sub-contractors and supplier's activities. The Quality Control Plan shall be prepared on the Contractors / Suppliers standard format.

(b) Deviations from this Quality Control Plan may only be permitted following acceptance in writing by the *Supervisor* and/or the appointed Third-Party Inspection Authority.

(c) The *Contractor* shall not proceed with any work without the acceptance of a Quality Control Plan by the *Project Manager*.

(d) During the review of the Quality Control Plan / Inspection and Test Plan, Inspection and Test intervention points will be included by Transnet and, where applicable, the Third-Party Inspection Authority to indicate their intended monitoring during manufacturing, fabrication, and installation.

(e) The *Contractor* / Supplier shall ensure that any work sub-contracted will be covered by Quality Control Plans / Inspection and Test Plans generated by the relevant Sub-contractor or Supplier.

The *Contractor* shall also ensure that all Sub-contractors are accepted by the *Project Manager*, and are suitably qualified and experienced to carry out the work for which they have been sub-contracted.

The *Employer* may, at own discretion, require a Quality Audit of sub-contractor(s) to ensure that the sub-Contractor(s) have the necessary management, facilities, skilled staff, and quality control facilities to carry out the Works to ensure compliance with the Works Information.

The *Contractor* shall accept full responsibility for the quality of his sub-contractor(s) work and of materials used, irrespective of any quality surveillance that may be caried out by the *Employer* or his representative.

3.6. Programming constraints

a) The *Contractor* presents their first programme and all subsequently revised programmes in hard copy format printed in full colour in A3 size and in soft copy 'Native' format.

b) The *Contractor* submits his Level 4 programme to the *Employer* for acceptance in the period stated in the Contract Data.

c) The *Contractor* uses Primavera software or Microsoft Project for his programme.

d) The *Contractor* shows on his programme submitted for Acceptance and all subsequently revised programmes schedules (including calendar) the critical path or paths and all necessary logic diagrams demonstrating the order and timing of the operations which the *Contractor* plans to do.

e) The *Contractor*'s programme shows duration of operations in working days (Monday – Friday, excluding public holidays).

The *Contractor*'s programme shows the following levels:

- Level 1 Master Schedule – defines the major operations.
- Level 2 Project Schedule – Breakdown showing different packages and/or disciplines involved in the project; a summary schedules 'rolled up' from Level 3 Project Schedule described below.
- Level 3 Project Schedule – detailed schedules generated to demonstrate all operations identified on the programme from the starting date to Completion. The *Employer* notifies any subsequent layouts and corresponding filters on revised programmes.
- Level 4 Project Schedule – detailed discipline speciality level developed and maintained by the *Contractor* relating to all operations identified on the programme representing the daily activities by each discipline.

The *Contractor* shows on each revised programme he submits to the *Employer* a resource histogram showing planned progress versus actual, deviations from the Accepted Programme and any remedial actions proposed by the *Contractor*. The *Contractor*'s weekly programme narrative report includes:

- Level 4 Project Schedule – showing two separate bars for each task i.e., the primary bar must reflect the current forecast dates and the secondary bar the latest Accepted programme.
- 3-week Look ahead Schedule - showing two separate bars for each task i.e., the primary bar must reflect the current forecast dates and the secondary bar the latest Accepted programme.

3.7. Contractor's management, supervision, and key person

The *Contractor* employs a Construction Manager (registered with SACPMP as a Construction Manager) as a key person under ECC Clause 24.1

Minimum requirements of people employed on the Site are:

- The *Contractor* shall provide an adequate, experienced, and stable project team for the duration of the contract.
- It is a requirement of this contract that the *Contractor* will employ a full time, fully experienced Construction Manager as key person who has been delegated sufficient authority to manage the contract efficiently on-site during construction.

- The *Contractor* shall employ personnel to perform functions of a Site Environmental officer, Safety Manager, and Quality officer as key persons. These appointments shall have the necessary experience and be suitably qualified.
- The *Contractor* shall provide an Organogram of ALL his Key people (both as required by the *Employer* and as independently stated by the *Contractor* under Contract Data Part Two) and how.
- Key personnel changes: The *Contractor* will ensure replacement by like-for-like or more experienced personal in the event of changes of key personnel, and is to be authorized/approved by the *Project Manager*. If the contractor fails to do so, a negative compensation event will be issued, and the qualified personnel will be appointed on behalf of the contractor.
- The minimum key people required by the employer for this project are indicated as follows:

Key People	Qualifications & Experience
Construction Manager	• The Construction Manager should at least have a minimum qualification of a BSc./B.Eng./B-Tech./National Diploma in Construction Management or Civil Engineering • The Construction Manager should have relevant experience in Structural/Marine construction projects • The Construction Manager should be registered with SACPCMP as a Construction Manager (Pr.CM). • The Construction Manager must have experience with the NEC 3 Engineering and Construction Contracts. • The Construction Manager must have a minimum of five years working experience on Structural/Marine construction works or projects.
Project Planner/Scheduler	• A project planner should have a minimum experience of five (5) years working on similar projects
Health & Safety Manager	• Health & Safety Manager should have valid professional registration with SACPCMP as a Construction health & Safety Manager. • B-Tech Degree Safety Management or Similar, with minimum of 5 years in a similar Structural/Marine Construction Projects.
Environmental Officer	• The Environmental Officer must be in possession of a B degree in Environmental Management. • The environmental Officer must have a minimum of three (3) years' experience in the construction sector.
Quality Officer	• Quality Officer should have a Quality diploma / Technical diploma with ISO 9001:2015 Quality Management System

	certificates, and must have a minimum of 3 years' experience in similar projects

3.8. Insurance provided by the *Employer*

Insurance provided by the *Employer* is contained in the Contract Data – Part 1.

3.9. Contracts change management

No additional requirements apply to ECC Clause 60 series.

3.10. Provision of bonds and guarantees

The form in which a bond or guarantee required by the conditions of contract (if any) is to be provided by the *Contractor* is given in Part 1 Agreements and Contract Data, document C1.3, Sureties.

The *Contractor* provides a bond or guarantee as required by the conditions of contract concurrently with the execution by the Parties of the form of agreement for the ECC contract.

3.11. Records of Defined Cost, payments & assessments of compensation events kept by Contractor

As part of the returnables, the *Contractor* should submit Defined Costs breakdown for People, Equipment, etc., to ensure rates are agreed upfront (prior to the contract starting) between the *Employer* and *Contractor*.

The *Contractor* keeps the following records available for the *Project Manager* to inspect:

- Records of employee's location of work (if appropriate).
- Records of Equipment used, and people employed outside the Working Areas (if applicable).

3.12. The *Contractor's Invoices*

When the *Project Manager* certifies payment (see ECC Clause 51.1) following an assessment date, the Contractor complies with the *Employer's* procedure for invoice submission.

The invoice must correspond to the *Project Manager*'s assessment of the amount due to the *Contractor* as stated in the payment certificate.

The invoice states the following:

Invoice addressed to Transnet SOC Ltd.

Transnet SOC Limited's VAT No: 4720103177.

Invoice number.

The *Contractor*'s VAT Number; and

Purchase Order Number and

The Contract numbers

The invoice contains the supporting detail

The invoice is presented either by electronic mail or hand delivery.

Invoices submitted electronically are addressed to:

Invoices submitted by hand are presented to:

Transnet National Ports Authority - Port Control Building

Port of East London,

Ganteaume Crescent,

Quigney,

East London - 5201

For the attention of

The invoice is presented as an original.

3.13. Contractor Liability

The *Contractor* warrants that it will be liable to *Employer* for any loss or damage caused by strikes, riots, lockouts, or any labour disputes by and/or confined to the *Contractor's* employees, which loss will include any indirect or consequential damages.

The *Contractor* warrants that no negotiations or feedback meetings by the *Contractor's* employees shall take place on Transnet premises, whether owned or rented by Transnet.

The *Contractor* shall give notice to *Employer's* of any industrial action by the *Contractor's* employees immediately upon becoming aware of any actual or contemplated action that is or may be carried out on *Employer* premises, whether owned or rented, and shall notify Transnet of all matters associated with such action that may potentially affect Transnet.

The *Contractor* is responsible for educating its employees on relevant provisions of the Labour Relations Act which deal with industrial action processes, and the risks of non-compliance.

The *Contractor* is required to develop a Contingency Strike Handling Plan, which plan the *Contractor* is obliged to update on a three-monthly basis. The *Contractor* must provide Transnet with this plan and all updates to the Plan. The *Contractor* is responsible to communicate with its employees on site details of the plan.

3.14. Industrial Action By Contractor Employees

In the event of any industrial action by the *Contractor's* employees, the *Contractor* is required to provide competent contingency resources permitted in law to carry out any of the duties that are or could potentially be interrupted by industrial action in delivering the Service.

The *Contractor* warrants that it will compensate the *Employer* for any costs the *Employer* incurs in providing additional security to deal with any industrial action by the *Contractor's* employees.

In the event of any industrial action by the *Contractor's* employees, the *Contractor* is obliged to prepare and deliver to the *Employer*, within two (2) hours of the commencement of industrial action an Industrial Action Report. If the industrial action persists the *Contractor* is required to deliver the report at 8h30 each day.

The Industrial Action Report must provide at least the following information:

- Industrial incident report,
- Attendance register,
- Productivity / progress to schedule reports,
- Operational contingency plan,
- Site security report,
- Industrial action intelligence gathered.

The final Industrial Action Report is to be delivered 24 hours after finalisation of the industrial action.

The management of the *Contractor* is required to hold a daily industrial action teleconference with personnel identified by the Employer to discuss the industrial action, settlement of the industrial action, security issues and the impact on delivery under the contract.

The resolution of any disputes or industrial action by the *Contractor's* employees is the sole responsibility of the *Contractor*.

Access to Transnet premises by the *Contractor* and its employees is only provided for purposes of the *Contractor* delivering its goods and services to Transnet. Should the *Contractor* and its employees not, for any reason, be capable of delivering its goods and services, Transnet is entitled to restrict or deny access onto its premises and unless otherwise authorized; such person will be deemed to be trespassing.

3.15. Industrial Action associated with Transnet

In the event of industrial action associated with Transnet, or rooted from Transnet business operations, TNPA guidelines for business continuation during industrial action should be adhered to. These guidelines and communications shall be provided by the *Project Manager*.

3.16. Subcontracting

The *Contractor* shall not employ or bring a Sub-Contractor onto the Site and/or Working Areas without the prior approval of the *Project Manager.* Further, he shall appoint his Sub-Contractor(s) under the NEC3 Engineering Contract Subcontract unless approved otherwise by the *Project Manager.*

The Contractor shall not deviate from an approved Sub-Contractors list without prior acceptance of the Project Manager.

Subcontract documentation, and assessment of subcontract tenders:

- The Contractor is required to appoint his Sub-Contractors under the NEC3 Engineering Contract Subcontract unless accepted otherwise by the Project Manager, and all Sub-Contractors will be required to conform to the requirements as set out herein as if they were employees of the Contractor.
- The Contractor shall ensure that the quality assurance, health and safety, industrial relations, environmental, documentation control and all other requirements placed on him under this contract are transferred into any subcontracts.

3.17. Plant, and Materials

The *Contractor* provides Plant and/or Materials for inclusion in the works in accordance with SANS 1200A sub-paragraph 2.1, unless otherwise stated elsewhere in the Works Information provided by the *Employer*. All Plant and/or Materials are new, unless the use of old or refurbished Plant and/or Materials are expressly permitted as stated elsewhere in this Works Information or as may be subsequently instructed by the *Project Manager*.

Where Plant, Equipment and/or Materials for inclusion in the works originate from outside the Republic of South Africa, all such Plant, Equipment and/or Materials are new and of merchantable quality, to a recognised national standard, with all proprietary products installed to manufacturers' instructions.

The Contractor replaces any Plant and/or Materials subject to breakages (whether in the Working Areas or not) or any Plant, Equipment and/or Materials not conforming to standards or specifications stated and notifies the Project Manager and the Supervisor on each occasion where replacement is required.

ANNEXURES

Annexure A2: Variations to SANS 1200 G
Annexure A3: Structural Steel Specifications
Annexure A4: Dowelling and Anchorage Specification

Annexure B1: General Quality Requirements for Contractors and Suppliers_ QAL-STD-0001
Annexure B2: Standard Environmental Specification (SES)
Annexure B3: Construction Environmental Management Plan (CEMP)
Annexure B4: Declaration of Understanding
Annexure B5: Contractor Documentation Submittal Requirements standard DOC-STD-0001
Annexure B6: Health and Safety Project Specification
Annexure B7: Baseline Risk Assessment
Annexure B8: Legal Register
Annexure B9: HS Cost Breakdown
Annexure B10: HS Questionnaire

Note: In all cases check against online version for the latest revision prior to use

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Deepening and Strengthening N-berth

ANNEXURE A2 – VARIATIONS TO STANDARD SPECIFICATION SANS 2001 CONCRETE (STRUCTURAL)

TABLE OF CONTENTS

1. SCOPE [Clause 1]

This specification covers the *Employer's* requirements for all structural concrete work.

2. REQUIREMENTS

All structural concrete work is in full compliance with SANS 2001: Concrete (Structural), except for the following variations and additions to the standard specification required to ensure durability in a marine environment. The references in square brackets refer to the particular clause(s) in SANS 2001: Concrete (Structural).

3. MATERIALS [Clause 3]

3.1. Cements [Clause 3.2]

All cements used for concrete work comply with SANS ENV 197-1. All cement extenders used for concrete work comply with SANS 1491. The cement types given below are acceptable for use in the Works, however the proportion of extender in factory blended cements conform to the requirements of set out in 4.3.4. On no account are masonry cements used for concrete work, even if the strength designations are the same as for common cements.

Acceptable cement types:

i)	CEM I 42,5	Portland Cement
ii)	CEM I 42,5R	Portland Cement, rapid hardening
iii)	CEM II/B-V	Portland fly ash cement
iv)	CEM II/B-W	Portland fly ash cement
v)	CEM III/A	Blast furnace cement

3.2. Applicable Specifications [Clause 3.2.1]

In addition to the specifications listed in Clause 3.2.1 of SANS 2001: concrete, the following specifications also apply where relevant:

SANS 0100-2:1992	The Structural use of concrete - Part 2: Materials and execution of work
SANS ENV 197-1	Cement – composition, specifications and conformity criteria. Part 1: Common cements
SANS 1491-1:1989	Portland cement extenders - Part 1: Ground granulated blast furnace slag
SANS 1491-2:1989	Portland cement extenders - Part 2: Fly ash
SANS 1491-3:1989	Portland cement extenders - Part 3: Condensed Silica Fume

3.3. Aggregates [Clause 3.4]

Should the *Contractor* use a coarse aggregate type, which is reactive with alkali, the *Contractor* ensures that the equivalent Na_2O content in the concrete mix is such that it is below the threshold value, which causes the deleterious reaction in the concrete.

Alkali Reactive Aggregates shall not be used in this project.

The equivalent Na_2O content of the concrete shall not exceed 2,0 kg/m^3

where % Na_2O equivalent = %Na_2O + (0,658 x %K_2O).

A laboratory report by the *Contractor* on the mix design and trial mixes prior to construction elaborates on the above matter. If required by the *Supervisor*, the *Contractor* submits 40kg samples for acceptance at least 6 weeks before concreting is to commence. No aggregate is delivered for use in the Works until the *Supervisor's* written acceptance is given.

The use of plums in concrete is not permitted unless otherwise specified in the individual project specifications.

3.4. Admixtures [Clause 3.5]
Admixtures containing chlorides is not permitted in reinforced concrete.

3.5. Curing Compound
In all cases where a concrete curing compound is specified, the curing compound is grey or white pigmented membrane forming material complying with ASTM specification C 309, except that the maximum permissible water loss in the test is 0.40 kilograms per square metre.

Alternatively, the concrete curing compound is acceptable if the treated concrete retains 90% or more of its mixing water when subject to the test set out in BS 8110: Part 1, Clause 6.6(c).

4. CONSTRUCTUION [Clause 5]

4.1. Reinforcement [Clause 5.1]
Minimum concrete cover to all steel reinforcement is as shown on the drawings or as given in the Works Information, and maintenance of this minimum cover during casting of concrete is strictly enforced. Concrete, which is cast with insufficient cover to the reinforcement is demolished and re-cast at the *Contractor's* cost.

Cover blocks used to ensure the cover to reinforcement are made of cement mortar. They are dense and have a minimum 28 day crushing strength of 50 MPa, and are cured in water for at least 14 days before being used. Spacer blocks made of plastic are not permitted.

4.2. Formwork [Clause 5.2]
All exposed concrete surfaces require a smooth finish to a Degree of Accuracy II as specified in clause 6, SANS 2001: Concrete, unless otherwise specified in the Works Information.

The *Contractor* takes particular care to ensure that formwork joints are tight enough to prevent leakage of cement mortar. Shutters that are damaged, or that leave a surface that is unacceptable to the *Supervisor*, are removed and repaired or discarded.

4.3. Concrete [Clause 5.5]
4.3.1. Concrete Quality

The *Contractor's* quality management plan provides for all the necessary operations, tests and/or inspections to ensure compliance with this specification. Before any concrete work commences, the *Contractor* provides the *Supervisor* with documentary proof that all specified operations have been carried out satisfactorily.

4.3.2. Potential Heat Generation

Measures, subject to the acceptance of the *Supervisor*, are applied to reduce heat development in concrete of which the minimum dimension to be placed during a single pour is larger than 600 mm, and the cement content exceeds the values given in *Table 1*.

Table 1: Heat Generation - Limiting Cement Contents

STRUCTURAL ELEMENT	**CEMENT TYPES I AND III/A (kg/m³)**	**CEMENT TYPES II/B-V AND II/B-W (kg/m³)**
Reinforced Concrete	400	450
Pre-cast Concrete	500	550

4.3.3. Chloride Content [Clause 5.5.1.4]

The chloride content in steel reinforced concrete at the time of placing is not greater than 0,15% by mass of the cement.

4.3.4. Durability [Clause 5.5.1.5]

In order to enhance durability and notwithstanding strength considerations the concrete mixes satisfies one of the mixes given in *Table 2* below and prior written acceptance for the mix is obtained from the *Supervisor.*

Table 2: Concrete Mixes

CONCRETE TYPE	**CEMENT TYPE & %CONTENT**	**EXTENDER TYPE & %CONTENT**	**MINIMUM CEMENT + EXTENDER CONTENT (kg/m³)**	**MAXIMUM WATER/CEMENT RATIO**
STEEL REINFORCED	CEM I 50% – 60%	GGBS 40% – 50%	420	0.40
STEEL REINFORCED	CEM I 70% - 75%	FA 25% –30%	420	0.40
PLAIN	CEM I 100%	NIL	340	0.50
PLAIN	CEM I $\geqslant$ 75%	FA $\leqslant$ 25%	340	0.50
PLAIN	CEM I 35% - 65%	GGBS 35% – 65%	340	0.50
PLAIN	CEM I 65% – 74%	FA 26% – 35%	300	0.55

Note:

1) CEM I may be CEM I 42,5 or 42,5 R.
2) GGBS – Ground Granulated Blast Furnace Slag
3) FA – Fly Ash
4) Factory blended cements (CEM II/B-V, CEM II/B-W or CEM III/A) are accepted provided that they conform to one of the blends specified in the table. The *Contractor* supplies certification thereof.
5) Water-reducing admixtures may be used to improve workability (See also Clause 3.4 above). The water cement ratio includes the water content of admixtures.

   Blends of CEM I and Condensed Silica Fume (CSF) are not acceptable for steel reinforced concrete. Ternary blends such as CSF with CEM I and FA or GGBS may be

considered provided that they can be shown to be equivalent in durability to the mixes given. The onus will be on the *Contractor* to prove to the *Supervisor* the adequacy of the blend.

4.3.5. Strength Concrete [Clause 5.5.1.7]

The strength of the concrete mixes as specified on the drawings or given in the Works Information, shall conform to the following requirements, as Class 50/19, where:

50 = minimum 28 day crushing strength in MPa, and
19 = maximum aggregate size in mm.

4.3.6. Batching [Clause 5.5.2]

Because of the limited size of the available site and the need to remain well clear of the adjacent mess and ablution facility, it will not be possible to accommodate a batching plant on site and the *Contractor* will be required to make use of premix concrete for the project.

4.3.7. Off-Site Batched Concrete [Clause 5.5.3.2]

The use of ready-mixed concrete is required. Concrete test results obtained from the production facility are acceptable, provided that the tests are carried out in accordance with the specifications.

4.3.8. Methods of Depositing Concrete

(i) By Tremie:

The top section of the tremie consists of a hopper of greater capacity than the pipe.

The tremie is sturdily constructed of steel, and be not less than 200 mm in diameter. It is strong enough to withstand the full hydrostatic pressure, even if a partial vacuum develops in the pipe, and is completely watertight.

The lower end of the tremie is equipped with an automatic check valve, which is watertight.

Initial filling of the tremie is carried out with the valve closed, in such a manner as to avoid air locks.

When concrete is deposited, the tremie penetrates the concrete bed and is slowly raised to discharge a uniform flow of concrete. The end of the tremie is under concrete during the whole operation.

Concreting continues to such a point that laitance can be removed and a sound surface left at the final finished level.

(ii) By Pumping Concrete:

The same conditions and criteria as for concreting by tremie as described in (i) above, apply.

4.3.9. Placing [Clause 5.5.5]

(i) Inspection of Area to be Concreted

Concrete mix design should be proposed to the *Employer* for approval, no concrete is placed until the size, shape and depth of the particular area is accepted by the *Supervisor*.

(ii) Inspection of Reinforcement

No concrete is placed until the fixed reinforcement is accepted by the *Supervisor*. The *Supervisor's* prior written acceptance is obtained before any concrete is cast.

4.3.10. Construction Joints [Clause 5.5.7]

It is essential that a good bond is achieved between casts at construction joints. The joint surface of the concrete is to be roughened while still green by means of brush and water spray to expose the coarse aggregate. Retarders may be used on stop-ends, which should be removed after 12 hours for green cutting. Mechanical roughening of hardened concrete using power tools is not permitted as it may break or dislodge the coarse aggregate.
All surfaces are cleaned and kept continuously wet for 24 hours before pouring of the adjoining cast.

Unless otherwise shown on the drawings, the exact position of horizontal construction joints are marked on the formwork by means of grout checks in order to obtain truly horizontal joints.

Stub columns, stub walls and stays on footings are cast integrally with the footings and not afterwards, even where another class of concrete is being used.

Joint lines are so arranged that they coincide with features of the finished work.

At contraction joints (joints having no reinforcement passing through the joint), no bond is required between casts. Contraction joints are smooth, and have one coat of limewash or PVA applied to the older surface prior to casting the newer concrete.

The *Supervisor's* prior written acceptance is obtained before the adjoining concrete is cast.

4.3.11. Curing [Clause 5.5.8]

In order to enhance the long-term durability of the concrete in the marine environment it is essential that it is correctly cured so that adequate hydration of the cement and extenders may take place.

All water for curing shall be clean, fresh water and under no circumstances is seawater permissible.

The curing period for concrete containing CEM I only is 7 days. The curing period for concrete's containing CEM I plus cement extenders (GGBS, FA) is 10 days. The period starts on completion of the concrete pour and for formed surfaces includes the time for which forms are still in place after the pour.

The *Supervisor's* prior written acceptance of the curing method to be used is obtained before any concrete is cast.

Concrete, of which the adequacy of the curing has not been accepted by the *Supervisor*, is removed from the Works and re-cast at the *Contractor's* cost.

The following curing methods are permissible:

(i) Covering with burlap or hessian or similar moisture retaining materials. The materials are kept continually moist and are not allowed to dry out as alternate wetting and drying is detrimental to the curing process. The material is free of injurious amounts or substances such as sugar or fertiliser that may harm the concrete or cause discoloration.

(ii) Sprinkling or spraying with water. This may be done at frequent intervals provided that the concrete surface remains continuously moist and is not allowed to dry out between wetting. Erosion of the fresh concrete surface is avoided.

(iii) Releasing the forms slightly and allowing a flow of water between the form and the concrete.

(iv) Liquid membrane-forming curing compounds, which comply with the requirements of 3.5 may be used. Only resin type compounds are permitted. The formulation must be such as to form a moisture retentive film shortly after being applied and must not be injurious to Portland cement paste. White or grey pigments or dyes are incorporated to enable the compound to be visible on the surface for inspection purposes.

For unformed surfaces the compound is applied after finishing and as soon as the free water on the surface has disappeared and no water sheen is visible, but not so late that the liquid curing compound will be absorbed into the concrete. For formed surfaces, when forms are removed, the exposed concrete surface is wetted with water immediately and kept moist until the curing compound is applied. Immediately prior to application, the concrete is allowed to reach a uniformly damp appearance with no free water on the surface. Application of the compound then begins at once. The compound is applied at a uniform rate with two applications at right angles to each other to ensure complete coverage, and is applied by hand or power sprayer. Pigmented compounds are adequately stirred to assure even distribution of the pigment during application, unless the formulation contains a thixotropic agent which prevents settlement.

The compound manufacturer supplies a certificate confirming compliance with **Error! Reference source not found.** and the manufacturer's directions with r espect to preparation and application. The manufacturer's preparation and application directions for the compound are strictly adhered to.

The total application rate is as specified by the Manufacturer, or 0,30 litres per square metre, whichever is the greater.

In the case of concrete surfaces with run-off problems, it may be necessary to apply more than one coat of membrane forming curing compound to obtain the specified total or cumulative application rate.

When the wind velocity exceeds 5 m/s and/or the ambient temperature is above 25 deg C and/or the relative humidity is below 60%, the initial 24-hour curing of concrete surfaces not covered by formwork is carried out by ponding, covering with constantly wetted sand or mats, or continuous spraying in accordance with SANS 1200G.

4.3.12. Concrete Surfaces [Clause 5.5.10]

All exposed concrete surfaces have a neat, smooth, even and uniform finish, free from any honeycombing and blow holes.

4.3.13. Records [Clause 5.5.15]

The *Contractor* maintains the following daily records for every part of the concrete work and makes these available at all times during the progress of the work for inspection by the *Supervisor*:

(i) The date and times during which concrete was placed.
(ii) Identification of the part of structure in which the concrete was placed.
(iii) The mix proportions and specified strength.
(iv) The type and brand of cement.
(v) The slump of the concrete.
(vi) The identifying marks of test cubes made.
(vii) Curing procedure applied to concrete placed.
(viii) The times when shuttering was stripped, and props were removed.
(ix) The date of despatch of the cubes to the testing laboratory.
(x) The test results.

The records are delivered to the *Supervisor* each week except in the case of sub-standard concrete when the *Supervisor* is informed immediately.

5. TOLERANCES [CLAUSE 6.2]

Deviations are within the limits listed in SANS 2001: Concrete, for Degree of Accuracy II, specified in Clause 6, unless stated otherwise on drawings or elsewhere in the Works Information.

6. TESTING [CLAUSE 7]

6.1. Concrete

Before the start of any concrete work on the site, the *Contractor* supplies the *Supervisor* with a statement of the mix proportions which he proposes to use and the target strength for each grade of concrete.

6.1.1. Frequency of Sampling

Frequency of sampling and testing are as specified in SANS 2001: Concrete, sections 7.1 and 7.2, subject to the testing of a minimum of 3 sets of samples per day from each grade of concrete placed in each independent structure if the concrete quantity from which these samples were taken exceeds 40 m3, and the testing of a minimum of 2 sets of samples per day when such quantity is equal to or less than 40 m^3.

Where required, the two-point loading method of the flexural strength tests, as described in SANS Method 864 (1994) is used.

6.1.2. Acceptance Criteria

Acceptance criteria are as specified in SANS 2001: Concrete, section 7.3. If the *Contractor* disputes test results on concrete cubes, the concrete represented by the cubes are considered acceptable if the *Contractor*, at his/her own cost, proves to the satisfaction of the *Supervisor* that the estimated actual strength of the cores taken from the structure, determined in accordance with SANS Method 865, is not less than the specified strength.

Note: In all cases check against online version for the latest revision prior to use

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ANNEXURE A3 – STRUCTURAL STEELWORK SPECIFICATION SANS 1200-H

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1. SCOPE

This specification covers the *Employer's* requirements for all structural steel work undertaken, including manufacturing and erection.

2. REQUIREMENTS

All structural steelwork is in full compliance with SANS 1200-H: Structural Steelwork, and additions to the standard specification required to ensure durability in a marine environment.

2.1. GOVERNING CODES AND STANDARDS

SANS 1200 H	Structural Steelwork
ANSI/AWS D1.1:	Structural Welding Code - Steel
BS-EN 287 Part 1:	Approval testing of welders/fusion welding
BS-EN 288 Part 3:	Specification and approval of welding procedures for metallic materials
BS 5135:	Metal arc welding of carbon and carbon manganese steels
BS 4360/SABS 1431:	Weldable structural steel
BS 2573: Part 1:	Classification, stress calculations and design of structures
BS 3923:	Methods for ultrasonic examination of welds
BS 2600:	Radiographic examination of fusion welded butt joints in steel
DIN 1026:	Metric channels
ISO R657:	Angles
SABS 094:	The use of high strength friction grip bolts and nuts
SABS 135:	ISO metric bolts, screws and nuts (hexagon and square) (coarse thread free fit series)

3. STRUCTURAL STEELWORK

3.1. The design of all structural steelwork shall be such as to provide a robust and rigid structure requiring the minimum of maintenance and providing a long service life.

3.2. In the design of steel structures, due cognizance shall be taken of environmental and wind load conditions as specified in the main specification.

3.3. Due to the highly corrosive conditions experienced by Transnet National Ports Authority, the permissible stresses shall not exceed those set out in British Standard No. 2573. The minimum thickness of steel for load bearing members shall be 15mm for gussets, 10mm for angles, tees, plates and flats and 9mm for webs of channels and joists. Punching of holes over and above that permitted in BS 2573, shall not be permitted. Other structural steel shall be of not less than 6 mm thickness.

3.4. No site welding will be permitted in final erection of steelwork at the Port, without the approval of TNPA.

3.4.1. The members must be structural sections manufactured from grade S355JR, weldable structural steel complying with BS4360/SABS1431.

3.4.1.1. Ultimate Tensile Strength of grade S355JR: **450MPa**
3.4.1.2. Minimum Yield Strength of grade S355JR: **355MPa**

3.4.2. All joints must be completely seal welded in accordance with BS 5135. Special care must be taken to prevent the ingress of moisture into hollow section members by ensuring that each member is airtight.

3.4.3. Bolted or screwed attachments which require drilled holes through a hollow section will not be permitted.

3.4.4. Non-hollow structural sections and plate used on the structure, in conjunction with the hollow section framework, must comply with the relevant requirements of this specification.

3.5. All steel sections shall be manufactured in accordance with the following standards:

Weldable structural steel:	BS 4360/SABS 1431
I and H sections:	BS 4 Part 1
Metric channels:	DIN 1026
Structural Steel, hot rolled sections:	BS 4 Part 1
Angles:	ISO - R657
Hot finished hollow sections:	BS 4848 Part 2
Structural Steel, Cold formed sections:	BS 6363
Forgings:	BS 29
Steel Castings:	BS 3100
Cast Iron:	BS 1452

3.6. All steel plates and rolled steel sections used in the construction of the structures shall be of steel made by the open-hearth process (acid or basic) and shall comply in every respect with BS 4360, "A" quality Structural Steel for Bridges and General Building Construction, Grade 43A or Grade 50B. That is, the percentage of phosphorous and sulphur shall not exceed 0,06.

3.6.1. The above is laid down as a standard, but tenders will also be considered for rolled steel not conforming strictly to the above standard. Full particulars of the guaranteed properties of the steel tendered for should in this case be furnished, i.e. chemical composition, tensile strength, yield point, reduction in area, bend tests, etc.

3.7. Forgings and drop forgings shall be free from flaws and surface defects of any kind and be accurately finished to the prescribed dimensions.

3.8. Steel castings shall be sound, clean and free from all defects and distortion of any kind and should, except where otherwise specified, conform with the conditions and tests specified in B.S. No. 3100/Latest Edition, for grades A, B and C according to

requirements. They shall be thoroughly annealed and all working parts and bearing surfaces shall be machined and turned accurately with correct finish.

3.9. Cast iron used throughout must be close grained, tough and free from all defects, and shall conform with the conditions and tests specified in B.S. 1452/Latest Edition, for grades 12 to 14 according to requirements. This applies to functional components only. A lower grade is acceptable for portal and machinery house ballast. Tenderers to state grade of cast iron proposed.

3.10. The dimensional and out-of-square tolerance as specified in the above Standards shall also apply to built-up components. Edge preparations, welding techniques, straight beds and material fit-up shall be considered when welded joints are designed.

3.11. The shape of all members and connections must allow easy accessibility for maintenance painting of all surfaces. No members shall comprise a double member which cannot be painted and maintained.

3.12. Structural details must be so designed as to eliminate or seal off any cavities or pockets where water or condensation could collect and promote corrosion. Horizontal members with upstanding flanges require special drainage.

3.13. All hollow sections shall be completely closed and airtight, and all welding is to be of such size and quality as to ensure complete airtightness. No tapping or drilling of holes into sealed sections will be permitted.

4. WELDING

4.1. All the provisions of BS 5135 shall be complied with as far as applicable.

4.2. Design of weld joints shall be such that crevices, overlaps, pockets, arc strikes, and dead ends do not exist.

4.3. All joints shall be completely seal welded in accordance with BS 5135. Special care must be taken to prevent the ingress of moisture into the tubular members by ensuring that each such tubular member is airtight. "Stitch" welding will not be permitted. Only continuous welding will be accepted.

4.4. Weld cracks, undercut, or pock marks will not be accepted.

4.5. All welds on the load bearing frame structure, containers, piping, pipeline flanges, etc., shall be continuous and shall be visually inspected for cracks and other discontinuities.

4.6. Welds on the main chords must be tested ultrasonically in accordance with BS 3923 or X-rayed in accordance with BS 2600 and those on minor joints by the dye-penetrant method. The equipment required for these tests must be supplied by the Contractor and the testing done at his cost.

4.7. Steel, except in minor details, which has been partially heated, shall be properly annealed. (Electrically welded structural members excepted.)

4.8. All brackets, clamps, lugs, straps, suspenders, etc. required for attaching mechanical and electrical equipment must be welded on prior to erection and special precautions must be taken not to damage welds or puncture tubes during erection.

4.9. The welding of all rails shall be done by an approved method.

4.10. Welding shall only be carried out by a coded welder according to SABS 044, BS-EN 287 Part 1 and BS-EN 288 Part 3 or ANSI/AWS D1.1.

4.11. All parts to be welded shall be thoroughly cleaned and dried before welding. The welding will only be done in dry surroundings and all steps taken to prevent hydrogen embrittlement.

4.12. Where materials of different compositions are joined by welding, especially carbon steel to chrome steel, the filler welding method and post welding treatment shall be such that embrittlement and other degradation of both steel and filler are prevented.

4.13. It must be ensured that welded joints are ductile.

5. FASTENERS

5.1. All bolts and nuts shall be manufactured in accordance with the following standards:

Commercial bolts and nuts Grade 8.8:	SABS 135
Precision bolts and nuts Grade 8.8:	SABS 136
Friction Grip bolts and nuts Grade General:	SABS 094

5.2. All fasteners (excluding friction grip) shall be hot dipped galvanised (and their nuts and washers), structural rivets and Huck Bolts.

5.2.1. All holding down bolts and nuts and brackets, as well as all fixing bolts, washers, studs and nuts, less than 12mm diameter shall be of stainless steel.

5.3. Bolts and setscrews shall be locked in an approved manner and shall not be stressed in tightening to beyond the recommended loads.

5.4. The quality of friction grip bolts, nuts and washers, bolt lengths, sizes of holes, tightening standards, surface condition of clamped components, shop and site assembling, and acceptance inspection of friction grip joints shall comply with the latest edition of SABS 094. Certificates shall be supplied for all bolts of grade 8.8 and 10.9.

5.5. All bolt and rivet holes must be accurate to size and location, the centers of holes shall not be placed nearer the edge of a plate than 1,5 diameters with an extra allowance of 3mm for sheared edges. All holes in the structural work shall be drilled or otherwise

punched to a diameter not exceeding 1,5mm less than the diameter of the finished hole, and afterward reamed out to the exact size.
Where possible the adjoining parts forming a connection shall be drilled or reamed together, with holes not exceeding 1,5 mm diameter the rivet or bolt for which it is made. No rough or broken edge shall be left around any of the holes.

5.6. For turned and fitted bolts, the holes shall be accurately drilled or reamed, the diameter of the hole shall not exceed the finished diameter of the bolt by more than 0,25mm.

5.7. The holes, after assembly of the parts, shall be true throughout the thickness of all the parts and perpendicular to the axis of the member.

5.8. Rivets shall be cup-headed or countersunk as required, unless otherwise specified.

5.9. All field rivets must be supplied with shanks of suitable length for pneumatic riveting.

5.10. Bolts shall be of such length as to accommodate a full nut and washer when tightening up and protrude a maximum of 3 thread pitches beyond the nut. Excessive projection of threads beyond the nut must be avoided. Bolts that are flush or under top of nut are not acceptable.

5.11. All bolts having countersunk heads shall have strong feathers forged on the neck and head to prevent turning and the bolt holes shall be cut to receive same. All nuts and bolts (excluding countersunk bolts) shall be furnished with circular washers of sufficient thickness, the outside diameter being at least twice the nominal diameter of the bolt, and washers fitted correctly.

5.12. Where bolt heads or nuts are seated on beveled surfaces of beams or channel flanges, beveled washers must be inserted.

6. JOINTS AND MATING SURFACES OF MEMBERS

6.1. Mating surfaces of members to be joined by high tensile steel bolts in friction grip shall be cleaned and primed as specified for the rest of the steelwork. Mating surfaces shall lay flat against each other to eliminate gaps which may allow ingress of water. After joining, the edges shall be sealed with an approved brand of Butyl/ Rubber sealing compound by means of a suitable caulking gun or shall be seal welded.

6.2. Other joints shall be formed by one of the following methods:

6.2.1. The mating surfaces of members shall be blast cleaned, primed and protected prior to sub-assembly by the liberal application of caulking compound. While the compound is still wet, the members shall be bolted together and caulking compound which is squeezed out shall be completely removed.

6.2.2. The mating surfaces shall be protected with the full corrosion protection system as specified, the surfaces joined together and the joint so formed shall be sealed with butyl rubber sealer.

6.2.3. After being cleaned and primed the surface shall be joined together and the joint so formed shall be seal welded.

7. FABRICATED PARTS

7.1. All fabricated parts shall be properly fitted during assembly to result in properly aligned equipment having a neat appearance. Fabrications of load bearing members shall have no abrupt changes in cross section and regions of severe stress concentration. All sharp corners accessible by personnel during erection or operation shall be ground, rounded, or removed by other methods. Burrs, welding spatter and stubs of welding wire shall be removed.

8. LADDERS, HANDRAILS, AND PLATFORMS

8.1. Ladders, handrails, platforms, and hatches shall be provided where necessary to give easy access to all parts of the quaywall, for inspection and maintenance purposes.

8.1.1. The handrails and ladders shall be complete with stanchions, knee rails, back hoops, mounting brackets etc. and shall be manufactured in sections which are hot-dipped galvanized, painted, and bolted onto the structure.

8.2. The handrail shall have a minimum diameter of 40mm and shall not be more than 500 mm above the LWOST (CD).

8.3. Ladders shall not be less than 400 mm wide. Ladders must be provided with back hoops.

8.4. Trap doors and hatches must be of light, but robust, construction, suitably hinged with stainless steel hinges and provided with a catch to keep them in the open position, if necessary. Trap door openings are to be protected by means of toe boards and removable handrails.

8.5. No obstructions or sudden changes in levels will be permitted on ladders.

Note: In all cases check against online version for the latest revision prior to use

PORT OF EAST LONDON

Deepening and Strengthening N-berth

ANNEXURE A4 – DOWELLING/ANCHORAGE SPECIFICATION

TABLE OF CONTENTS

1. SCOPE

This specification covers the requirements for the dowelling and anchorage of rebar and threaded bar as part of the Contract: Part-C3 for the Deepening and Strengthening of N–berth project at the Port of East London.

The Contractor shall furnish all labour, materials, tools, supervision, transportations, installation, testing, and equipment necessary to complete the Works specified herein and shown on the Contract drawings. The Works shall include but not limited to mobilisation, surveying, drilling, inserting, grouting, and load testing of anchor bars at the appropriate locations.

Unless otherwise directed, the Contractor shall select the drilling method, grouting method, grout pressures, and subject to minimum values in the contract document. The Contractor shall be responsible for installing the anchor bars that will develop the necessary load-capacity indicated on the Contract drawings in accordance with the testing subsection of this specification.

The anchor bars shall be protected from corrosion as shown on the Contract drawings and in accordance with the requirement of this specification.

2. GOVERNING CODES AND STANDARDS

SANS 1200 H	Structural Steelwork
SANS 10162- 1:	The Structural use of steel
IS: 4000: 1992:	Code of practice for high strength bolts in steel structures
EN 1993-1-1:	Design of Steel Structures: General rules and rules for buildings

3. DOWELLING/ANCHORAGE SPECIFICATIONS

3.1. Preparation of contact surfaces

Concrete contact surfaces shall be prepared by removing all surface laitance and damaged, loose and soft concrete, concrete containing aggressive ions, e.g., chloride, as well as cleaning the surfaces of all foreign adherents and impregnates such as oil, paint, grease, curing compounds, dirt, etc. The contact surface shall be treated to expose the sound substrate by means of chiselling, grit blasting or high-pressure water-jetting.

The mechanically prepared surfaces shall be finally cleaned of loose dirt and dust by means of oil-free compressed air, water-jetting or vacuum cleaning, as appropriate.

3.2. Properties of Anchor Bars

The Contractor shall supply high tensile reinforcing bars in accordance with BS 4486: High Tensile Steel Bars for Prestressing of Concrete or similar approved international standard and shall have the following minimum properties:

- Diameter: 32 mm
- Cross sectional Area: 804.3 mm^2
- Ultimate Tensile Strength: 500 MPa
- Minimum Yield Strength: 420 MPa

The Contractor supply high tensile threaded bars/rods complete with hexagonal nuts and plates in accordance with BS 4486: High Tensile Steel Bars for Prestressing of Concrete or similar approved international standard and shall have the following minimum properties:

- Diameter: 32 mm
- Cross sectional Area: 807 mm^2
- Ultimate Tensile Strength: 1040 MPa
- Minimum Yield Strength: 950 MPa

3.3. Drilling and Anchoring

Holes shall be drilled using approved mechanical equipment. The size of a drilled hole is dependent on the type of grout to be used, and as a guideline the following sizes are recommended as a minimum, based on the dowel or anchor bar diameter, D.

Table 1: Dimensions of drill holes

Grout type	Diameter of hole	Minimum depth of hole	Direction and Inclination
Cementitious	1,5 to 2,0.D	15.D	As detailed on drawings
Epoxy resin	1,3 to 1,5.D	15.D	

The diameter, depth, direction and inclination of the holes required shall be as shown on the detail drawings, but shall not be less than the dimensions scheduled in Table 1.

The Contractor shall install the rebars and must be anchored into the original gravity quaywall by at least 40xD. The installation of the rebars shall be in accordance with the manufacturer's specification and recommended installation-method. The Contractor shall make use of spacers/centralisers to ensure that the grout cover is uniform around the threaded bars.

3.4. Corrosion Protection

The rebars need to be thoroughly protected due to high aggressive nature of coastal weather conditions on steel. The threaded bars shall be double corrosion protected as per the detail shown on the Contract drawings. The Contractor shall supply corrugated high density polypropylene sheathing with a minimum wall thickness of 1mm. The corrosion protection sleeve shall extend by 75mm into the concrete base. The epoxy or grout applied to the annulus between the tie bar and the corrugated sheath shall be applied under factory conditions.

3.5. Performance Testing

The Employer shall randomly select 5 anchored rebars and 5 threaded bars for performance testing at 200 kN each. The test results shall be recorded and submitted to the Employer for acceptance.

Any bar that does not satisfy the acceptance criteria shall be rejected by the Employer. The Contractor shall replace it at no additional cost to the Employer. The Contractor shall submit to the Employer, after completion of the works, a report containing:

- Prestressing steel manufacturer's mill test report for the rebars incorporated in the installation,
- Grouting records indicating cement type, quantity injected, and the grout pressures, and
- Performance test results and graphs

4. GROUT SPECIFICATION

The grout used for bonding anchors (injection type) should consist of an injection mortar using an applicator equipped with a special mixing nozzle. The steel element used for dowelling will be Ø32 mm rebar and Ø32 mm threaded bar.

The steel element is placed into a drilled hole previously injected (using appropriate applicator equipment) with a mortar with a slow and slight twisting motion. The bar (dowel) is anchored by the bond formed between the steel element and the concrete. Keep visible, exposed grout surfaces as small as possible and protect from premature drying out by suitable measures (keep moist, cover with wet Hessian, etc.)

Application/Uses of grouting product:
- As a fluid grout on concrete, stone, mortar, steel, iron etc.
- To grout bearings, machine foundations, columns, etc.
- To grout anchors in concrete
- To grout cavities, gaps, and voids in concrete

Characteristics/Advantages of grouting product:
- Easy to use
- Adjustable consistency
- Very good flow characteristics (seepage)
- Rapid strength development
- High final strengths
- Expands by gas generation whilst in the plastic state of curing
- Non-corrosive
- Shrinkage compensated

Anticipated strengths are as follows:

1 day	**7 days**	**28 days**
30 MPa	55 MPa	60 MPa

4.1. Formwork

Temporary formwork to place and contain the fluid grout may be required. Reference shall be made to the manufacturer's recommendations regarding flow distance based on the gap width and the fluid head at the pouring side. The unrestrained or exposed surface area of the grout shall not extend more than 50 mm beyond the perimeter of the smaller contact surface. The formwork shall be constructed to be leakproof to prevent wastage and loss of material.

5. EXECUTION METHODOLOGY

5.1. Step 1:

Drill hole to the required diameter and depth using a rotary percussive machine

5.2. Step 2: Hole cleaning

a. Clean the hole with brush and hand pump:

b. Clean the hole with compressed air

5.3. Step 3:

Insert corrosion protect and corrugated sleeve as per the contract drawings

5.4. Step 4:

Insert grout into appropriate dispener/equipment and attach appropriate nozzle or application. Dispense to waste until even colour is obtained.

5.5. Step 5:

Insert the mixing nozzle to the far nd of the hole and inject grout/resin, slowly withdrawing the nozzle as the hole is filled to 2/3 of its depth.

5.6. Step 6:

Immediately inset the rebar, slowly and with a slight twisting motion. Remove any excess resin around the hole before it sets.

5.7. Step 7:

Leave the fixing undisturbed until the curing time elapses.

5.8. Step 8:

Attach fixtures and ensure required bond specifications have been reached.

6. HEALTH AND SAFETY

Cement containing material may cause skin irritation. Wear gloves and goggles or apply barrier cream to hands while working with the mortar.
Residues of material must be removed according to local regulations. Fully cured material can be disposed of as household waste under agreement with the responsible local authorities.

Detailed health and safety information as well as detailed precautionary measures e.g. physical, toxicological and ecological data can be obtained from the Material Safety Data Sheet.

TRANSNET

GENERAL QUALITY REQUIREMENTS FOR CONTRACTORS AND SUPPLIERS

QAL-STD-0001

Document Number	QAL-STD-0001
Version Number	01
Review Date	15 March 2023

SUMMARY VERSION CONTROL

VERSION NO.	NATURE OF AMENDMENT	PAGE NO.	DATE REVISED
0	New Document		11/08/2020
1	Updating requirements		15/03/2023

Note: Only the latest amendments and/or additions are reflected in italics in the body of the document.

TRANSNET

Table of Contents

1. Purpose

This Specification outlines the minimum requirements to ensure that products and services supplied to TRANSNET are manufactured, provided, constructed or installed in accordance with all specified requirements as defined in the Contract, all associated specifications, drawings, codes and standards.

2. Definitions / Abbreviations

Term, Abbreviation	Meaning
Contract:	Formal document evidencing agreement between *Employer* and *Contractor* for supply of on site or off site services (generic term used for Purchase Orders, Contracts and Service Orders in this Standard).
Contractor:	The party to a *contract* that provides services to the *Employer* (generic term used for Vendors, Suppliers, Contractors, Consultants, etc.).
Contractor Documentation Schedule (CDS)	A schedule specifying the *Employer's* requirements for the document types to be submitted by the *Contractor* at various stages of the *Contract* and the timing of the submissions.
Data:	All drawings/documents/data/information/DPs and IOMs required to be supplied under the *Contract*.
Data Pack (DP):	A compilation of manufacturing data, certification, inspection and testing records prepared by the *Contractor* to verify compliance with the Contractual requirements.
Employer:	The party to a *Contract* or Purchase Order to whom the goods are supplied or for whom the work or services are performed. In the context of this document, Transnet Capital Projects is the *Employer*.
Field Inspection Checklist (FIC):	A document that details the checks, requirements and test parameters for each type of equipment to permit field installation and pre-commissioning of the equipment
Inspection Release Report (IRR):	A document issued to the *Contractor* by TRANSNET advising release of materials for shipment. This does not relieve the *Contractor* of its

Term, Abbreviation	Meaning
	obligations in accordance with the Terms and Conditions of the *Contract*.
Inspection Waiver Report (IWR):	A document issued to the *Contractor* by TRANSNET advising that TRANSNET has waived final inspection for the materials listed in this document. The issue of this report does not preclude further inspections by TRANSNET. It is issued without prejudice and does not relieve the *Contractor* from the guarantees and obligations included in the *Contract*.
Installation and Operating Manual (IOM):	A document prepared by the *Contractor* providing relevant information applicable to the installation and maintenance of the specific equipment, including data relating to consumables (e.g., Oils, etc.)
Non Conformance (NC)	Material, product or workmanship which is not in accordance with the requirements of the *Contract.*
Non-Conformance Report (NCR):	A document initiated by either TRANSNET or the *Contractor* advising that certain materials/products/workmanship provided by the *Contractor* do not conform to the required standards and specifications.
Project Quality Plan (PQP):	A document that outlines the *Contractor's* strategy, methodology, resources allocation, Quality Assurance and Quality Control coordination activities to ensure that Goods and Services supplied meet or exceed the requirements defined in the *Contract* drawings, codes and standards.
Quality Assurance (QA):	A formal methodology designed to assess the quality of products or services provided.
Quality Control (QC):	A set of activities intended to ensure that quality requirements are actually being met.

Term, Abbreviation	Meaning
Quality Control Plan (QCP):	A document outlining specific manufacturing/construction inspection and testing requirements, including responsibilities, test acceptance criteria, nomination of witness and hold points.
Technical Query Note (TQN):	A document used by the *Contractor* to formally clarify a Technical Query related to the scope of supply. This should not be used where a Non-Conformance Report has already been initiated.
TRANSNET:	Transnet SOE Limited
Works Information:	Refers to the *Works Information* as defined in the *Contract*

3. Applicable Documents

3.1 General

All work performed shall comply with the requirements of this Specification, the documentation referenced in the *Contract* and the latest revision/edition of the relevant Codes and Standards referenced herein.

3.2 Statutory Regulations

Occupational Health & Safety Act, Act No 85, of 1993 and Regulations as amended.

3.3 Codes and Standards

Document No.	Title
ISO 9001: 2015	International Standard Series Quality Systems

4. Quality System

4.1 General

The Contractor is responsible for all quality activities necessary to ensure the Work meets the requirements specified in the Contract, and shall manage and coordinate all Quality aspects of the Work in accordance with the requirements of this Specification, together with the Contractor's PQP and QCPs once reviewed and accepted by TRANSNET.

4.2 Contractor Quality System Requirements

The *Contractor* shall have and maintain a documented Quality Management System. The *Contractor* may be required to demonstrate its use to TRANSNET. The *Contractor's* Quality Management System should be in accordance with the requirements of International Standard ISO 9001:2015.

4.3 Kick Off Meeting

After the *Contract* start date, and prior to manufacture or construction activities, TRANSNET will require a Kick-Off Meeting with the *Contractor* to discuss fully the implications of meeting TRANSNET's quality requirements. This meeting may be held as part of the *Contract* kick-off meeting for each package or may be a separate meeting, subject to the critical or complex nature of the work. This requirement for a pre-inspection meeting may be repeated when Sub-Contractors of key equipment are engaged.

4.4 Contractor */ Supplier* Documentation Submittal Requirements

The *Contractor* will make formal submission of this Quality Documentation on award of the *Contract* and at the times defined in the *Contractor's* Documentation Schedule, included in the *Works Information* for the *Contract*.

The Contractor's responsibilities are defined in terms of *DOC-STD-0001* which outlines the standard requirements for preparation, submission, receipt, review, and collection of Technical and (or) Deliverable Documentation, as detailed in the Contractor Documentation Schedule (CDS).

TRANSNET uses the *Contractor's* Documentation Schedule (CDS), included in the *Works Information* for the *Contract*, to indicate those documents required to be submitted for information/review and/or acceptance.

The *Contractor* develops and maintains a comprehensive register of documents (*Contractor's* Documentation Register – CDR) that will be generated throughout the project. The CDR includes all quality related documents. The CDR is a 'live' document and I s submitted to TRANSNET for review following each revision by the *Contractor*. The CDR indicates the dates of issue of the documents taking into account sufficient time to allow for the TRANSNET review/acceptance cycle prior to the document being required for use.

TRANSNET includes a standard template for the CDR (DOC-FAT-0002) in the Starter Pack issued to the *Contractor* at the start of every *contract.*

4.5 Project Quality Plan

Where specified, the *Contractor* submits a PQP to TRANSNET within the period stated in the CDS and in any event not later than 28 days after the *Contract* start date. The PQP details how the *Contractor's* Quality System will be applied to the Scope of Work specified in the *Contract*, and shall address the following:

- Satisfying the technical and quality requirements of the Contractor's Scope of Work, and relevant elements of the applicable ISO 9001 standard
- Include all quality activities relevant to the Scope of Work, identifying all procedures, reviews, audits, controls and records used to control and verify compliance with the specified Contractual requirements.
- Include a listing of all special processes (e.g. welding and non-destructive testing, cube testing etc.) envisaged for use, including confirmation of personnel certification as required.
- Include all proposed method statements (for site based work activities).
- Include a description of the Contractor's project organisation, with key positions and responsibilities identified and individuals named. The organisation structure shall also indicate the resources committed to the management and coordination of QA / QC activities.
- Include a listing of all Quality Control Plans (QCPs), and associated Field Inspection Checklists (FICs), as applicable.
- Identify in the PQP any Sub-Contractor/Sub-Supplier work. Sub-Contractor/Sub-Supplier plans are approved by the Contractor, and a copy forwarded to TRANSNET for information.
- Include the proposed Authorised Inspection Authority (where applicable - for pressurised equipment and systems).
- Include proposed quality records.

The PQP shall be controlled and re-submitted for approval when required to incorporate any change necessary during the *Contract* duration to ensure that the document is maintained as an effective control, change management and records. The change management will be done to an agreed policy or procedure.

Note: Where the *Contractor* is required to provide a PQP, no work shall commence until the PQP is accepted by TRANSNET.

4.6 Procedures

The *Contractor's* PQP and procedures shall address the system elements and activities appropriate to the Scope of Work, in compliance with the specified Quality Standard.

Where specified, the *Contractor* submits copies of Quality Procedures for review. In addition, the *Contractor* ensures that copies of all Procedures relevant to the Scope of Work are available for reference by TRANSNET at each work location.

These will include, as applicable, the following:

4.6.1 Document Control

The *Contractor's* PQP shall provide a description of how documents provided by TRANSNET to the *Contractor* are to be managed. The description shall address as a minimum:

- Management tools and databases
- Receipt, registration and maintenance
- Internal and external distribution to Employer, third parties and Sub-Contractors
- Management of Codes, Standards and Specifications
- Internal review and approval routines and authorities
- How it is ensured that the correct revisions of documents are available at the point of use including retention periods for all documentation

4.6.2 Design Control

Where the *Contractor* is responsible for any aspect of design related to the Scope of Work, the Quality Plan shall describe the *Contractor's* methods and procedures for the control of these design activities.

4.6.3 Procurement

Where the *Contractor* is responsible for any aspect of procurement related to the Scope of Work, the Quality Plan shall describe the *Contractor's* methods and procedures for the control of these activities.

5. Quality Audits

5.1 Contractor Audits

The *Contractor* shall:

- Carry out audits in accordance with its Quality System at its own and Sub-Contractor's facilities to ensure project quality requirements are being achieved.
- Include a QA Audit Schedule in the *Contractor* PQP submitted to TRANSNET prior to commencement of the Scope of Work. The Audit Schedule shall include all audits to be implemented by the *Contractor* and Sub-Contractor during the execution of the *Contract*.
- Where stipulated in the *Contract*, perform an audit within three months after the *Contract* start date and thereafter at a minimum frequency of three months. Audit reports are submitted to TRANSNET at the completion of each Audit. Where unsatisfactory performance is evident, TRANSNET will direct the *Contractor* to perform additional audits.

5.2 Transnet Audit

Upon the appointment of the Contractor, the project Quality Officer will schedule and conduct the QMS Audit at the contractor's head office to assess the *Contractor's* ISO 9001 QMS status.

TRANSNET reserves the right to perform quality audits or participate as an observer in *Contractor* audits to verify compliance with the Contractual requirements. The *Contractor* shall within a time frame as agreed upon, correct any adverse audit finding advised by TRANSNET.

The *Employer* may, at own discretion, require a Quality Audit of sub-contractor(s) to ensure that the sub-Contractor(s) have the necessary management, facilities, skilled staff, and quality control facilities to carry out the Works to ensure compliance with the Works Information.

6. Quality Control Plans

6.1 Quality Control Plans

The *Contractor* prepares and submits QCPs to TRANSNET for review in accordance with the requirements of the Contract and PQP.

QCPs must clearly identify all inspection, test and verification requirements to meet the Contractual obligations, specifications, drawings and related details including destructive and non-destructive testing, witness and hold points.

The *Contractor* shall NOT commence fabrication or manufacture prior to review and approval of the applicable QCP by TRANSNET.

QCPs shall include reference to all tests specified in the *Works Information*.

A typical format for a QCP is shown in Appendix 1. The *Contractor* may use its own format providing all information shown in the sample in Appendix 1 is included.

6.2 Intervention Points

The QCP identifies points in the fabrication, manufacturing and/or installation process that are selected for inspection. These points are denoted by the following inspection codes:

- **Hold Point (H)** Inspection points in the manufacturing cycle, beyond which work shall not proceed without the specified activity, work or function being witnessed. Hold points require written notification to TRANSNET.
- **Witness Point (W)** An inspection point in the manufacturing cycle that will be witnessed or verified. If TRANSNET confirms it is unable to attend after being provided with the written notification, then manufacture may proceed. Witness points require written notification to TRANSNET.
- **Review Point (R)** A point at which products and quality records are verified and endorsed. Review points are not points that require notification to TRANSNET.
- **Surveillance (S)** An inspection point in the manufacturing cycle during which any activity, work or function is observed. No formal notification is required.

6.3 Field Inspection Checklists

For site installation and construction activities, the *Contractor* prepares Field Inspection Checklists (FICs) to permit inspection and testing of installed equipment and constructed facilities in accordance with the respective QCPs.

FICs are used to record the results of inspection and testing (where applicable). On completion, FICs are submitted to TRANSNET to confirm satisfactory completion of the tests and inspections at nominated QCP witness and hold points.

7. Inspection and Testing

7.1 General

Inspection means all activities such as measuring, examining, testing, gauging one or more characteristics of material or service and comparing these with specified requirements to determine conformity.

TRANSNET may, at its discretion, perform surveillance inspection at the *Contractor's* premises, the premises of any Sub-Contractor or at the location of the Scope of Work.

Dependent on the nature of the Scope of Work and the frequency of inspections, TRANSNET may elect to have inspection personnel resident at the place of manufacture, fabrication, or assembly.

The *Contractor* ensures free entry and access is given to TRANSNET, certifying authorities and statutory authorities to inspect the Scope of Work and review procedures and quality records at all parts of the *Contractor's* and Sub-Contractor's premises, or at the location of the Scope of Work while any work or test is in progress.

The *Contractor* provides TRANSNET with all necessary tools, calibrated measuring equipment, safety equipment and workspace to verify or witness tests in progress.

While TRANSNET is at the *Contractor's* premises, the *Contractor* provides, free of charge, reasonable facilities including office facilities and reasonable access to a telephone, facsimile machine and computer connection point.

The *Contractor* provides written notice within a time frame as agreed upon, to allow the attendance of TRANSNET and other representatives at nominated witness and hold points.

7.2 Schedule of Inspection

The *Contractor* shall submit a Schedule showing the proposed dates for inspections and tests nominated in the QCP where witness and hold points are required. The Schedule shall be regularly updated with progress and issued to TRANSNET to show the current inspection and test status.

7.3 Contractor's Inspection

The Contractor shall as a minimum, carry out the inspections as detailed in the Quality Control Plan and maintain the required records for verification by the Employer and/or Third-Party Inspection Authority.

For sub-contracted material or services, the Contractor shall ensure that controls are effective, including, where necessary, monitoring at the Subcontractor's works and retention of the necessary records.

Signing-off of the Quality Control Plan progressively by all relevant parties is a mandatory requirement following the indicated inspection activity.

7.4 Readiness for Inspection

Material or services shall be deemed ready for inspection by the Employer and/or Project Manager only when:

- The Contractor has firstly carried out his own inspection at the stage identified on the relevant Quality Control Plan and is satisfied that material, workmanship and services meet the specified requirements. Documented evidence shall be maintained by the Contractor including signing-off the Quality Control Plan.
- The Contractor shall ensure that the latest revisions of approved drawings and/or procedures with evidence of acceptance by Transnet, his nominated representative or Third-Party Inspection Authority are available.

7.5 Inspection Notification

The *Contractor* notifies TRANSNET in writing for inspections or tests within the country, arrangements are confirmed at least two working days before the event. For inspection and tests outside of the country, arrangements are confirmed at least seven working days before the event.

Inspection notifications include the following essential information:

- Contract Number
- Location of Inspection or Test
- Nature of Inspection or Test
- Date and Time of Inspection or Test
- Name and telephone number of the *Contractor's* Representative.

7.6 Cancellation of Inspection

Contractors are advised that it is a condition of Purchase / Contract that all costs of Employer's representative and/or Third-Party Inspection Authority will be passed on to the Contractor for cancellation of inspection visits.

A visit is considered cancelled if:

- The Contractor advises "readiness" for inspection and upon arrival of Employer's representative or Third-Party Inspection Authority, the material, or Services and/or the associated documentation is not ready; or
- If Employer's personnel identify that material or services are to specification such that the Contractor's Inspector should have identified the non-conformity prior advising readiness for Employer's or Third-Party Inspection Authority inspection.

7.7 Inspection Waiver

Any Employer's Witness, or review or Hold point may, at the sole discretion of Employer, be waived, which will be followed by an inspection waiver report.

8. Fabrication Process and Factory Acceptance Test

8.1 Fabrication Process

It is the *Contractor's* responsibility to ensure that all processes which require prequalified procedures and/or work methods are tested and qualified before work begins at the manufacture's premises. This typically covers such activities as welding, non-destructive testing, special fabrication techniques and painting. When such procedures are requested, no work shall commence at the manufacture's premises until procedures are approved by TRANSNET.

It is the *Contractor's* responsibility to ensure all operators are qualified for the processes in accordance with the procedure and/or applicable standards. Records of qualification of operators shall be maintained by the *Contractor* and made available to TRANSNET when requested.

Records of qualification of procedures and processes shall be maintained by the *Contractor* in accordance with the applicable procedure or code.

The Employer's representatives are also required to do inspections during fabrication to ensure that the fabrication process is in accordance with the designs, specifications, and standards to ensure the work meets the requirements specified in the Contract.

8.1.1 Welding Procedures

Where the *Contractor's* Scope of Work includes fabricated weldments, Welding Procedure Specifications (WPS) defining the method, preparation and sequences to be adopted to

achieve a satisfactory welded joint shall be provided for all weld types required in the execution of the *Contractor's* Scope of Work. The procedure shall only be submitted to TRANSNET when requested in the *Contract*.

WPS include all welding essential and non-essential variables for each process used, including appropriate test results. WPS comply fully with the standard or code pertaining to welding required in the execution of the *Contractor's* Scope of Work.

When requested in the *Contract*, a suitably marked "weld map" is completed by the *Contractor* for all items to be fabricated. A summary of WPS is prepared and, when used, is identified on the weld map.

Where TRANSNET approval is required, fabrication is not to commence until written approval of WPS and Welding Procedure Qualification Records (WPQR) is received by the *Contractor*. No welding fabrication will be accepted that is not covered by a TRANSNET approved WPS/WPQR.

Welding Procedure Qualification (WPQ) tests may be witnessed by TRANSNET and/or an independent inspection authority. Testing of the specimens prepared during the WPQ Tests is carried out by an approved testing laboratory, independent of both TRANSNET and the *Contractor*. In certain instances, a certificate to EN 10204 3.1 B may be required which will be clarified at Tender review and clarification stage.

Where actual weld deposit analysis and weld metal physical properties are required for procedure qualification, the information is taken from the procedure qualification tests. Data listed in the catalogues of the manufacturer of welding consumables is not acceptable.

Welders/welding operators are qualified in accordance with the relevant welding code prior to commencing production fabrication. Specific Welder Qualification (WQ) records will be reviewed by TRANSNET in the *Contractor's* works and should NOT be submitted for review.

A register of welders qualified to work shall be maintained by the *Contractor*.

8.1.2 **Material Traceability**

Where, and to the extent that material traceability is required, the *Contractor* shall provide its procedures for the maintenance of material identification throughout all phases of manufacture. Methods of identification, routines for re-stamping or stencilling as appropriate shall be defined and agreed with the *Employer*.

Adequate records shall be maintained throughout construction enabling traceability of key materials from final product back to original material certificates. The material traceability records shall form part of the DP

The *Contractor* shall prepare a schedule of materials and equipment that are subject to traceability requirements.

8.1.3 **Material Certification**

Where specified in the Contract the following certificates shall be provided to TRANSNET and included in the DP.

Type A: A *Contractor's* certificate of compliance with the *Contract*. This certifies that the goods or services are supplied in compliance with the *Contract* without mention of any test results (EN10204 certificate 2.1).

Type B: A certificate issued by a laboratory or test facility independent of the *Contractor's* works. It shall quote test results carried out on the product supplied and state whether compliance with the relevant technical standard, code, etc., has been complied with. (EN10204 certificate 3.1B).

Type C: The same as Type B, the tests are to be witnessed by a third party (EN10204 certificate 3.1C).

8.2 **Factory Acceptance Test**

The factory acceptance test (FAT) is a process that evaluates the equipment during and after the assembly process by verifying that it is built and operating in accordance with design specifications.

The Contractor shall conduct a Factory Acceptance Test for all Plant's to be installed as part of the Works to be executed in this Contract prior to delivery to site. The Factory Acceptance Test shall be conducted in the presence of the Employer's representatives (Quality, Engineering and/or the Third-Party Inspection Authority).

8.3 **Inspection Release**

At completion of the Scope of Work, either in total or in phases, TRANSNET may issue an Inspection Release Report (IRR) or an Inspection Waiver Report (IWR).

The issue of either an inspection release or waiver of inspection does not relieve the *Contractor* of its obligations under the *Contract*. The *Contractor* ensures that a copy of the

release note and final expediting release note for transport, where appropriate, is attached to the delivery docket and accompanies the Work to the designated destination indicated in the *Contract.* Items delivered to TRANSNET without a copy of these documents may not be accepted.

A copy of the inspection release or waiver of inspection is included in the DP.

9. Non-Conforming Products

9.1 General

The *Contractor* shall establish and maintain procedures to control material or products that do not meet the specified requirements.

All *Contractor* product and/or materials identified as not conforming to requirements shall be dealt with promptly as follows:

- If the *Contractor* discovers material or product which is not in accordance with the requirements of the *Contract*, i.e. a non-conformance, the *Contractor* shall immediately initiate the non-conformance procedure in terms of the *Contractor's* Quality Management System, advise TRANSNET promptly, and provide a copy of the non-conformance report (NCR) to TRANSNET
- If TRANSNET or its agent identifies a non-conformance, a TRANSNET NCR may be raised.

Originals of all closed out NCRs shall be included in the DP.

9.2 Defects

The project Quality officer will notify to NEC supervisor / Construction Manager of any defects observed and long them on the snag list.

9.3 Corrective and Preventative Action

If the *Contractor* proposes a disposition of any non-conforming materials or product which varies from the requirements of the Specification or *Contract*, such a proposal shall be submitted in writing to TRANSNET whose decision on the proposal shall be obtained in writing before the non-conforming material or product is covered up or incorporated into the Works, or is the subject of any other disposition.

The disposition of non-conformances which do not vary the requirements of the *Contract*, specification or drawings may be approved by the *Contractor* following discussion and agreement with TRANSNET.

10. Concession Requests and Technical Queries

10.1 Concession Requests

Where a *Contractor* requests a Concession to deviate from the requirements of the *Contract* or specified requirements, the *Contractor* raises the request with TRANSNET using the format as shown in Appendix 2.

The Concession Requests shall clearly identify all elements of the proposed deviation together with any resulting technical, commercial and/or schedule impacts.

Completed original Concession Requests shall be included in the DP.

10.2 Technical Queries

For clarification of technical issues (only), the *Contractor* may submit a Field Engineering Query (FEQ) to TRANSNET in accordance with the *Contract*.

The FEQ shall clearly identify all elements of the query, and all supporting documentation and/or drawings shall be attached where appropriate.

Completed original FEQ's shall be included in the DP.

11. Inspection, Measuring and Test Equipment

11.1 Calibration

The *Contractor*, including its Sub-Contractors/Sub-Suppliers, shall ensure the calibration of test and measuring equipment is performed and maintained in accordance with the relevant *Contractor* procedures and/or the equipment manufacturer's specifications.

Where calibration is required by an external laboratory, the *Contractor* shall ensure that the facility selected for calibration possesses current certification. Calibration certificates shall contain a statement that the test equipment is accurate to within specified tolerances.

The *Contractor* should establish the frequency of calibration for each item of equipment (including jigs, fixtures or templates) and record the details in a 'Measuring and Test Equipment Register' (or similar).

11.2 Use of Inspection, Measuring and Test Equipment

The *Contractor* shall ensure that authorised equipment users:

- Use the equipment in accordance with manufacturer's instructions, and accepted industry practices
- Ensure the equipment is covered by a current calibration certificate
- Conduct the measurements or tests in accordance with the equipment manufacturer's specifications or other relevant specification
- Prior to commencement of each inspection or test activities:
  - Identify the measurements to be made
  - Determine the accuracy required
  - Select the appropriate inspection, measuring or test equipment for the scope of work.

11.3 Verification of Previous Test Results

Where the calibration status of the equipment is unknown, expired or has doubtful accuracy, the equipment shall immediately be quarantined, and tagged according to *Contractor's* Quality System procedures. The *Contractor* shall then arrange for either in-house or external calibration, and:

- review all previous test results associated with the suspect equipment;
- identify the inspections, measurements or tests required to re-validate the results;
- ensure that suitable re-testing is performed with calibrated equipment;
- record the results of the re-testing on the respective inspection and test documentation.

12. Quality Personnel Qualifications

The Contractor shall nominate a suitably experienced Quality Officer in possession of Quality Diploma/Certificate, ISO 9001:2015 QMS Understanding and Implementation and Auditing trainings, with a minimum of 3 years' experience in similar projects.

The Contractor shall submit the CV of his nominated quality representative for the Project Manager's review and approval.

13. Quality Records

Contractors shall maintain Quality Records necessary to provide objective evidence that demonstrates and verifies achievement of the QA / QC requirements associated with the Scope of Work. All Quality Records, including original source material test certificates and non-destructive test reports, shall be retained by the *Contractor* during the project, and be provided to TRANSNET at the times, and in the quantities specified in the *Contract*.

The *Contractor* shall collate all quality records in the DP and submit the DP to TRANSNET in accordance with the *Contract* and all referenced standards and specifications. This DP shall be compiled progressively, and shall be available for review at all phases of manufacture or construction activities.

The Scope of Work shall not be complete until the *Contractor's* DP, including the quality records from Sub-Contractors/Sub-Suppliers, has been reviewed and accepted by TRANSNET.

The *Contractor* compiles the DP progressively during the execution of the Scope of Work and makes the DP available for review by TRANSNET as required.

The *Contractor* shall retain a copy of all Quality documentation generated during the *contract*, including a copy of the complete DP, for his own records for a minimum period of five years after the completion of the work.

TRANSNET NATIONAL PORT AUTHORITY

ENVIRONMENT AND SUSTAINABILITY

STANDARD ENVIRONMENTAL SPECIFICATION (SES)

ENV-STD-002 Rev04

Document Control

This document will be managed and controlled in terms of the Transnet Document, Data and Records Management Procedure.

Revision History

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Document Approvals List

This document has been approved by

Name	SAP Component	Signature	Date approved
Khathutshelo Tshipala	Executive Manager: Environment and Sustainability		30 November 2017

Table of Contents

1 Purpose

This specification describes the minimum standards for environmental management to which Contractors and Sub-contractors on a construction site must comply. It is a generic standard for use across all construction works executed by Transnet National Port Authority (TNPA).
There may be project specific environmental standards in addition to the standards in this document that exceed the standards prescribed here. The project specific environmental standards will be described in the Project Environmental Specification (PES) that will be issued separately for each project (where relevant).

This document must be read in conjunction with the TNPA Construction Environmental Management Plan (CEMP).

2 Scope

This standard applies to Contractors that work on site under the authority of TNPA.

3 Abbreviations and Definitions

3.1 Abbreviations

Abbreviation	Meaning
CEMP	Construction Environmental Management Plan
CM	Construction Manager
DEA	Department of Environmental Affairs
EA	Environmental Authorisation
EO	Environmental Officer
EGF	Environmental Governance Framework
NEMA	National Environmental Management Act 107 of 1998 (as amended)
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NWA	National Water Act 36 of 1998
PEM	Project Environmental Manager

PM	Project Manager
PES	Project Environmental Specification
SES	Standard Environmental Specification
SHEQ	Safety, Health, Environment and Quality
TNPA	Transnet National Port Authority

3.2 Definitions

Fauna A group of animals specific to a certain region or time period.

Flora A group of plants specific to a certain region or time period.

General waste Waste that does not pose an immediate hazard or threat to health or to the environment; and includes:

(a) domestic waste;
(b) building and demolition waste;
(c) business waste;
(d) inert waste; or
(e) any waste classified as non-hazardous waste in terms of NEMWA, 59 of 2008.

Hazardous waste Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles.

Indigenous vegetation Plants that naturally occur in an area.

Liquid waste Waste that appear in liquid form such as used oil, grease and/or contaminated water or waste water.

Method statement	A document that describes how the Contractor will implement environmental management measures associated with a particular environmental aspect during construction. It is a written submission by the Contractor to the TNPA Environmental Officer/Construction Manager in response to this Specification or a request by the Engineer, an ECO or Authorities setting out the equipment, plant, materials, labour and method the Contractor proposes to use to carry out an activity identified by this Specification or the TNPA EO when requesting the Method Statement, in such detail that the TNPA EO is able to assess whether the Contractor's proposal is in accordance with this Specification and/ or will produce results in accordance with this Specification.
Natural Vegetation	All existing species, indigenous or otherwise, of trees, shrubs, groundcover, grasses and all other plants found growing on the site.
Rehabilitation	Refers measures that must be put in place to restore the site to its pre-construction or enhanced state, subsequent to construction taking place.
Responsible Authority	A Responsible Authority, according to the National Water Act 36 of 1998, relates to specific power or authority in respect of water uses that is assigned by the Minister to a Catchment Management Agency or to a Regional Office.
Sensitive area	Any area that is denoted as sensitive by this Specification due to its particular attributes, which could include the presence of rare or endangered vegetation, the presence of heritage resources (*e.g.* archaeological artefact or graves), the presence of a unique natural feature, the presence of a watercourse or water body, the presence of steep slopes.

Solid waste	All solid waste, including construction debris, chemical waste, excess cement/ concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).
Spoil	Excavated material which is unsuitable for re-use as material in the Works or any other use; or is material which is surplus to the requirements of the Works.
Temporary Storage	A once-off storage of waste for a period not exceeding 90 days.
Topsoil	Means a varying depth (up to 300 mm) of the soil profile irrespective of the fertility appearance, structure, agricultural potential, fertility and composition of the soil.
Waste	Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes. Waste or a portion of waste ceases to be a waste only once the waste is, or has been re-used, recycled or recovered.
Watercourse	Means: a) a river or spring; b) a natural channel in which water flows regularly or intermittently; c) a wetland, lake or dam into which, or from which, water flows; and d) any collection of water gazetted by the National Water Act, 36 of 1998 as a watercourse and a reference to a watercourse includes, where relevant, its bed and banks

Wetland	Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

4 Minimum Standards for Environmental Management

The Contractor shall identify the potential environmental aspects and impacts that may occur as a result of his/her activities and accordingly prepare separate Method Statements describing how each of these impacts will be prevented or managed so that the standards set out in this document are achieved. These method statements will be prepared in accordance with the requirements set out in the CEMP.

The Contractor will comply with the standards described below.

4.1 Site Planning and Establishment

The Contractor shall establish his construction camps, offices, workshops, eating areas and any other facilities on the site in a manner that does not adversely affect the environment. These facilities must not be sited in close proximity to sensitive areas. Where required a buffer must be determined by the ecological requirements of the fauna/flora found on-site.

The Contractor shall ensure that a most recent Transnet SHEQ Policy is displayed on the notice-board at all times.

4.1.1 Site plan

Before the onset of construction, the Contractor shall submit to the TNPA Construction Manager and TNPA Environmental Officer for their approval, plans of the exact location, extent and construction details of the proposed facilities and the impact mitigation measures the Contractor proposes to put in place. Any changes to the location of the facilities and site activities as per the approved site layout plan shall be re-submitted for approval prior to implementation of changes.

The Site Plan must as a minimum include but not necessarily be limited to:

- Detailed layout of the construction works areas including access roads, site offices, material laydown areas, temporary stockpile areas and parking areas;
- Detailed locality and layout of all waste storage and handling facilities for litter, kitchen refuse and workshop-derived liquid waste;
- Proposed areas for the stockpiling of topsoil and excavated spoil material;
- Demarcation of the construction footprint including areas not to be disturbed by the development; and
- Location of sewage and sanitary facilities at the site offices and staff accommodation and at all localities on the site where there will be a concentration of labour. Sanitary arrangements should be to the satisfaction of the TNPA Construction Manager and Environmental Officer.

The site offices should not be sited in close proximity to steep areas. It is recommended that the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles be located as far away as possible from any watercourse. Should this not be possible, approval for the location of these facilities must be granted by the TNPA Environmental Officer.

4.1.2 Identification and establishment of suitable access routes/roads

Existing access routes to the construction/works areas must be used as far as possible. The building of access roads must be restricted to within the development footprint to prevent unnecessary disturbance of the surrounding environment. However, prior to making a decision about a new access road, the TNPA Environmental Officer must assess the proposed access road against the prevailing environmental legislation to confirm/rule out possible EIA triggers. Access tracks must be maintained in a good condition at all times during construction to minimize erosion and dust generation.

4.1.3 Demarcation of site limits

Prior to the commencement of construction, the actual site to be developed must be clearly demarcated through the most effective means. Vegetation within the demarcated zone may be

cleared only upon obtaining approval from the TNPA Environmental Officer. Disturbance of vegetation outside of the demarcated development footprint is not permitted.

All plant, material and equipment required for construction must be located within the designated areas. Laydown areas must be clearly demarcated within the site limits. No activities are allowed outside of the demarcated development footprint.

4.1.4 Eating Areas

The Contractor is responsible for providing adequate eating facilities within the works area to ensure that workers do not leave the site to eat during working hours. Refuse bags/bins must be provided at all established eating areas and when full it should be disposed as required by Section 4.3 below.

4.1.5 Liquid waste Management

Liquid waste water from site shall be stored on-site in a properly designed and constructed system, situated so as not to adversely affect water courses (streams, rivers, pans, dams etc.). Only domestic type wastewater, i.e. toilet, shower, basin, kitchen water shall be allowed to enter the designated system.

4.2 Sewage and Sanitation

The Contractor is responsible for providing adequate sanitary facilities including toilets, toilet paper, wash basins etc. to all workers on site and for enforcing the proper use of these facilities. Safe and effective sewage treatment will require one of the following sewage handling methods: dry-composting toilets such as "enviro loos" or the use of chemical toilets which are supplied and maintained by a suitably qualified Sub-contractor. The type of sewage treatment will depend on the location of the site and the surrounding land uses, the duration of the contract and proximity (availability) of providers of chemical toilets.

Toilet facilities shall be serviced regularly and the waste material generated from these facilities shall be disposed of at a registered waste water treatment works/macerator and proof of servicing and disposal shall be made available in the Contractor EO's File.

Toilets and latrines shall be easily accessible and shall be positioned within walking distance from wherever employees are employed on the works. Use of open areas (i.e. the veldt) shall not, under any circumstances, be allowed. For projects of high mobility a mobile toilet facility shall be made available by the Contractor.

Outside toilets shall be provided with locks and doors and shall be secured to prevent them from blowing over. Toilets must not be placed in areas susceptible to flooding or high winds. The Contractor shall arrange for regular emptying of toilets and shall be entirely responsible for enforcing their use and for maintaining such facilities in a clean, orderly and hygienic condition to the satisfaction of the TNPA Construction Manager.

4.3 Waste Management

Waste is grouped into "general" or "hazardous", depending on its characteristics. The classification determines handling methods and the ultimate disposal of material.

General waste to be expected during construction includes the following:

- Trash (waste paper, plastics, cardboard, etc.) and food waste from offices, warehouses and construction personnel;
- Uncontaminated construction debris such as used wood and scrap metal; and
- Uncontaminated soil and non-hazardous rubble from excavation or demolition.

The Contractor shall classify all waste expected to be generated during the construction period. Examples of typical construction waste which could be expected on the site and how they should be classified are indicated in the following table:

TABLE 1: EXAMPLE OF CONSTRUCTION WASTE CLASSIFICATION

WASTE	CLASSIFICATION	
	HAZARDOUS	GENERAL
Aerosol containers	X	
Batteries, light bulbs, circuit boards, etc.	X	X
Clean soil		X
Construction debris contaminated by oil or organic compounds	X	

WASTE	CLASSIFICATION	
	HAZARDOUS	GENERAL
Domestic waste		X
Empty drums (depends on prior use)	X	X
Empty paint and coating containers		X
Explosive waste	X	
PCB waste	X	
Rubble (not contaminated by oil or organic compounds)		X
Waste Cable		X
Waste plastic		X
Waste paint and/or solvent	X	
Waste oil	X	
Waste concrete		X
Waste cement powder	X	
Waste empty cement bags (must be thoroughly decanted)		X
Waste containing fibrous asbestos	X	
Waste timber		X
Sewerage sludge	X	
Scrap metal		X
Chemically-derived sanitary waste	X	

A hierarchical control approach to waste management is encouraged. Waste should preferably be managed in the following order of preference:

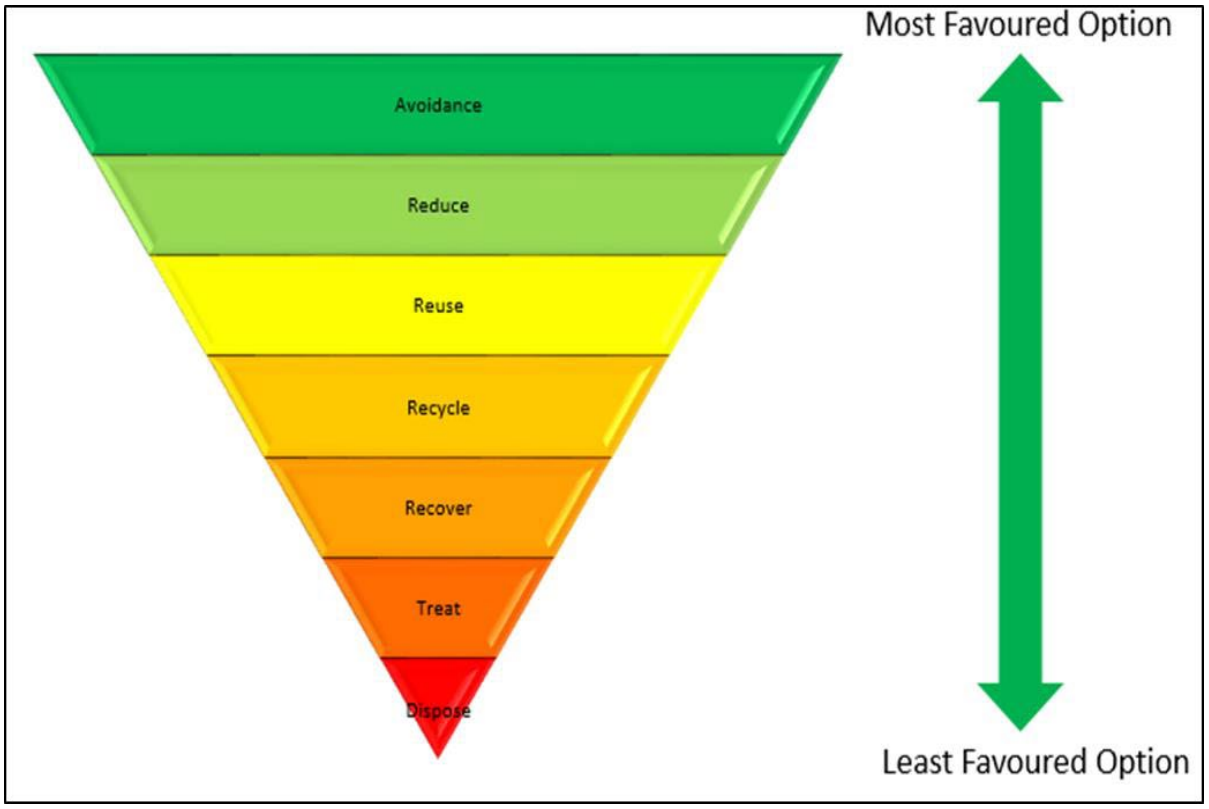

FIGURE 1: THE WASTE MANAGEMENT HIERARCHY

(Transnet Environmental Risk Management Strategy and Framework, 2015:42)

Avoidance/Prevention:	using goods in a manner that minimises their waste components
Reduction/Minimisation:	reduction of the quantity and toxicity of waste generated during construction
Re-use:	removing an article from a waste stream for use in a similar or different purpose without changing its form or properties
Recycling:	separating articles from a waste stream and processing them as products or raw materials
Recovery:	reclaiming particular components or materials, or using the waste as a fuel
Treatment:	processing of waste by changing its form or properties in order to reduce toxicity and quantity
Disposal:	burial, deposit, discharge, abandoning or release of waste

The Contractor is responsible for the removal of all waste from site generated through the construction activities. The Contractor shall ensure that all waste is removed to appropriate licensed waste management facilities. (For the identification of an appropriate facility, the following source may be utilized: **http://sawic.environment.gov.za/**.

The Contractor's Environmental Officer will work in conjunction with the Contractor's Safety and Health personnel to create a Hazardous Materials Management Program. This program will establish the necessary protocol for proper handling and removal of hazardous materials on the site.

The Contractor shall manage **GENERAL WASTE** that is anticipated to be generated by operations as follows:

- Notify waste hauler when container is full so that it can be removed and replaced with an empty container/skip;
- No littering is allowed on site. In the event where staff mobility is high, refuse bags will be made available by the Contractor;
- Provide documented evidence of proper disposal of waste (Waste Disposal Certificate)

The Contractor shall recycle **GENERAL WASTE** (as far as practically possible) that is anticipated to be generated by its operations as follows:

- Obtain and label recycling containers for the following (whichever relevant) and locate them within temporary office building and trailers:
  - Office Waste;
  - Aluminium;
  - Steel;
  - Glass;
  - Ferrous Metals;
  - Non Ferrous Metals; and
  - Waste Timber
- Establish recycled material collection schedule
- Arrange for full bins to be hauled away

Spent batteries, circuit boards, and bulbs, while non-hazardous, require separate storage, special collection and handling.
No burning, burying or dumping of waste of any kind will be permitted.

The Contractor shall manage **HAZARDOUS WASTE** anticipated to be generated by his operations as follows:

- Obtain and provide an acceptable container with correct and visible classification label;
- Place hazardous waste material in allocated container;
- Inspect the container on a regular basis as prescribed by the Contractor's waste management plan;
- Track the accumulation time for the waste, haul the full container to the registered hazardous disposal site;
- Notify the waste hauler when container is full so that it can be removed and replaced with an empty container/skip; and
- Provide documented evidence of proper waste disposal of the waste (Waste Disposal Certificate).

The Contractor shall quantify all waste disposed of, whether general or hazardous (including waste disposed of by any sub-contractors) and keep record of these quantities on site.

4.4 Workshops, equipment maintenance and storage

All vehicles and equipment must be kept in good working order to maximise efficiency and minimise pollution. Maintenance, including washing and refueling of plant on site must be done at designated locations at workshop areas. These designated areas must be agreed with the TNPA Construction Manager and TNPA Environmental Officer. The Contractor must ensure that no contamination of soil or vegetation occurs around workshops and plant maintenance facilities. All machinery servicing areas must be bunded. Drip trays should be used to collect used oil, lubricants at all times. Drip trays must be provided for all stationary plant. Washing of equipment should be restricted to urgent maintenance requirements only. Adequate wastewater collection facilities must be provided and the wastewater should be disposed of at a registered hazardous waste disposal site.

4.5 Vehicle and Equipment Refueling

4.5.1 Stationary/Designated Refueling

No vehicles or machines shall be serviced or refuelled on site except at designated and approved servicing or refuelling locations. No oil or lubricant changes shall be made except at designate locations, or in case of breakdown or emergency repair.

The Contractor shall store fuel and oil at a secure area, which shall be bunded to contain 110% of the total volume within the bund and designed with an impervious layer or liner or paved surface to prevent spillage from entering the ground.

The Contractor shall provide details of its proposed fuel storage and fuelling facility to the TNPA Environmental Officer for approval. The design shall comply with the regulations of the National Water Act, (Act 36 of 1998), the Hazardous Substances Act, (Act 15 of 1973), the Environmental Conservation Act, (Act 73 of 1989), National Environmental Management Act, (Act 107 of 1998), and the Occupational Health and Safety Act, (Act 85 of 1993), mainly the Construction - and Hazardous Chemical Substances Regulations.

4.5.2 Mobile Refueling

In certain circumstances, the refuelling of vehicles or equipment in a designated area is not a viable/practicable option and refuelling has to be done from a tank, truck, bowser or container moved around on site. In such circumstances, the Contractor may request approval from the TNPA Construction Manager to conduct mobile refuelling subject to the following control measures:

- Secondary containment equipment shall be in place. This equipment shall be sized to contain the most likely volume of fuel that could be spilt during transfer.
- Absorbent pads or drip trays are to be placed around the fuel inlet prior to dispensing.
- Mobile refuelling units are to be operated by a designated competent person.
- The transfer of fuel must be stopped prior to overflowing. Fuel tanks or refuelling equipment on vehicles may only be filled to 90% carrying capacity.
- Mobile fuelling tanks must be stored in an area where they are not susceptible to collisions. The fuel storage area must be located away from drainage channels.

- Mobile refuelling operations shall not take place within 30 meters of any watercourses or 7.5 meter from other structures, property lines, public ways or combustible storage.
- All mobile refuelling tanks are to be properly labelled and fire extinguishers with valid service dates shall be located near the fuel storage areas. These extinguishers must be of a suitable type and size.

4.6 Spill Response

The Contractor shall have adequate spill response materials/equipment on site which must be aligned with the volumes of hazardous substances used on site and the risk of pollution to sensitive environmental attributes.

The Contractor shall provide details for approval by the TNPA Construction Manager and TNPA Environmental Officer of its spill response plan in the event of any spills of fuel, oils, solvents, paints or other hazardous materials. The plan will show measures to be taken in removing contaminated material from site and demonstrate complete removal of contamination.

The Contractor shall instruct construction personnel on the following spill prevention and containment responsibilities:

- Immediately repair all leaks of hydrocarbons or chemicals;
- Take all reasonable means to prevent spills or leaks;
- Do not allow sumps receiving oil or oily water to overflow;
- Prevent storm water runoff from contamination by leaking or spilled drums of oil or chemicals; and
- Do not discharge oil or contaminants into storm water or sewer systems.

If a spill occurs on land, the Contractor must:

- Immediately stop or reduce the spill
- Contain the spill
- Recover the spilled product
- Remediate the site
- Implement actions necessary to prevent the spill from contaminating groundwater or off-site surface water
- Dispose of contaminated material at a registered hazardous waste disposal site and provide proof thereof (SDCs)

Any spill to water has the potential to disperse quickly, therefore, the spill must be contained immediately using appropriate containment equipment.
If a spill to water occurs, the Contractor must:

- Take immediate action to stop or reduce the spill and contain it
- Notify the appropriate on-site authorities
- Implement actions necessary to prevent the spread of the contamination by deploying booms and/or absorbent material
- Recover the spilled product
- Dispose of spilled material at a registered hazardous waste disposal site and provide SDCs
- Water samples to be taken downstream from where the spill took place to trace the extent of pollution

4.7 Spray Painting and Sandblasting

Spray painting and sandblasting should be kept to a minimum. All painting should, as far as practicable, be done before equipment and material is brought on site. Touch-up painting is to be done by hand painting or by an approved procedure. A Method Statement shall be submitted to the TNPA Environmental Officer for approval.

The relevant Contractor will inform his Environmental Officer of when and where spray painting or sandblasting is to be carried out prior to commencement of work. The Contractor's Environmental Officer will monitor these activities to ensure that adequate measures are taken to prevent contamination of the soil.

If the area is in confined or high (elevated) areas, a protection plan must be issued for approval by the TNPA Environmental Officer.

4.8 Dust Management

Contractors are responsible for managing dust generated as a result of their activities. The use of water for dust management must be minimised as far as practically possible. Discretion must be applied on a site-by-site basis in terms of dust control. Dust control measures must be agreed upon by the TNPA EO prior to commencement of the Works.

Below are some dust control measures which can be applied during construction:

- Operate vehicles within speed limits, where no speed limit has been specified, the limit shall be 20km/h;
- Minimise haulage distances where possible;
- Environmentally friendly soil stabilisers may be used as additional measures to control dust on gravel roads and construction areas;
- The introduction of hydro-seeding and mulch due to its ability to bind soil particles together and thus reduce fugitive dust on-site;
- Dust suppression measures will also apply to inactive construction areas. (An inactive construction site is one on which construction will not occur for a month or more);
- Minimise disturbance of natural vegetation during right-of-way construction (e.g. transmission lines and erection of fences) to reduce potential erosion, runoff, and air-borne dust;
- Material in transit should be loaded and contained within the load bin of the vehicle in such a way as to prevent any spillage onto the roads and the creation of dust clouds. If necessary, the load bin of the vehicle shall be covered with a tarpaulin to prevent dust;
- Implement a system of reporting excessive dust conditions by construction personnel (as instructed through Environmental Awareness Training);
- In cases where water is to be used for dust control; it shall be ensured that only authorised sources are used; and
- Apply water to gravel roads with a spraying truck when required

4.9 Storm water and Dewatering Management

The Contractor shall be aware that, apart from runoff from overburden emplacements and stock piles, storm water can also be contaminated from batch plants, workshops, vehicle wash-down pads etc., and that contaminants during construction may include hydrocarbons from fuels and lubricants, sewerage from employee ablutions and excess fertiliser from rehabilitated areas, etc.

The Contractor shall take note that discharges to controlled waters such as the sea, rivers, groundwater or to sewerage systems are controlled under the South African Water Legislation. The following specific measures are required:

- Temporary drainage must be established on site during the construction period until permanent drainage is in place. Contractors are responsible for maintaining the temporary

drainage in their areas. Contractors must provide secondary drainage that prevents erosion, where necessary.

- Contractors must employ good housekeeping in their areas to prevent contamination of drainage water.
- The Contractor shall clear stagnant water at all times.
- The Contractor shall ensure that no contaminated surface water flows off-site as a result of Contractor operations. Where necessary, silt traps shall be constructed to ensure retention of silt on site and cut-off ditches shall be constructed to ensure no runoff from the site except at points where silt traps are provided. The Contractor shall be responsible for checking and maintaining all silt traps for the duration of the project.
- The removal from groundwater is defined as a water-use under the National Water Act 36 of 1998. Therefore, it must be ensured that the project has been authorised by the Responsible Authority to remove groundwater prior to dewatering taking place. If applicable, the Contractor shall be responsible for collection, management, and containment within the site boundaries of all dewatering from all general site preparation activities.
- No discharge/dewatering to off-site land or surface water bodies will be allowed
- On-site drainage shall be accomplished through gravity flow. The surface drainage system shall consist of mild overland slopes, ditches, and culverts. The graded areas adjacent to buildings shall be sloped away with a 5% slope. Other areas shall have a minimum slope of 0,2% or as otherwise indicated
- Ditches shall be designed to carry a 25-year storm event with velocities in accordance to minimise erosion. Erosion protection shall consist of suitable stabilising surfaces in all ditches.
- Culverts shall be designed to ensure passage of the 50-year storm peak runoff flow.

4.10 Erosion Control

All structural and non-structural (vegetative) erosion control measures will be designed, implemented, and properly maintained in accordance with best management practices which will include, but not limited to the following:

- Scheduling of activities to minimise the amount of disturbed area at any one time;
- Implementation of re-vegetation as early as feasible;
- Limiting construction traffic and/or avoidance thereof on access roads and areas to be graded to the extent feasible at drainage ditches;

- Compacting loose soil as soon as possible after excavation, grading, or filling;
- Using silt fences, geo-textiles, temporary rip-rap, soil stabilisation with gravel, diversionary berms or swales, small sedimentation basins, and gravelled roads to minimise transport of sediment;
- Implementing the erosion and sedimentation control plan and ensuring that construction personnel are familiar with and adhere to it;
- Managing runoff during construction; and
- The Contractor shall be responsible for checking and maintaining all erosion and sedimentation controls.

4.11 Noise Management

The Contractor must implement the following measures, as a minimum, to manage noise pollution resulting from his/her activities:

- Keep all equipment in good working order;
- Operate equipment within its specification and capacity and don't overload machines;
- Apply regular maintenance, particularly with regards to lubrication;
- Operate equipment with appropriate noise abatement accessories, such as sound hoods;
- Sensitive social receptors shall be notified of any excessive noise-generating activities that could affect them;
- Ensure that the potential noise source will conform to the South African Bureau of Standards recommended code of practice, *SANS 10103:2004* or the latest at the time, so that it will not produce excessive or undesirable noise when released;
- All the Contractor's equipment shall be fitted with effective exhaust silencers and shall comply with the South African Bureau of Standards recommended code of practice, *SANS 10103:2004* or the latest at the time, for construction plant noise generation
- All the Contractor's vehicles shall be fitted with effective exhaust silencers and shall comply with the Road Traffic Act, (Act 29 of 1989) when any such vehicle is operated on a public road
- If on-site noise control is not effective, protect the victims of noise by ensuring that all noise-related occupational health provisions are met. (Occupational Health and Safety Act, (Act 85 of 1993).

4.12 Protection of heritage resources

4.12.1 Archaeological Sites

If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The Contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the TNPA CM and TNPA EO of such a discovery. The South African Heritage Resources Agency (SAHRA) or relevant Authority is to be contacted and will appoint an Archaeologist to investigate the find. Work may only resume once clearance is given in writing by the Archaeologist.

4.12.2 Graves and middens

If a grave or midden is uncovered on site, or discovered before the commencement of work, all work in the immediate vicinity of the graves/middens shall be stopped and the TNPA Construction Manager and EO informed of the discovery. The South African Heritage Resources Agency (SAHRA) or relevant Authority should be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial. The undertaker will, together with the SAHRA, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred.

4.13 Fire prevention

Fires shall only be allowed in facilities or equipment specially constructed for this purpose.

A firebreak shall be cleared and maintained around the perimeter of the camp and office sites where and when necessary in accordance with relevant legislative requirements.

All conditions incorporated in the requirements of the Occupational Health and Safety Act shall be implemented.

4.14 Water Protection and Management

No water shall be abstracted from any water course (stream, river, or dam) without the expressed permission of the TNPA Construction Manager and TNPA Environmental Officer. Such permission shall only be granted once it can be shown that the water is safe for use, that there is sufficient water in the resource to meet the demand, and once permission has been obtained from the Department of Water and Sanitation in accordance with the requirements of the National Water Act (Act 36 of 1998).

Water for human consumption shall be available at the site offices and at other convenient locations on site. The generally acceptable standard is that a supply of drinking water shall be available within 200m of any point on the construction site.

Method Statement(s) must be prepared by the Contractor for the various water uses. The Contractor shall keep a record of the quantities of water used during construction (including use by sub-contractors), irrespective of the purpose of use.

4.15 Protection of Fauna and the collection of firewood

On no account shall any hunting or fishing activity of any kind be allowed. This includes the setting of traps, or the killing of any animal caught in construction works.

On no account shall any animal, reptile or bird of any sort be killed. This specifically includes snakes or other creatures considered potentially dangerous discovered on site. If such an animal is discovered on site an appropriately skilled person should be summoned to remove the creature from the site. Consideration should be given to selection and nomination of such a person prior to site establishment. If no-one is available, training should be provided to at least two site staff members.

The Contractor shall provide adequate facilities for all his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The Contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes.

4.16 Environmental Awareness Training

An Environmental Awareness Program is considered a necessary part of the Construction Environmental Management Plan for the Project. Training of the appropriate construction personnel will help ensure that all environmental regulations and requirements are followed which must be defined in the relevant Method Statement to be prepared by the Contractor.

Objectives of environmental awareness training are:

- Environmental Management – protecting the environment from the effects of construction by making personnel aware of sensitive environmental resources.
- Regulatory compliance – complying with requirements contained in project – specific permit conditions, also complying with requirements in regional and local regulations.
- Problem recognition and communication – training personnel to recognise potential environmental problems, i.e. spills, and communicate the problem to the Contractor's EO for a solution.
- Liability control - non-compliance with regulatory requirements can lead to personal and corporate liability.

All individuals on the Project construction site will need to have a minimum awareness of environmental requirements and responsibilities. However, not all need to have the same degree of awareness. The required degree of knowledge is greatest for personnel in the Safety, Health, and Environmental Sections and the least for the manual personnel.

The Contractor shall present environmental awareness programmes on a weekly/bi-monthly basis (depending on project requirements) and keep record of all the environmental related training of the personnel.

4.17 Handling and Batching of Concrete and Cement

Concrete batching shall only be conducted in demarcated areas which have been approved by the TNPA Construction Manager and TNPA EO.

Such areas shall be fitted with a containment facility for the collection of cement-laden water. This facility shall be bunded and have an impermeable surface protection so as to prevent soil

and groundwater contamination. Drainage of the collection facility will be separated from any infrastructure that contains clean surface runoff.

The batching facility will not be placed in areas prone to floods or the generation of stagnant water. Access to the facility will be controlled so as to minimise potential environmental impacts. Hand mixing of cement and concrete shall be done on mortarboards and/or within the bunded area with impermeable surface or concrete slab. Bulk and bagged cement and concrete additives will be stored in an appropriate facility at least 10m away from any watercourses, gullies and drains.

Waste water collected in the containment facility shall be left to evaporate. The Contractor shall monitor water levels to prevent overflows from the facility. It is acknowledged that all waste water will evaporate; it must be ensured that the remaining water can be pumped into sealed drums for temporary storage and must be disposed of as liquid hazardous waste.

All concrete washing equipment, such as shovels, mixer drums, concrete chutes, etc. shall be done within the washout facility. Water used for washing shall be restricted as far as practically possible.

Ready-mix concrete trucks are not allowed to wash out anywhere other than in an area designated and approved by the TNPA Construction Manager and EO for this purpose.

The Contractor shall periodically clean out hardened concrete from the wash-out facility or concrete mixer, which can either be reused or disposed of as per accepted waste management procedures.

Empty cement and bags, if temporarily stored on site, must be collected and stored in weatherproof containers. Used cement bags may not be used for any other purpose and must be disposed of on a regular basis in accordance with the Contractor's solid waste management system.

Sand and aggregates containing cement will be kept damp to prevent the generation of dust.

Concrete and cement or any solid waste materials containing concrete and cement will be disposed of at a relevant registered disposal facility and SDCs kept on the file. Where disposal

facilities for general waste are utilised, written consent from the relevant municipality must be obtained by the Contractor and proper records kept.

4.18 Stockpiling, Soil Management and Protection of Flora

The Contractor shall measure the extent of all areas cleared for construction purposes and keep this figure updated. Sensitive areas shall be cordoned off and avoided in this regard.

Stockpiling may only take place in designated areas indicated on the approved site layout plan. Any area to be used for stockpiling or material laydown shall be stripped of all topsoil.

Clearance of vegetation shall be restricted to that which is required to facilitate the execution of the works. Vegetation clearance shall occur in a planned manner, and cleared areas shall be stabilised as soon as possible when and where necessary. The detail of vegetation clearing shall be subject to the TNPA Construction Manager's approval and shall occur in consultation with the TNPA Environmental Officer.

Stockpiles must be positioned in areas sheltered from the wind and rain to prevent erosion and dispersion of loose materials. Stockpiled soil shall be protected by adequate erosion-control measures. Soil stockpiles shall be located away from drainage lines, watercourses and areas of temporary inundation. Stockpiles containing topsoil shall not exceed 2m in height unless otherwise permitted by Transnet.

Topsoil shall be stockpiled separately from other materials and prevented from movement. Excavated subsoil, where not contaminated, must be used for backfilling, if possible, and topsoil for landscaping and rehabilitation of disturbed areas. Where topsoil has become mixed with subsoil or is not up to the original standard, fertiliser or new topsoil shall be provided by the Contractor.

No vegetation located outside the construction site shall be destroyed or damaged. As far as is reasonably practicable, existing roads must be used for access to the site. Before site clearance takes place, vegetation surveys must be conducted and protected species identified.

No protected plant species shall be removed without written consent from the relevant authorities. The development of new embankments or fill areas must be undertaken in consultation with the TNPA Environmental Officer.

No dumping of solid waste or refuse shall be allowed within or adjacent to areas of natural vegetation.

The Contractor shall identify and eradicate all declared alien and invasive plant species occurring on site.

4.19 Traffic Management

Vehicles usage is permitted **only** on access roads. Vehicles should only be parked within designated parking areas as demarcated on the site layout plan.

Turning of vehicles should only take place within a clearly demarcated "turn area" located within the approved construction footprint.

The Contractor must co-ordinate the loading and offloading of material during the construction phase so as to ensure that vehicular movement is in one direction only at any one time and that side-tracks are not created on the site.

4.20 Transportation of Materials

The Contractor is responsible for ensuring that all suppliers and delivery drivers are aware of procedures and restrictions (e.g. no-go areas) in terms of the CEMP and this Specification. Material must be appropriately secured to ensure safe passage between destinations during transportation. Loads must have appropriate cover, where ADTs are not utilised, to prevent spillage from the vehicles. The Contractor will be held responsible for any clean-up resulting from the failure to properly secure transported materials.

4.21 Borrow Pits and Quarries

The Contractor shall ensure that suppliers of rock and sand raw materials are in possession of the required permit/license and keep record of the quantity of material supplied.

The Contractor will not make direct use of any borrow pits and quarries unless the borrow pit has a valid permit, he has obtained written approval from the TNPA Construction Manager and Method Statement has been submitted and approved. The Method Statement will provide the detailed description of the location of the borrow pits and/or quarries and the procedures that will be followed to adhere to any pertinent national or local legislation (e.g. mineral extraction, rehabilitation, safety and noise levels).

4.22 Social and Labour Issues

The criteria for and selection of labourers, sub-contractors and suppliers for the project shall demonstrate preference for the local community and shall be aligned with the criteria set by TNPA in appointing the Contractor. The Contractor shall keep records of the identity of all staff.

Under no circumstances shall the Contractors engage in formal discussions with landowners without prior consent by the TNPA Construction Manager.

No activity on private property shall be allowed without written consent by the relevant landowner and TNPA Construction Manager/TNPA Environmental Officer.

Any damage to private property caused by the Contractor during the construction period, shall be repaired to the satisfaction of the TNPA CM and the TNPA EO and the land-owner.

The Contractor shall keep record of any complaint raised during the construction period relating to the Contractor's activities.

No job-seekers shall be allowed on site and signs reflecting such shall be displayed on the notice boards.

All public complaints received shall be dealt with as per the CEMP.

4.23 Energy Management

The Contractor shall measure and keep updated records of the following:

- Electricity consumption (to be measured in Kilowatt Hours)
- Fuel consumption (to be measured in liters)

4.24 Handling, Storage and Management of Hazardous Substances

All hazardous materials/substances shall be stored in a secured, designated area that is fenced, bunded and has restricted entry.

All storage shall take place using suitable containers to the approval of the TNPA Construction Manager and EO.

All hazardous liquids shall be located in a secure, demarcated area and an adequate bund wall (110% of the total volume stored) shall be provided. The floor and wall of the bund area shall be impervious to prevent infiltration of any spilled/leaked liquids into the soil.

No spillages or accumulated stormwater within this bunded area will be allowed to be flushed from the bund into the surrounding area. All fluids accumulated within the bunded area shall be removed and disposed of in accordance with Section 4.3 above.

Hazard signs indicating the nature and volume of the stored materials shall be displayed on the storage facility or containment structure.

Weighbills of hazardous substances shall be sourced from suppliers and kept on site for inspection by the TNPA Environmental Officer.

The Contractor must provide a method statement detailing the hazardous substances that are to be used during construction, as well as the storage, handling and disposal procedures for each substance. Emergency procedures in the event of misuse or spillage that might negatively affect the environment must be specified.

Information on each hazardous substance will be available to all persons on site in the form of Material Safety Data Sheets (MSDS)/Safety Data Sheets (SDS). Training and education about

the proper use, handling, and disposal of the material will be provided to all workers handling the material.

The Contractor's Environmental Officer must be informed of all activities that involve the use of hazardous substances to facilitate prompt response in the event of a spill or release.

4.25 Housekeeping

The Contractor must ensure proper housekeeping of the site for the duration of the project. If practical the contractor shall amongst construction personnel, assign one to be responsible for good housekeeping

Materials shall be stored in a neat and tidy manner in designated areas as per the approved site layout plan.

4.26 Rehabilitation

Contractors shall rehabilitate the entire site upon completion of work. A rehabilitation plan will be submitted to the TNPA Construction Manager and EO for approval at least six weeks before project completion. The following, but not limited are critical issues to be included in the rehabilitation plan:

- Details of soil preparation procedures including proposed fertilisers or other chemicals being considered for use;
- A list of the plant species that will be used in the rehabilitation process. Note that these should all be indigenous species, and preferably species that are endemic to the area. The assistance of an appropriately qualified Botanist/Horticulturist should be sought in developing this list;
- Procedures for watering the planted areas (frequency of watering, methodology proposed etc.);
- An indication of the monitoring procedures that will be put in place to ensure the successful establishment of the plants (duration and frequency of monitoring, proposed criteria for declaring rehabilitation as being successful); and
- Procedures for the prevention of the establishment and spread of alien invasive species.

5 Documentation

Refer to the Construction Environmental Management Plan.

6 Records

All documents generated in terms of this procedure will be classed as records and retained for the life of the project for handover by the contractor to TNPA (electronic and hard copies).

TRANSNET NATIONAL PORT AUTHORITY

ENVIRONMENT & SUSTAINABILITY

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

ENV-STD-001 Rev04

Document Control

This document will be managed and controlled in terms of the Transnet Document, Data and Records Management Procedure.

Revision History

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Stehan Bouwer	30 November 2017

Document Approvals List

This document has been approved by

Name	Designation	Signature	Date approved
Khathutshelo Tshipala	Executive Manager: Environment and Sustainability		30 November 2017

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Purpose

This document describes the main environmental management requirements that the Contractor must comply with during the construction phase to ensure that the environment is considered, negative impacts avoided or minimised, and positive impacts enhanced. This document is critical to the principal Contractor and the Contractor's Environmental Officer (EO) as well as any sub-contractors performing work on the principal Contractor's behalf.

The purpose of this Document is to:

- Describe how project environmental risks will be identified and managed during the construction phase;
- Detail the roles and responsibilities of all parties with respect to environmental management during construction;
- Outline the organisational structure for effective implementation of the CEMP;
- Assist the Contractor in understanding the requirements of complying with the CEMP and any relevant specifications; and
- Provide a set of standards for environmental management during the construction phase.

Scope

This standard applies to Contractors that work on site under the control of Transnet National Port Authority(TNPA).

Abbreviations and Definitions

3.1 Abbreviations

Abbreviation	Meaning
CEMP	Construction Environmental Management Plan
CV	Curriculum Vitae
DEA	Department of Environmental Affairs
EA	Environmental Authorisation
ECO	Environmental Control Officer
EO	Environmental Officer

Abbreviation	Meaning
EGF	Environmental Governance Framework
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
NEMA	National Environmental Management Act 107 of 1998 (as amended)
NCR	Non-conformance Report
PES	Project Environmental Specification
SES	Standard Environmental Specification
SHEQ	Safety, Health, Environment and Quality
TNPA	Transnet National Port Authority
CM	Construction Manager
PEM	Project Environmental Manager
PM	Project Manager

3.2 Definitions

Compliance The action or fact of complying with legislation or regulations.

Conformance The action or fact of conforming to this standard and other internal policies, procedures, guidelines and best practice.

Construction Manager Works together with the Project Manager and the TNPA EO to ensure that construction proceeds in accordance with the relevant specifications and agreed schedule.

Contractor The Principal Contractor as engaged by Transnet National Port Authority for infrastructure construction operations, including all sub- contractors appointed by the main contractor of his own volition for the execution of parts of the construction operations; and any other contractor from time to time engaged by Transnet National Port Authority directly in connection with any part of the construction operations which is not a nominated sub-contractor to the Principal Contractor.

Contractor's Environmental Officer	Contractor's Environmental Officer responsible for ensuring compliance with the CEMP.
Corrective Action	It is generally a reactive process used to address problems after they have occurred. Corrective action may be triggered by a variety of events, e.g. Non-conformance to documented procedures and work instructions, non-conformances raised through internal audits, unacceptable monitoring and measurement results, internal & external SHEQ complaints, etc.
Emergency	Sudden unforeseen event needing immediate or prompt action.
Environment	Surroundings in which the Contractor operates, including air, water, land, natural resources, flora, fauna, humans and their interrelations.
Environmental Aspect	Element of a Contractor's activities, products or services that can interact with the environment and cause an environmental impact (e.g. dust, noise etc.).
Environmental Authorisation	Environmental Authorisation is the authorisation granted by a competent authority of a listed activity or specified activity in terms of National Environmental Management Act 107 of 1998 (as amended).
Environmental Impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from a Contractor's activities, products or services.
Environmental Management Plan	A plan generated by the Contractor describing the relevant roles and responsibilities and how potential environmental risks will be assessed and managed including the monitoring and recording thereof.

Environmental Management Programme	A programme that has been approved by the Competent Authority in terms of NEMA, 107 of 1998 stipulating information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified
Environmental Risk	The product of the likelihood and severity of an unforeseen occurrence/incident/aspect and the impact it would have, if realised, on the environment
Incident/Occurrence	An undesired event occurring at work that results in physical harm to a person or death, or damage to the environment, plant and/or equipment, and/or loss of production.
Method Statement	A document that describes how the Contractor will implement environmental management measures associated with a particular environmental aspect during construction.
Non-conformance	An action or situation that does not conform to Transnet/TNPA's SHEQ standards, procedures or legislative requirement(s) and that can be, or lead to, an unacceptable SHEQ incident.
Non-compliance	Contravention to environmental legislative requirements.
Project Environmental Manager	Works together with the Project Manager and Construction Manager to ensure that the requirements of the CEMP/SES and applicable PES are met.
Project Manager	A person/s, as appointed by Transnet, responsible for the overall management and implementation of a project.

Overview of the CEMP

It is the stated goal of TNPA to implement sustainable environmental management practices within the organisation. This will apply to the planning, design, construction, operation, restoration, reuse and decommissioning activities related to all infrastructure development, upgrade and maintenance. The CEMP is the tool used to ensure this goal is achieved during the construction and commissioning phases. Some decommissioning may occur during site clearing in brownfield sites and this CEMP will also apply to those activities.

The CEMP has been developed in line with the requirements of all relevant South African Environmental Legislation and Standards of Best Practice.

The CEMP and associated documents or specifications as well as the EA will be included in the Tender Documents issued to the prospective Contractors. The Contractors will incorporate all requirements set out in the specifications in their submissions to TNPA.

There are two types of environmental specifications:

- **Standard Environmental Specification** (SES) describes the minimum standards for environmental management for a range of environmental aspects associated with all construction projects with which the Contractor must comply.
- **Project Environmental Specification** (PES) describes standards specific to a particular project. Variations and additions to the SES are set out in this PES. These would include the EA issued to the project or elements generally drawn from the EA or permits for that project or from specific requirements set by TNPA Clients. The PES may also require a more stringent standard to that described in the SES if required by the EA or a particular industry code to which Transnet subscribes including any environmental constraints at a construction site. The PES need not be a separate document; however it can be in a format of an appendix/addendum making reference to environmental authorisation(s), permit(s) or licence(s) applicable to the project. In cases where the project does not trigger any of the NEMA listed activities or any permit(s)/licence(s), the PES may be compiled to prescribe additional environmental management measures over and above the measures stipulated on the SES.

The specifications are configured as performance specifications to ensure that TNPA and any entities that enter into formal agreements with TNPA achieve the required level of environmental performance.

NOTE: No advice, approval of method statements or any other form of communication from TNPA will be construed as an acceptance by TNPA of any obligation that indemnifies the Contractor from achieving any required level of performance. Further, there is no acceptance of liability by TNPA which may result from the Contractor failing to comply with the specifications, i.e. the Contractor remains responsible for achieving the required performance levels.

Implementation of the CEMP

5.1 Roles and Responsibilities

5.1.1 TNPA Project Environmental Manager (PEM)

The TNPA PEM will be responsible for ensuring that the CEMP and associated specifications or requirements are complied with during construction. The TNPA PEM will report functionally to the TNPA Senior Manager: Environment and Sustainability, and relevant Project Manager.

Specific tasks during the construction stage will include:

- Liaison with the relevant authorities;
- Preparation of the PES;
- Tender evaluation, development of environmental criteria and adjudication thereof;
- Review all reports from the Environmental Officer/Specialist, including sign off on Method Statements and Monthly Audit reports;
- Conduct any environmental incident enquiries;
- Identify, with support from the TNPA Construction Manager; the need for corrective or remedial measures with regard to proposed works;
- Ensure induction material includes project appropriate environmental issues;
- Approve training programmes and other awareness initiatives;
- Coordinate or facilitate internal environmental audits;
- Sign-off on audit reports prepared by ECOs; and
- Prepare environmental monitoring protocols (if monitoring to be done by Environmental

Officer and not by an outside consultant).

The TNPA PEM may delegate part or all of these responsibilities to the TNPA Environmental Officer, based on the merits of the particular project at hand.

5.1.2 TNPA Construction Manager

The TNPA Construction Manager has overall responsibility for environmental management on site which includes the implementation of the CEMP, SES and PES and reports to the Project Manager. The TNPA Construction Manager is supported by the TNPA Environmental Officer/Specialist.

The specific environmental tasks for TNPA the Construction Manager during the construction phase will include:

- Reviewing the monthly reports compiled by the TNPA Environmental Officer/Specialist;
- Communicating directly with the Contractors on environmental issues observed on site; and
- Issuing non-conformance notifications to Contractors in consultation with the TNPA Environmental Officer/Specialist

5.1.3 TNPA Environmental Officer

The TNPA Environmental Officer reports functionally to the TNPA Construction Manager and TNPA PEM and is responsible for conducting the tasks required to ensure that the CEMP, SES and PES are implemented on the construction site.

The TNPA Environmental Officer will conduct the following tasks:

- Ensure that environmental issues receive adequate attention in the site induction training;
- Prepare Risk Reports;
- Prepare and conduct environmental awareness training, as and when required (e.g. posters, tool box talks, signage);
- Generate an inspection checklist prior to the project commencement for sign off by the TNPA PEM;
- Review and approve site layout plan;
- Conduct monthly observation & inspection of all work places based on the approved inspection checklist;

- Monitor the Contractor's compliance with the CEMP, SES and PES;
- Develop an Audit Finding and Close out Register that documents all audit findings, close out actions and the time frame allowed for in order to close the finding/s;
- Ensure that all environmental monitoring programmes (sampling, measuring, recording etc. when specified) are carried out according to protocols and schedules;
- Measurement of completed work (e.g. areas top soiled, re-vegetated, stabilised etc.);
- Attendance at scheduled SHE meetings, as and when required, and project coordination meetings;
- Ensure that site documentation (permits, EA, EMPr, CEMP, method statements, audit reports, waste disposal slips etc.) related to environmental management is maintained on the relevant Document Control System;
- Inspect and report on environmental incidents and check corrective action;
- Keep a photographic record of all environmental incidents;
- Completion of Flash Reports for all Level 1 and 2 environmental incidents;
- Implementation of environmental-related actions arising from the minutes of scheduled meetings;
- Management of complaints register;
- Review and Sign off Method Statements prepared by Contractor's EO, as delegated by the TNPA PEM;
- Audit conformance to Environmental Method Statements;
- Collate information received, including monitoring results into a monthly report that is supported with photographic records to the TNPA Construction Manager showing progress against targets; and
- Report environmental performance of the project on a monthly basis through relevant governance channels.

The key deliverables will include the compilation of:

- Project Start Up Checklist
- Monthly Inspection Checklist
- Monthly Environmental Audit Report
- Monitoring Results, where required
- Flash reports
- Incident investigation Reports
- Environmental Incident Register
- Environmental Non-Conformance Register & Reports
- Complaints Register

- Method Statements Register
- Site Close Out Inspection
- Site Close-Out Reports

5.1.4 Environmental Control Officer

The Environmental Control Officer (ECO) is an independent person legally appointed to monitor compliance of construction related activities with the conditions of the Environmental Authorisation. The ECO fulfils an autonomous role and submits audit reports to the Competent Authority at intervals specified in the EA.

The ECO will conduct the following tasks:

- Monitor compliance to the conditions of the EA, EMPr and can include permits and licenses applicable to a project;
- Attend project meetings as and when required;
- Conduct audits at a frequency stipulated on the EA/EMPr; and
- Compile audit reports and submits them to relevant authorities.

5.1.5 Contractor's Environmental Officer

The Contractor will appoint an Environmental Officer before commencement of any work on site whose role is to ensure implementation of the requirements of the CEMP, SES and PES where applicable. The Contractor will submit the name and CV of the Environmental Officer as well as an Environmental Management Plan detailing roles and responsibilities with their tender submission. The Environmental Officer should have relevant environmental qualifications and experience required for the project. The level of qualifications and experience will depend on the complexity of the project and the sensitivity of the site. This will be for TNPA's approval and no work can commence on site if this has not been done.

The Contractor's Environmental Plan will include, but not be limited to:

- Contractor's Environmental Organogram;
- A description of environmental management responsibilities of the Contractor's Project Manager, Contractor's Site Manager and the Contractor's Environmental Officer;
- A signed and dated organisational Environmental Policy;
- Environmental Method Statements; and

- Project-specific Environmental Management Plan;

The Contractor's Environmental Officer will liaise with the TNPA Environmental Officer on site. It will be the responsibility of the Contractor's Environmental Officer to ensure that all work is conducted according to the approved Environmental Method Statements and that the roles and responsibilities as set out in this document are fulfilled. The Contractor Environmental Officer's tasks will include:

- Daily and weekly inspections of the work area(s) as per schedule or authorised through written instruction by TNPA PEM or Environmental Officer. The Contractor is referred to Section 7 for an example of the items that will need to be inspected and which items will be audited by the TNPA Environmental Officer;
- Prepare project-specific activity/aspect based Environmental Method Statements;
- Identify local, provincial and national environmental legislation that applies to the Contractor's activities;
- Ensure conformance/compliance to the CEMP, SES, PES, licenses and permits and approved Environmental Method Statements;
- Conduct ongoing Environmental Awareness Training of the Contractor's site personnel;
- Reporting, investigating and recording of any environmental incidents caused by the Contractor or due to the Contractor's activities, including their sub-contractors;
- Close out of environmental incidents;
- Attendance at all SHE meetings and induction programmes, and toolbox talks where required
- Monitor Waste Management;
- Monitor Water and Energy use;
- Ensure that environmental signage and barriers are correctly placed;
- Taking required corrective action within specified time frame and close out of non-conformances;
- Maintain site documentation related to environmental management (permits, CEMP, method statements, EA, reports, audits, monitoring results, receipts for waste removal etc.). Documentation to be maintained on the relevant site Document Control System;
- The compilation of the Project Environmental Management File
- Hazardous Substances Register; and
- Ensure the environmental file content is scanned monthly or in intervals agreed to by the TNPA EO, as per the TNPA index and submitted to the TNPA document control monthly.

The Contractor's Environmental Officer will be expected to submit daily/weekly checklists as agreed by the TNPA Environmental Officer to the TNPA Environmental Officer.

When the Contractor's Environmental Officer is replaced after the person has been approved by TNPA, the Contractor will submit a CV of a replacement Environmental Officer who has at least the same level of qualification and experience of the previous approved person for approval by the TNPA Environmental Officer and TNPA Construction Manager. No work can proceed until the replacement Environmental Officer has been approved.

5.1.6 The Contractor

The Contractor shall comply with the requirements of the CEMP and abide by the TNPA Project Manager's and TNPA Environmental Officer/Specialist's instructions regarding the implementation of the CEMP.

The Declaration of Understanding, as detailed in **Section 6**, must be signed during tender stage, and a signed copy must be submitted to the TNPA Environmental Officer prior to the start of construction.

Section 6 details some of the main actions required from the Contractor at various stages during the contract. The TNPA Environmental Officer will monitor that all of these actions are undertaken in accordance with the CEMP.

It must be noted, however, that **Section 6** does not list all the requirements of the CEMP, but rather serves as a guide as to where definite actions are required before certain activities can commence. It should be read in conjunction with the SES, and the PES.

Section 7 contains aspects that will be subject to regular inspections and audits by the various parties.

5.2 Organisational structure

The organisational structure identifies and defines the responsibilities and authority of the various entities involved in the project. All instructions and official communications regarding environmental matters will follow the organisational structure shown in **Figure 1**.

All instructions that relate to the CEMP will be given to the Contractor via the TNPA Project Manager. In an emergency situation, however, the TNPA Environmental Officer may give an instruction directly to the Contractor. Environmental Management of the site will be an item on the agenda of the monthly site meetings, and the TNPA Environmental Officer will attend these meetings on request by the Contractor. If at any time the TNPA Project Manager is uncertain in any way with respect to an environmentally related issue or specification in the CEMP, he will consult with the TNPA PEM.

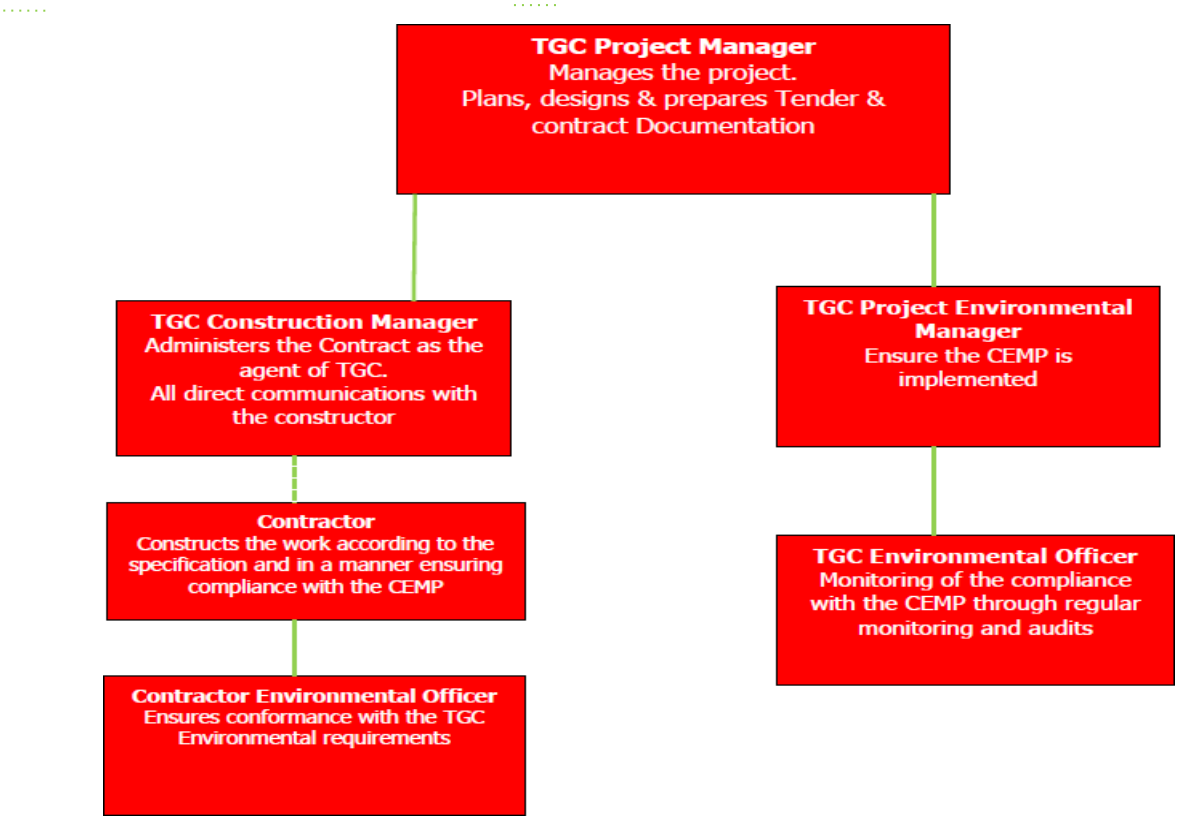

Figure 1: Typical TNPA Organogram for Construction

5.3 Availability of the CEMP

Copies of the relevant CEMP documentation (SES, & PES, and any Contractor's Guideline Documents) must be available at the site offices of the Contractor and/or on site.

5.4 Project Environmental Management Plan

The Contractor is required to submit an Environmental Management Plan (EMP) with his Tender Documents. The EMP should describe the relevant roles and responsibilities and how potential environmental risks will be assessed and managed including the monitoring and recording thereof. These will be used to establish a Contractor's competency and experience of preventing and managing potential environmental impacts.

5.5 Environmental Method Statements

Environmental Method Statements are written submissions by the Contractor to the TNPA Construction Manager and Environmental Officer describing:

- The proposed activity, setting out the plant, equipment, materials, labour and method the Contractor proposes using to carry out an activity;
- The environmental management of site conditions – waste management, housekeeping, site establishment;
- Transportation of the equipment to and from site;
- How the equipment/ material will be moved while on site;
- How and where material will be stored;
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- Timing and location of activities;
- Description of potential positive and negative environmental impacts and how they will be managed;
- Conformance/ non-conformance with the Standard Environmental Specification and any other statutory and best practice standards;
- Monitoring and reporting requirements;
- Records Management; and
- Any other information deemed necessary by the TNPA Construction Manager and TNPA EO as well as ECO where applicable.

The Contractor will compile Activity/Aspect-based Environmental Method Statements for all activities proposed. The Environmental Method Statements will enable the potential positive and negative environmental impacts associated with the proposed construction activity to be identified and mitigation measures put in place. All method statements must be signed by both the Contractor and TNPA CM and EO, with the addition of the ECO on authorised projects, thereby indicating that the works will be carried out according to the methodology described therein.

Activities may only commence once the Environmental Method Statements have been approved by the TNPA PEM, Construction Manager and/or ECO. In some instances local authorities may also need to approve the method statements. This will be highlighted in the Project Environmental Specification, when applicable.

All changes to the original Method Statements must be approved by the TNPA PEM/EO and/or TNPA Construction Manager prior to implementation. The Contractor, TNPA CM, EO and/or ECO will also be required to re-sign the amended Environmental Method Statement.

To enable timely approvals, the environmental method statements will be submitted to the TNPA Construction Manager and TNPA Environmental Officer for review **two (2) weeks** prior to the intended date of commencement of the activity, or as directed by the TNPA Project Manager/Construction Manager.

Where changes to the work methodology are proposed, Environmental Method Statements must be amended accordingly and signed off by all relevant parties as indicated above. These Environmental Method Statements MUST contain sufficient information and detail to enable the TNPA Construction Manager and/or Environmental Officer to apply their minds to the potential impacts of the works on the environment. The Contractor will also need to thoroughly understand what is required of him/her in order to undertake the works.

The initial Environmental Method Statements required for submission and approval are listed in the environmental specifications. Others may be requested by the TNPA Construction Manager and/or TNPA Environmental Officer/ECO during the Contract.

An explanatory example of an environmental method statement on the pro forma method statement sheet to be completed has been included as **Annexure B**.

5.6 Environmental Incidents

Environmental incidents are classified under four levels: 1, 2, 3 and 4. For the purpose of this document; they are defined as follows:

5.6.1 Level 1 Environmental Incident

An incident or sequel of incidents, whether immediate or delayed, that results or has the potential to result in:

- A significant impact on the physical or biological environment (air, ground, water and habitat) with extensive or long term impairment of ecosystem function or surface and ground water resources.
- An inconvenience/ disturbance/disruption/annoyance (including odour, dust, noise, traffic problem, loss of water supply) of a long duration or with a long term impact on interested and affected parties. A release of material (gas, liquid, solid) or energy that will cause chronic illness, permanent lost time injury, fatality or extensive property damage experienced by interested and affected parties.
- Irreparable damage to highly valued structures and sacred locations.
- Public or national / international media outcry.
- Instances where inspections undertaken by or for the regulator to check legal compliance, were found to be outside the permitted limits and have resulted in prosecution.

Where the environmental impact of a Level 2 environmental incident is still present 120 days after occurrence, the incident will be reclassified as a Level 1 incident.

NOTE: A Level 1 environmental incident usually should be reported to the authorities, the incident usually results in significant pollution and may entail risk of public danger. Level 1 environmental incidents usually cause an irreversible impact even with the involvement of long-term external intervention i.e. expertise, best available technology, remedial actions, excessive financial cost etc.

5.6.2 Level 2 Environmental Incident

An incident or sequel of incidents, whether immediate or delayed, that results or has the potential to result in:

- A moderate impact on the physical or biological environment (air, ground, water or habitat) with limited impairment of ecosystem function and/or surface and ground water resources.
- An inconvenience disturbance/ disruption/annoyance (including odour, dust, noise, traffic problems, loss of water supply) of moderate or with medium effect on interested and affected parties.
- A release of material (gas, liquid, solid) or energy that causes severe but reversible illness, non-lost time injury or moderate property damage experienced by interested and affected parties.
- Damage to rare structures of cultural significance or significant infringement of cultural values / sacred locations.
- Attention from local media or widespread complaints.
- Instances where inspections undertaken by or for the regulator to check legal compliance have been outside the permitted limits and an official pre-directive or directive was issued.
- Inability of Contractors to close out corrective actions in an NCR without proper reason.

NOTE: A Level 2 environmental incident may be reported to the authorities, can result in significant pollution or my entail risk of public danger. The impact of Level 2 environmental incidents should be reversible within a short to medium term with or without intervention.

5.6.3 Level 3 Environmental Incident

An incident or sequel of incidents, whether immediate or delayed, that results or has the potential to result in:

- A minor impact on the physical or biological environment (air, ground, water or habitat), with no significant or long-term impairment to the ecosystem function or surface/ground water resources.
- An inconvenience / disturbance / disruption / annoyance (including odour, dust, noise, traffic problems, loss of water supply) of short duration and with no long-term effect on the employees and the community.
- A release of material (gas, liquid, solid) or energy that has the potential to cause illness, or that causes short term discomfort or reversible health effect to interested and affected parties.
- Isolated complaints by interested and affected parties.

- Instances where inspections undertaken taken by or for the regulator to check for legal compliance, have been outside the permitted limits and a non-compliance notice was issued.

NOTE: A Level 3 environmental incident is not reportable to authorities, should not result in pollution and may not have a risk of public danger. The impact of Level 3 environmental incidents should be insignificant immediately after occurrence and/or once-off intervention on the day of occurrence.

5.6.4 Level 4 Environmental Incident

A minor incident with lesser significance that did not necessarily result in damage or injury but that had the potential to cause damage to the environment, including:

- Could result in service disruption with a lesser significance;
- Did not necessarily result in damage; and/or
- Had the potential, under different circumstances, to cause major damage to the environment

In the event of an environmental incident, the Contractor will follow the following procedure:

Step 1:	Immediately take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;
Step 2:	Telephonically notify the TNPA Environmental Officer and follow up in writing within ***one(1) working day*** including the following information: the nature of the incident and initial classification; substances involved with quantities; initial measures taken to minimise impacts; causes of the incident; measures taken and proposed to avoid the reoccurrence of the incident;
Step 3:	Step 3: Report the incident on all relevant documents and systems - TNPA Environmental Incident Register; TNPA Environmental Incident Report and TNPA Incident Flash Report;
Step 4:	Undertake clean-up procedures;

Step 5: Remedy the effects of the incident; and

Step 6: Assess the immediate and long-term effects of the incident on the environment and on public health;

In the event of any Level 1 or 2 environmental incidents, the TNPA Environmental Officer will:

• Ensure that an Incident Flash Report (FAC-FAT-0005) has been compiled and that it contains the necessary information; and
• Ensure that Contractor has complied with relevant Transnet protocols on Occurrence Management.

In the event of any Level 3 environmental incident, the Contractor's Environmental Officer must complete a TNPA Environmental Incident Report and document the incident on the TNPA Environmental Incident Register.

In the event of any Level 4 environmental incidents, the Contractor's Environmental Officer must document the incident on the TNPA Environmental Incident Register and/or the Contractor's Incident Register.

In the event of an incident (regardless of level) occurring, the TNPA EO shall ensure that the problem statement on the report is clear, the actual or potential consequences are noted, and priority mitigation actions and responsibility for actions are indicated where necessary.

5.7 ublic Complaints

Any public complaint received shall be dealt with as depicted in Figure 2.

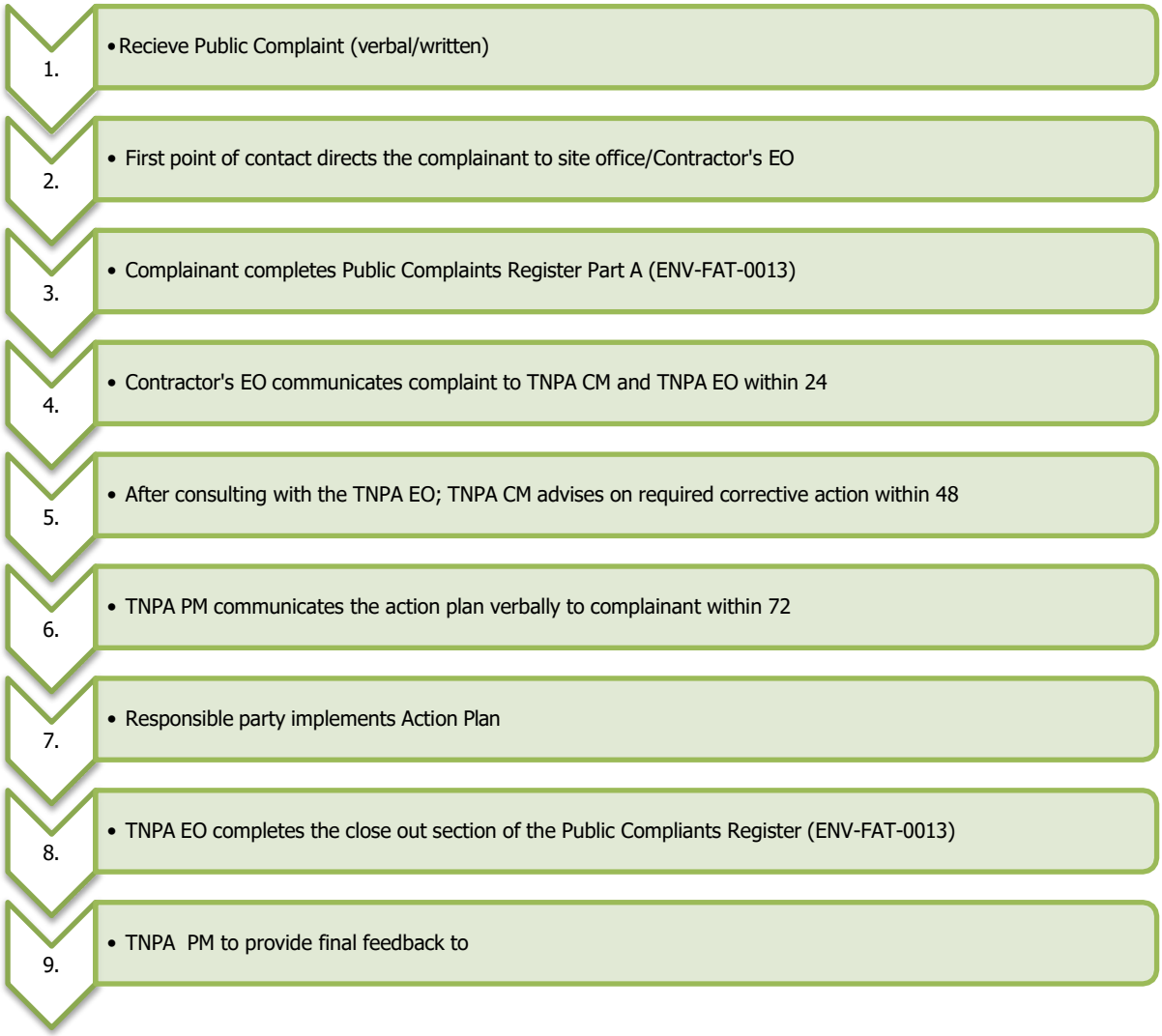

Figure 2: Public Complaints Procedure

5.8 Environmental Non-Conformances

A non-conformance may be issued to the Contractor by the TNPA Project Manager/Construction Manager/Environmental Officer where:

- The incident response procedure described in section 5.6 above (including administrative requirements) was not successfully implemented; or
- There are repeated incidents due to inadequate environmental practices on site;
- Documentation required to comply with the CEMP is not prepared or maintained adequately on site; or

- Any non-compliance/non-conformance with the requirements of the Environmental Authorisations, the CEMP, permit(s), licence(s) and Environmental Specifications are identified.

Any environmental non-conformance will be dealt with similarly to a *Defect* as defined in the Contract. A defect is due to non-compliance with the *Works Information* and it is the responsibility of the Contractor to correct the defect in order to ensure that the work takes place in accordance with the *Works Information*. Similarly, non-conformance with the CEMP and SES or with any other permit or licence will be regarded as a non-conformance with the *Works Information*. The Contractor is responsible to rectify any *defect* (non-conformance) as defined above promptly.

The Contractor's EO shall be responsible to search for and identify non-conformances with the environmental specifications at inspection intervals agreed to with the TNPA Environmental Officer. The TNPA Environmental Officer shall also undertake such inspections on a monthly basis. If such monthly inspections indicate that any part of the Contractor's work is non-conformant with the requirements of the CEMP, permit(s), licence(s), the TNPA Environmental Officer shall complete an Environmental Non-Conformance Report and advise the TNPA PM to issue a Defects Notification to the Contractor accordingly. The Contractor shall correct the non-conformance (defect) within the timeframes specified in the report and notification and submit proof of such correction to the TNPA Environmental Officer by virtue of a completed Non-Conformance Report and up to date Non-Conformance Register.

The Contractor shall be responsible to rectify all environmental non-conformances at the time depicted as per Non-conformances that have not been rectified by the defects in the Contract date, the TNPA Environmental Officer shall not issue the Contractor with a Site Closure Certificate. In such an event, the Supervisor may also make use of any reasonable contractual means to rectify the non-conformance(s) as allowed by the Contract (retention moneys etc.).

If the defect (non-conformance) is not corrected within the Defect Correction Period, the TNPA Construction Manager can assess the cost of correction by others, and this amount needs to be paid by the Contractor.

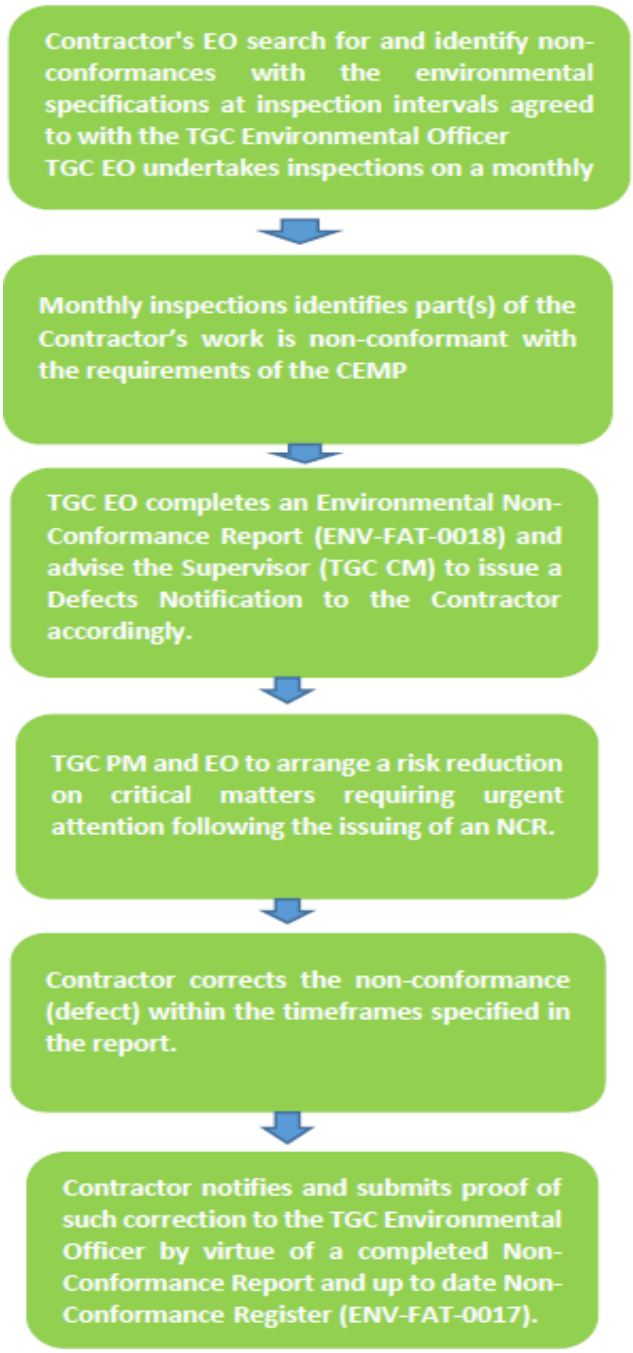

Figure 3: Non-Conformance procedure

NOTE: Each Non-conformance should be listed and numbered separately.

5.9 Documentation and Records

The TNPA Document Control will ensure that the Contractor is supplied with all required/applicable documents listed in the TNPA Contents for the Contractors Environmental Management File. This Document has been included as **Annexure A.**

The Contractor's Environmental Officer will complete and maintain copies of all documents and records listed in Annexure A and ensure that these documents and records are kept up to date.

The Contractor's Environmental Officer will submit these documents to the TNPA Environmental Officer on a frequency as agreed to, except where documents have remained unchanged in which case written notification to this effect must be provided to the TNPA Environmental Officer. The Contractor's EO must ensure that electronic copies of these documents are saved on the system.

Once the construction activities have been completed and the TNPA Environmental Officer has conducted a site closure inspection and notified the Contractor that site closure will be granted, all documents described above must be handed over to the TNPA Environmental Officer after which a Site Closure Certificate will be issued.

NOTE: All documents/records are to be retained, within the TNPA Document Control System, for a period of 10 years. In the event of environmental documentation/record being lost before receiving a Site Closure Certificate, the Contractor will be penalised according to the specifications laid down in the relevant project-specific contract.

5.10 Application for Exemption

It is intended that the CEMP and SES be applicable to projects or activities of any size or complexity. For projects with minimal environmental impacts, or where the scope of work is limited; the Contractor may request, in writing to the TNPA Project Manager, for exemption from parts of the CEMP. The TNPA Project Manager will consult the TNPA PEM/TNPA Environmental Officer in reaching a decision on whether exemption from some of the CEMP provisions may be granted.

Main Actions required by the Contractor to comply

6.1 Prior to Commencement

The TNPA Project Manager must ensure that the requirements below are requested of the Contractor in the Project Construction Contract Document, the Letter of Appointment and any other relevant correspondence with the Contractor prior to the start of works, as relevant.

6.1.1 Declaration of Understanding (DoU)

The Declaration of Understanding will be signed, by a person of authority, and provided by the Contractor as part of his Tender Document. The signed DoU is a written confirmation by the Contractor that the requirements of the CEMP, PES, EA, EMPr and other licenses/permits are understood and will be complied with for the duration of their works on site. Post-contract award, a DoU must be signed by the Contractor's EO to confirm that the requirements of the CEMP, SES, PES and other applicable permits and licences will be compiled with. A signed DoU must be kept in the green file at all times.

The pro forma DoU to be signed by the Contractor has been included as **Annexure C.**

6.1.2 Appointment of Contractor's Environmental Officer

The Contractor will appoint an Environmental Officer or depending on the environmental impact of the project, assign a competent person, roles and responsibilities for environmental management during construction. The qualifications and experience of this person shall be stipulated at tender stage taking due regard to the complexity of the project and the sensitivity of the environment. The Contractor will forward details of the appointment to the TNPA Construction Manager and TNPA PEM for their review and approval. Should the Contractor's Environmental Officer or the person originally assigned with responsibilities for environmental management change from that person identified during either the tender stage, or the construction period, the Contractor will submit the details of such appointment or assignment for the TNPA Project Manager's approval. No work will proceed until the new Environmental Officer is assigned or appointed. The Contractor's EO must be employed for the duration of the contract and be 100% allocated to project. Sharing of an EO resource between projects is not allowed unless if it's agreed upon with TNPA Environment and Sustainability Department.

The pro forma appointment letter for the Environmental Officer to be appointed by the Contractor has been included as **Annexure D.**

6.1.3 Environmental Management Plans and Method Statements

Where relevant, an Environmental Management Plan and Environmental Method Statements, to meet the requirements of the CEMP, SES and relevant EA, permits/licences (activity based environmental method statements), will be provided by the Contractor as part of their Tender.

Required method statements will be specified in the Quality Criteria of the tender. These include, but are not limited to, the following where applicable:

- Establishment of construction lay down area
- Hazardous and non-hazardous waste management
- Storm water management
- Handling, Storage and Management of Hazardous Substances
- Contaminated water management
- Prevention of marine pollution
- Hydrocarbon spills
- Diesel tanks and refuelling procedures
- Dust control
- Spoil dumping
- Sourcing, excavating, transporting and dumping of fill material
- Noise and vibration control
- Removal of rare, endemic or endangered species
- Removal and stockpiling of topsoil
- Rodent and pest control
- Environmental awareness training
- Site establishment and demarcation
- Emergency procedures for environmental incidents
- Closure of construction laydown area
- Rehabilitation

Emergency construction activity Environmental Method Statements may also be required. The activities requiring Environmental Method Statements cannot commence if they have not been approved by the Construction Manager and PEM, ECO or Environmental Officer.

6.1.4 Environmental Induction

The Contractor will ensure that all management, foremen and the general workforce, as well as all sub-contractors, suppliers and visitors to site have attended the TNPA Environmental Induction Programme prior to commencing any work on site. Where new personnel commence work on site during the construction period, the Contractor will ensure that these personnel also undergo the TNPA Environmental Induction Programme and are made aware of the environmental specifications on site. The Contractor must ensure that all of their personnel

understand the requirements of the EA, EMPr, CEMP, SES, relevant permits and licences and PES as relevant to their scope of work.

6.2 During Construction

6.2.1 Copy of the CEMP and familiarisation thereof

A copy of the CEMP, SES and where relevant, EA, licenses and permits will be available on site and the Contractor will ensure that all the personnel on Site (including sub-contractors and their staff) as well as suppliers, are familiar with and understand the specifications contained in these documents.

6.2.2 Compliance with the SES and PES and relevant permits and licences

The Contractor will ensure that all sections of the SES and PES (where relevant), relevant EA, permits and licences are complied with during the construction period.

6.2.3 Site clean-up for Closure

Retention moneys will not be paid until a Site Closure Inspection (conducted by the TNPA Environmental Officer) has taken place and site closure granted and signed off by the TNPA Construction Manager and TNPA PEM together with the Site Closure Certificate.

Environmental Inspections and Audits

7.1 Environmental Inspections and Audits

Environmental inspections and audits are conducted using five basic techniques:

- Interviews with Contractor's staff including Sub-contractors and suppliers
- Document review
- Observations
- Monitoring
- Measurement and verification

This document sets out the areas and aspects of the construction site that will be inspected or audited, the frequency of such audits, the auditor and auditee.

It should be noted that these lists are not exhaustive and that each site will have specific issues that will need to be audited.

For each construction project, the auditor and auditee are as follows:

Table 1: Relationship between Auditor/Auditee

Place	**Inspector/Auditor**	**Auditee**	**Inspection/audit frequency**
Work places	Contractor's Environmental Officer	Contractor's team	Daily/Weekly Inspection
Construction site (entire area)	TNPA Environmental Officer	Contractor's Environmental Officer	Monthly Audit
Construction site (entire area)	Environmental Specialist: Assurance	TNPA EO and PEM	As stipulated on the annual audit protocol
Construction site (entire area)	Environmental Control Officer	Construction team (TNPA and Contractors)	As stipulated on the EA or TNPA Contract

7.1.1 Work Places Inspection

The Contractor's Environmental Officer will be required to conduct daily/weekly inspections of all work places for which the Contractor is responsible, including but not limited to the following:

- Contractor's camp, recreational and canteen facilities
- Material lay down areas
- Liquid and solid waste storage facilities (general, hazardous, recycling and scrap)
- Workshops
- Oil traps
- Wash bays
- Construction work area
- Spray Booths
- Haul roads
- No-go areas
- Storm water drains

- Any other construction area for which the SHE Officer is responsible

At each of these sites, the Contractor's Environmental Officer will be required on a daily basis to check for the following, where relevant:

By observation:

- Litter
- Separation of solid waste as per system
- Hydrocarbon spills
- Effectiveness of dust control measures
- Illegal washing out of containers in drains
- Wash bay drainage systems are working
- Correct usage of drip trays
- Effectiveness of oil separators
- Water use and wastage
- Pollution of rivers and sea
- Provision and use of toilet facilities
- Any other illegal activities

By document check:

- Removal of oil for recycling as per schedule
- Removal of packaging as per agreements with suppliers
- Removal of hazardous waste by specialist Contractors as per schedule
- Correct placement of environmental signage and posters
- Document board listing emergency numbers, hazmat info sheets, etc.

The following records must also be kept up to date (information must include that of sub-contractors where relevant):

- Fuel consumption for entire contract period measured in litres (including plant, generators, other equipment, vehicles etc.)
- Electricity consumption for entire contract period measured in Watt hours
- Quantities of general waste submitted for recycling measured in kilograms
- Quantities of general waste disposed of to landfill measured in kilograms
- Quantities of hazardous waste submitted for recycling measured in kilograms
- Quantities of hazardous waste disposed of to landfill measured in kilograms

- Water consumption, including water used for construction and human consumption measured in litres

7.1.2 Construction Site Audit

The TNPA Environmental Officer will be required to conduct monthly inspections of the entire construction site, which may involve more than one Contractor and may include, but not be limited to the following:

- Entire site
- Fencing
- Environmentally sensitive areas
- Contractor's camp, recreational and canteen facilities
- Material lay down areas
- Scrap yard
- Workshops
- Oil traps
- Wash bays
- Sewage plant
- Quarries and borrow pits used for fill and construction material
- Spoil dumping areas
- Solid waste disposal areas
- Liquid waste disposal areas
- Bioremediation site
- Area for the temporary storage of hazardous waste
- Fuel depot and hydrocarbon storage areas
- Construction work area
- Concrete batching plant
- Spray booths
- Haul roads
- No-go areas
- Storm water drains
- And any other construction areas not listed

At each of these sites, the TNPA Environmental Officer will be required to check for the following, where relevant:

By observation:

- Litter
- Separation of solid waste as per system
- Hydrocarbon spills
- Use of bunding, hard standing and other protection measures
- Illegal dumping
- Effectiveness of dust control measures
- Illegal washing out of containers in drains
- Wash bay drainage systems are working
- Correct usage of drip trays
- Effectiveness of oil separators
- Illegal use of tracks and off-road driving in no-go areas
- Correct procedures are followed for topsoil removal and stockpiling
- Effectiveness of erosion protection measures
- Excess noise and vibration
- Water use and wastage
- Pollution of rivers and sea
- Provision and use of toilet facilities
- Topsoil removed and stockpiled
- Any other illegal activities

By document check:

- All receipts for the collection of old oil, general recycled waste and hazardous waste
- Correct placement of environmental signage, SHEQ policies and posters
- Document board listing emergency numbers, hazmat info sheets, etc.
- Complete and accurate record of Contractor's Environmental File

By measurement:

- Amount of water used by each Contractor (where practical and/or required by TNPA EO)
- Amount of land stabilisation completed
- Area re-vegetated
- Amount of waste recycled, sent to scrap yard or disposed in dump
- Amount of material treated in the bioremediation site

By monitoring:

- Effectiveness of dust control systems
- Effectiveness of pollution control systems
- Effectiveness of rehabilitation and re-vegetation programmes
- Effectiveness of erosion control methods
- Effectiveness of noise control barriers

A site-specific inspection checklist will be provided to the TNPA Environmental Officer, by the Contractor's EO, prior to site establishment.

7.2 Environmental Performance Criteria

The Contractor will be required to achieve the minimum requirement for environmental audits. The standard/minimum requirement for all environmental audits, as per the TNPA Environmental Governance Framework is 80%. Furthermore, the standard/minimum requirement for all audits conducted by ECO is 90%.

8 Associated Forms

The list of applicable environmental forms and templates will be maintained by TNPA's Document Management Department, and these are revised as and when required.

Records

All environmental records/documents generated during the construction phase of the project will be managed in terms of the Transnet Document, Data and Records Management Procedure.

Annexures

Annexure A: Contents for Contractor's Environmental File
Annexure B: Environmental Method Statement Example
Annexure C: Declaration of Understanding
Annexure D: Appointment of Contractor's Environmental Officer

Annexure A: Contents for Contractor's Environmental File

TRANSNET

CONTENTS FOR CONTRACTOR'S ENVIRONMENTAL FILE

PROJECT NAME:		**DOCUMENT NO:**	
PROJECT NO:		**DATE:**	
CONTRACTOR:		**CONTRACT NO:**	

The following documents must be incorporated into the Contractors Environmental File

No	Item Description	Document No	Tick
1.1	Transnet Safety, Health, Environmental and Quality – Risk Management Policy Statement dated 10 June 2016.		
1.2	TGC Safety, Health, Environmental Management and Quality Policy dated 01 June 2016.		
1.3	Transnet Construction Environmental Management Plan (CEMP) as supplied to Contractor by Transnet Group Capital	**ENV-STD-001 Rev03**	
1.4	Transnet Standard Environmental Specification (SES) as supplied to Contractor by Transnet Group Capital	**ENV-STD-002 Rev03**	
2	Project Environmental Specification (PES) as supplied to Contractor by Transnet Group Capital	**ENV-FAT-0001**	
3	Declaration of Understanding (Signed)	**ENV-FAT-0002**	
4.1	Contractor's Information	**ENV-FAT-0003**	
4.2	Contractor's Environmental Policy		
4.3	Contractor's Organogram		
4.4	Contractor's Environmental Management Plan		
4.5	Appointment of Contractors EO and Declaration of Understanding (Including CV and Job Profile)	**ENV-FAT-0004**	
5	Schedule of Contractor's Construction Plant and Equipment	**ENV-FAT-0005**	
6	Hazardous Substances Register	**ENV-FAT-0006**	
7	Emergency Contacts Register	**ENV-FAT-0007**	
8	Energy Consumption Register	**ENV-FAT-0032**	

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CONTENTS FOR CONTRACTOR'S ENVIRONMENTAL FILE

9	Water Usage Register	ENV-FAT-0033	
10	List of Interested and Affected Parties	ENV-FAT-0008	
11	Induction Attendance Register	Rev 00-01	
12	Project Start-Up Checklist	ENV-FAT-0022	
13	Site Access Certificate	ENV-FAT-0010	
14	Method Statement Register	ENV-FAT-0011	
15	Method Statements	ENV-FAT-0026	
16	Waste Disposal Register	ENV-FAT-0012	
17	Daily Inspection Checklist	ENV-FAT-0023	
18	Weekly Inspection Checklist	ENV-FAT-0024	
19	Monthly Compliance Audits	ENV-FAT-0025	
20	Public Complaints Register	ENV-FAT-0013	
21	Record of Formal External Communications	ENV-FAT-0014	
22	Incident Register	ENV-FAT-0015	
23	Incident Reports	ENV-FAT-0016	
24	Non Conformance Register	ENV-FAT-0017	
25	Non Conformance Reports	ENV-FAT-0018	
26	Awareness/Toolbox Attendance Register (Including Awareness Material)	ENV-FAT-0019	
27	Minutes of Monthly SHE Meetings		
28.1	Environmental Site Rules for Visitors	ENV-GL-0002	
28.2	Environmental Site Rules for Contractors	ENV-GL-0003	
29	Basic Site Procedures	ENV-GL-0001	

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CONTENTS FOR CONTRACTOR'S ENVIRONMENTAL FILE

30	TGC Environmental Induction		
31	Contractor's Environmental Management File Handover	**ENV-FAT-0020**	
32	Site Closure Inspection Form	**ENV-FAT-0021**	
33	Site Closure Certificate	**ENV-FAT-0021**	
34	Application for Exemption	**ENV-FAT-0034**	

Annexure B: Environmental Method Statement Example

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ENVIRONMENTAL METHOD STATEMENT

PROJECT NAME:

PROJECT NO: **DOCUMENT NO:**

CONTRACTOR: **DATE:**

PROPOSED ACTIVITY (give title of method statement and reference number from the CEMP):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:	End Date:

DESCRIPTION OF HOW POTENTIAL ENVIRONMENTAL IMPACTS WILL BE PREVENTED OR MANAGED (provide as much detail as possible, including annotated sketches and plans where possible):

ENVIRONMENTAL STANDARDS (list the applicable environmental standards to be met):

MONITORING AND RECORD KEEPING (Describe how the activity will be monitored to ensure that the environmental standards are met, as well as the records to be kept):

DECLARATIONS

CONTRACTOR'S ENVIRONMENTAL OFFICER (The work described in this Environmental Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm):

Print Name	Signature	Date

PERSON UNDERTAKING THE WORKS I understand the contents of this Environmental Method Statement and the scope of the works required of me. I further understand that this Environmental Method Statement may be amended on application to other signatories and that Transnet Group Capital Environmental Manager and Construction Manager will audit my compliance with the contents of this Environmental Method Statement

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ENVIRONMENTAL METHOD STATEMENT

Print Name	Signature	Date

TGC ENVIRONMENTAL OFFICER The work described in this Environmental Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm:

Print Name	Signature	Date

APPROVING AUTHORITY (i.e. the Employer's Construction Manager)

The works described in this Method Statement are approved.

Print Name	Signature	Date

Annexure C: Declaration of Understanding

TRANSNET

DECLARATION OF UNDERSTANDING

PROJECT NAME:		**DOCUMENT NO:**	
PROJECT NO:		**DATE:**	
CONTRACTOR:		**CONTRACT NO:**	

I,

_____ _____

(Name) *(Designation)*

_____

(Representing)

Declare that I have read and understood the contents of the Construction Environmental Management Plan (ENV-STD-001) and associated documents for the above mentioned Project and Contract.

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed	Signature	Date
Place		
Witness 1:	Signature	Date
Witness 2:		

Annexure D: Appointment of Contractor's Environmental Officer

TRANSNET

APPOINTMENT OF CONTRACTOR ENVIRONMENTAL OFFICER & DECLARATION OF UNDERSTANDING

APPOINTMENT OF CONTRACTOR ENVIRONMENTAL OFFICER AND DECLARATION OF UNDERSTANDING	REFERENCE	

We, _____ *(Contractor)*, hereby confirm that

_____ has been appointed as Environmental Officer for the duration of Contract

_____, the scope of which entails _____

_____

_____ (Description of scope of works)

_____

I, _____ (Appointed Environmental Officer) declare that I have read and understand the contents of:

- The Transnet Group Capital (TGC) Construction Environmental Management Plan (CEMP) and Standard Environmental Specification (SES), documentation issued for Contract _____

I, (Appointed Environmental Officer) also declare that I understand my responsibilities in terms of enforcing and implementing the requirements of the Construction Environmental Management Plan, Standard Environmental Specification (SES) and any Project Environmental Specifications (PES) that may be relevant or required for this project.

Environmental Officer CV attached	Y	N	**Environmental Officer Job Description attached**	Y	N
Signed (Contractors Environmental Officer)	Signature		**Date**		
Received By (TGC Environmental Officer)	Signature		**Date**		

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DECLARATION OF UNDERSTANDING

PROJECT NAME:		**DOCUMENT NO:**	
PROJECT NO:		**DATE:**	
CONTRACTOR:		**CONTRACT NO:**	

I,

_____ _____

(Name) *(Designation)*

_____

(Representing)

Declare that I have read and understood the contents of the Construction Environmental Management Plan (ENV-STD-001) and associated documents for the above mentioned Project and Contract.

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed	Signature	Date
Place		
Witness 1:	Signature	Date
Witness 2:		

Note: If hardcopy, check electronic system for latest revision

Transnet Capital Projects Document Management

Contractor Documentation Submittal Requirements

DOC-STD-0001

Prepared by: R. Herholdt — Date: 21/09/2009

Reviewed by: N Uys, ~~Q Koen, G Whyte~~ — Date: 6/09/2009.

Approved by: C. Lesch / A. Wilson — Date: 13/10/09

03	25/08/2009	NEC Requirements checked
02	18/05/2009	CORRECTIONS
01	23/01/2009	CORRECTIONS
0	15/12/2008	ISSUE FOR REVIEW
Rev No.	**Date**	**Revision Details**

Table of Contents

1. Purpose

This standard outlines the documentation requirements that are to be implemented by the *Contractor* for the preparation, submission, receipt, review, and collection of Technical and (or) Deliverable Documentation, as detailed in the Contractor Documentation Schedule (CDS).

Contractor documentation is of the utmost importance for the in-house Engineering activities as the information contained in the *Contractor's* documentation interfaces with several other disciplines for the Engineering, e.g., Mechanical, Structural, Piping, Control and Instrumentation, Electrical, etc.

The supply of high quality documentation within the time required as defined in the '*Works Information*', Contractor Documentation Schedule (CDS), and *Contract* must be considered as one of the main objectives by the *Contractor*.

2. Scope

This scope defines the *Contractor's* responsibilities in terms of the preparation of all the *Contractor* Deliverables required for each *Contract*.

3. References

- ISO 9001:2000 - Quality Management Systems Requirements
- SANS 10111 - Code of Practice for Engineering Drawings
- SANS 10143 - Building Drawing Practice
- DOC-FAT-0001 - Contractor Documentation Schedule (CDS)
- DOC-FAT-0002 - Contractor Documentation Register (CDR)
- DOC-FAT-0003 - Contractor Review Label (CRL)
- DOC-FAT-0004 - Contractor Review Label (CRL) for drawings

4. Definitions / Abbreviations

4.1 Definitions

'As-Built' Document	Is a final record of what was actually installed / constructed according to the Fabrication / Construction *Contractor*, and includes all deviations or changes from the approved AFC document(s). As-Built document(s) are required to reflect the same degree of detail as the original document(s). As-Built document(s) shall be done by all *Contractors*.
Contract	Formal document evidencing agreement between *Employer* and *Contractor* for supply of on site or off site services (generic term used for Purchase Orders, Contracts and Service Orders in this Procedure).
Contractor	The party to a contract that provides services to the *Employer* (generic term used for Vendors, Suppliers, Contractors, Consultants, etc.).
Controlled Document	Any document where its revision and distribution are recorded to ensure that Project Team Members holding a copy of the document have the current revision, and will receive future revisions, subject to a formal review and approval process.
Documentation	Collective term used to describe drawings and documents, e.g., letters, faxes, drawings, specifications, reports, manuals, standards, publications, software, etc.
Document Control	The function that ensures systematic registration, distribution, retrieval, status reporting, and storage of revision controlled documentation, typically Technical and (or) Deliverable documentation.
Document Management	Is the over-arching term used to describe the management of documentation on a Project.
Employer	The party to a Contract or Purchase Order to whom the goods are supplied or for whom the work or services are performed. For this project Transnet Capital Projects is the *Employer.*
Employer's Documentation	Shall mean all documentation issued to *Contractors* by the Project.
Engineering Deliverables	Technical documentation generated by Engineering, i.e. drawings, drawing registers, Engineering Document Registers, calculations, requisitions, equipment lists, design specifications, etc.

'For Record' Document	A set of record drawings / documents conforming to the marked up prints, drawings and other data, handed over to the *Employer* as part of the Project Handover Procedure.
Master Document	The original wet signed (signature) document which is held by Project Office Document Control.
Native/Source Document	Original electronic file format of documentation.
Project Deliverables	Is any document, drawing, report, register, task, etc.
Project Manager	The Project Manager is appointed by the *Employer*, and his role is to manage the Contract for the *Employer*.
Squad Checking	The review of technical documentation by multiple Engineering disciplines in order to ensure co-ordination, communication and interface between the various disciplines; done in an area specifically allocated for the review of documentation; the process / activity is controlled by Document Control but the work is executed by the Engineering Team.
Tender Document	The formal document that expresses the terms, both Commercial and Technical, against which a Tenderer submits its Tender for Contracts.
Transmittal	Is documented evidence of the formal distribution of documentation to recipients which display Transmittal No., Title, Date, Issue Reason, Revision No. etc. It is evidence of distribution and receipt of documentation.
Uncontrolled Document	Any copy of a document where distribution is not required to be recorded, and that does not require revision control or formal review.
Working Document	The main working copy of an original document where proposed changes are recorded for incorporating into subsequent revisions.
'*Works Information*'	Shall refer to the *Works Information* as defined in the Contract

4.2 Abbreviations

AB	As-Built / Recorded Documentation

AFC	Approved For Construction
CDR	Contractor Documentation Register
CDS	Contractor Documentation Schedule
CRL	Contractor Review Label
DC	Document Control
DCIS	Document Control Instruction Sheet
EDMS	Electronic Document Management System
FN	Final
RE	Responsible Engineer

5. Responsibilities

5.1 *Contractor*

The *Contractor* is responsible for submitting all documentation, required by the Contract, via Document Control to the relevant *Project Manager*, to comply with the requirements of this standard.

The *Contractor* is responsible for setting up and maintaining his own internal Document Control Process to ensure traceability and accountability for all information submitted to the *Project Manager*, and all information issued to Sub-Contractors.

5.2 *Sub-Contractors*

The *Contractor* is responsible for providing the *Sub-Contractors* with all the relevant information, and for ensuring that the *Sub-Contractors* applies the Standard, and submit their data via the *Contractor* for formal submission to the *Project Manager*. (If the *Contractor* sub-contracts work, he is responsible for providing the Works as if he had not sub-contracted.)

6. Procedure

6.1 Documentation to be Submitted

6.1.1 Contractor Documentation Schedule (CDS) (DOC-FAT-0001)

The CDS states the Employer's requirements for:

- The document types to be submitted by the *Contractor* at various stages of the Contract
- The timing for documentation to be submitted by the Contractor
- The *Project Manager* completes the Contractor Documentation Schedule (CDS) and includes it with the Enquiry and Contract as an attachment / annexure to the 'Works Information' document. The *Contractor* submits documentation as required by the Contractor Documentation Schedule (CDS), within the time specified in the Contract All documentation shall be submitted according to the dates specified in the Contractor Documentation Schedule (CDS).

6.2 Contractor Documentation Register (CDR) (Annexure B)

The Contractor Documentation Register (CDR) is a list of documentation that the *Contractor* is to submit in accordance with the *Contract*. The *Contractor* is to use the Contractor Documentation Schedule (CDS) as the basis for developing the Contractor Documentation Register (CDR). The CDS is the minimum requirement, and the *Contractor* is still responsible to include all documentation on the CDR required for the successful completion of the contract even if no CDS has been included in the *Contract*.

The title of the documentation shall adequately define and describe the facility and equipment where applicable. The Contractor Documentation Register (CDR) must be submitted within 2 weeks of the *Contract* award date, unless otherwise indicated on the Contractor Documentation Schedule (CDS) or in the Contract. Once the Contractor Documentation Register (CDR) is submitted, the *Project Manager* in conjunction with Document Control assigns document numbers to each document. The Contractor Documentation Register (CDR) is reviewed and returned to the *Contractor* as defined elsewhere in this Standard. The *Contractor* is to use the exact document numbers and titles as provided and listed by the *Project Manager* on the Contractor Documentation Register (CDR), on each of the documents.

The Contractor Documentation Register (CDR) is a 'live' document that shall be updated and re-submitted by the *Contractor* on a regular basis to reflect any changes made, e.g., updated planned / actual submission dates or addition of new documents requiring new numbers. Changes to a row(s) of the register shall be highlighted in colour across the entire row(s).

The Contractor Documentation Register (CDR) shall be submitted in Excel (electronic format) as well as PDF format upon each submission to the Project, and shall also be submitted with the final documentation, unless otherwise agreed as per par 6.3.

The forecast and actual submission dates shall reflect the dates of the next issue of the documentation, and once this submission reaches conclusion the dates are to be updated to reflect the next issue, i.e., the as-built documentation submission dates.

6.3 Format in which Documentation is to be submitted

Although the aim of this Standard is to encourage all documentation to be managed and submitted electronically the *Contractor* can apply to the *Project Manager* to have these requirements changed to accept only paper copies of all documentation

6.4 Documentation Preparation Requirements

6.4.1 Quality

Documentation shall be of the highest quality to allow immediate and accurate use by the Project Manager, i.e., without any need for interpretation due to possible illegibility, or prints / copies of poor quality.

Any illegible or indecipherable drawings will be systematically rejected and returned to the *Contractor*, who shall in no case allege documentation being rejected and returned as a reason for any delay affecting delivery.

All documentation shall have sufficient borders for punching as required for filing purposes.

6.4.2 Standards and Codes

All documentation shall conform to the latest revisions of the following, i.e.,:-

- SANS 10111 - Code of Practice for Engineering Drawings, or
- SANS 10143 - Building Drawing Practice, or
- ISO 9001:2000 - Quality Management Systems Requirements

6.4.3 Language

All drawings and documents shall be in English.

6.4.4 Units and Dimensions

All units and dimensions on the *Contractor's* documentation shall be in SI units, unless otherwise specified.

6.4.5 Sizes of Documentation

6.4.5.1 Drawings

The following standard drawing sizes shall be used:

- A3 - 277 x 420mm
- A2 - 420 x 594mm
- A1 - 594 x 841mm
- A0 - 841 x 1189mm

Note:

- Drawings wider than A0 are not acceptable to the *Project Manager*
- Hard copy drawings shall be printed out at actual size, e.g., shall not print A1 size when drawing size is A0
- A4 drawings are prohibited unless issued as part of a document.

6.4.5.2 Other Documents

All the *Contractor's* documentation other than drawings shall be prepared on standard A3 or A4 size sheets suitable for insertion into an A4 (W71) hard-core binder (file).

All documentation shall have sufficient borders to allow for punching.

6.4.6 Documentation with Multiple Sheets

6.4.6.1 Drawings

If a series of drawings of a particular area is produced by the *Contractor* (e.g., loop diagrams which may have fifty (50) or more sheets) one sequential drawing number shall be used with a series of sheet numbers.

Where more than one sheet is used, the first sheet (numbered 01) shall incorporate an index for all the other sheets in the series, including their current revision status and date.

6.4.6.2 Documents

The *Contractor's* documents with several sheets (e.g., data sheets, reports, etc.) shall be compiled as sets, i.e., a multi sheet document identified as a single document with a single document number. Thus, each sheet is identified individually, e.g., "sheet 10 of 15" and all documents shall be numbered from page 2 onwards.

Each set shall include a Table of Contents and the identification data shall as a minimum contain the following, i.e., the document number, revision number, page number and continuation information shall appear on every page of the multiple page documents. The front sheet of each document shall be page 1; however the number or wording "page 1" is not shown on the first page.

6.4.7 Details Required on Documentation

Each drawing and document shall be identified with the following information, i.e.,:-

- Project Name and Number
- Contract Number or Purchase Order Number
- Equipment Tag Number(s) (if applicable)
- Manufacturer's model / type (if applicable)
- Official Name of *Contractor's* Company
- *Contractor's* Reference Number
- Project Document or Drawing Number
- Electronic File Name (identical to the *Employer's* Document or Drawing Number and not the *Contractor's* Document or Drawing Number)
- Identification and signature of Originator, Checker, Approver, PR Eng, etc.
- Complete Descriptive Title
- Revision

- Date

6.5 Electronic Documentation Requirements

No "Protection" or "password" will be placed on electronic files.

Electronic submissions shall conform to the minimum quality standard as listed below, i.e.,:-

- File Formats to be submitted
- All deliverables submitted by the *Contractor* must be supplied in the formats listed below, and be editable using the software listed in Table 1. Only exceptions that have prior approval from the *Project Manager* will be accepted. Software used shall be the latest generation, and where appropriate, shall be regularly upgraded**.**

Note:

All electronic documents shall be submitted in Adobe Acrobat (PDF) format and the 'Native' file shall be included at the final submission.

6.5.1 Table 1: Acceptable File Formats

Document Type	Description
Drawings	Native: Micro Station 2003 or later
	Published In: Adobe Acrobat (PDF) version 7 or later
Data Sheets (other than instrumentation)	Native: MS Excel 2003 or later
	Published In: Adobe Acrobat (PDF) version 7 or later
Data Sheets (Instrumentation)	Native: As per software used or as otherwise specified in Contract
	Published In: Adobe Acrobat (PDF) version 7 or later
Engineering Data Lists	Native: MS Excel 2003 or later
	Published In: Adobe Acrobat (PDF) version 7 or later
Calculation Outputs / Results	Native: As per software used or as otherwise specified in Contract
	Published In: Adobe Acrobat (PDF) version 7 or later
Document Viewers – Redlining	Adobe Acrobat v7 minimum with "Comments" enabled
All Reports	Native: MS Word 2003 or later
	Published In: Adobe Acrobat (PDF) version 7 or later
Report supporting Data including: Calculations, Charts,	Native: As per software used or as otherwise specified in Contract

Graphs, Indexes, etc.	Published In: Adobe Acrobat (PDF) version 7 or later
Manuals	Native: MS Word 2003 or later
	Published In: Adobe Acrobat (PDF) version 7 or later
General Documents	Native: MS Word 2003 or later
	Published In: Adobe Acrobat (PDF) version 7 or later
Presentations	Native: MS PowerPoint 2003 or later
	Published In: Adobe Acrobat (PDF) version 7 or later
Colour Photographs / Scanned Images	Native File format: JPG Compression level 1%
Graphic Imagery	Published images in: TIF uncompressed or WMF
	Native image format: Corel Draw 7 CDR file
	Adobe Photoshop 7.0 PSD
	PowerPoint 2000 PPT file
Project Schedules	Native: Primavera P6 (preferred)
	Native: MS Project
	Published In: Adobe Acrobat (PDF) version 7 or later
Databases (preferred)	MS SQL Server 2000
Databases (non-preferred)	ODBC compliant
	Microsoft Access 2003
Data Compression	Software: WinZip 8.0
Other General Project Data	Native: Microsoft Office 2003 application or later
	Published In: Adobe Acrobat (PDF) version 7 or later

6.5.1.1 Native File

Native files shall be clean of all extraneous fonts, formats and styles to ensure inadvertent reformatting and format adjustments or difficulties that do not eventuate in downstream handling of documents.

6.5.1.2 Adobe Acrobat (.PDF) Files

PDF files shall be of a high quality and without dark background shading as definition may otherwise become lost.

The quality of Adobe Acrobat (.PDF) files shall be such that a hardcopy of a laser printed A1 Adobe Acrobat (.PDF) drawing can clearly be read in A3 size. Similarly A3 and A4

Adobe Acrobat (.PDF) file quality shall be such that hardcopy of a laser printed A3 or A4 Adobe Acrobat (.PDF) document can clearly be read in A4 size.

The Contractor shall physically test and confirm this prior to transmitting Adobe files.

PDF files shall be saved as "Reader Extent" to make provision for the use of electronic signatures.

PDF files shall be "Optimized" to improve Quality and then "Reduce File Size" through Adobe.

6.5.1.3 Databases

Databases shall be presented in compatible format on CD Rom as specified in Table 1. Multi format documents (created from several files) shall be combined and submitted as a single Adobe Acrobat (.PDF) file.

6.5.1.4 Drawing Files

These shall be submitted in Adobe Acrobat (.PDF) and the 'Native' file format shall be submitted on the final submission unless otherwise specified. 'Native' files shall include reference / border files, etc.

A single file shall be submitted per document, i.e., under no circumstances shall different drawings with different numbers appear on one sheet under one file name, nor shall a drawing with multiple sheets be saved into one electronic file.

All CAD drawings shall be contained in one single merge file, any form of ex Ref or Reference File will not be accepted.

6.5.1.5 Sketches

These shall be A3 or A4 size scanned as Adobe Acrobat (.PDF) file.

6.5.1.6 Text Documents

Each page of a single document shall be collated into one file. (The "wet" signature Contractor Review Label (CRL) coversheet, where required, is inserted at the beginning of the document prior to review).

6.5.1.7 Tables / Diagrams

These shall be A4 and A3 size only.

6.5.1.8 Reports

Reports containing Word, Excel, DGN, DWG, brochures, etc., shall be compiled as one Adobe Acrobat (.PDF) file.

Note:

Original colour hardcopies shall be scanned in colour to ensure all details of paper documents.

6.5.1.9 Photo's / Video's

Prints should be submitted of conventional photographs or prints and digital files of electronic images, or as specified by the Project Manager.

6.5.2 Security

Files shall be clear of known viruses and extraneous (irrelevant) macro's. The *Contractor* shall at all times have the latest generation of virus protection software. The *Contractor* shall ensure appropriate security systems are in place to prevent unauthorized electronic distributions and (or) unauthorized editing or manipulation of electronic files.

6.5.3 Scanning Requirements

Where possible 'native' files shall be converted to PDF rather than scanned from hardcopy.

Where this cannot be done all drawings and documents shall be manually scanned black and white except where colour image and fonts are required or necessary.

The settings below should be adhered to where possible and may vary depending on scanning software used. Where images rendered with these settings are unreadable, operators shall use their discretion, and adjust colour depth and resolution accordingly.

6.5.3.1 Scan Settings

- Resolution:-

  Black and White - 200 dpi

  Colour - 100 dpi

  Fine Line Drawings - 300 dpi

- Image Type:-

  Black and White - 1 Bit

  Colour Line Drawings - 8 Bit (256 colours) minimum

  Colour photos and rendered images - 24 Bit

  Use automatic threshold to determine the white and black points

- Other Criteria to Adhere to:-

  Rotate to correct reading (i.e., viewable at correct orientation)

  De-skew (i.e., straighten if on a slant)

De-speckle (i.e., remove background dirt)

Optimized (i.e., reduce file size)

Note:

When a scanned drawing is printed to be re-scanned, subsequent to, e.g., mark-ups or signatures, then it shall be scanned at a setting of 400 dpi.

6.6 Documentation Numbering

Once the Contractor Documentation Register (CDR) has been submitted by the *Contractor*, Document Control will allocate the *Employer's* documentation numbers on the Contractor Documentation Register (CDR) and return it to the *Contractor*.

A unique sequence number is allocated to each document and remains the same for each submittal of that specific document.

The *Contractor* shall use the *Employer's* document numbers and titles exactly as per the Contractor Documentation Register (CDR) on all documentation submitted.

Electronic file names for all documentation shall be exactly as per the *Employer's* documentation numbers, including the revision number.

7. Revising Documentation

All documentation carries a revision block, which must be completed in full before submitting to the *Project Manager*, and typically denotes the following:-

- NO. - Revision Number, e.g., 00, 01, etc.
- DESCRIPTION - Describes the status, e.g., Issued for Tender and a brief description of the changes made.
- BY - Person responsible for revising the document
- CHK'D - Person responsible for checking the revised document
- APP'D - Person responsible for approving the revised document
- DATE - Date of the revised document

7.1 Revision Notes

The revision block should record each change in revision with a brief but specific description of the changes made.

Terms such as "Minor Revision" or "General Revisions" shall be avoided in favour of a more specific notation.

More than one line may be used but only the revision number and date together with the relevant initials shall appear in the top line.

7.2 Indicating Revisions

Revisions shall be clearly identified by placing a revision triangle with the correct revision number in the right hand column in the case of documents, and is adjacent to the area on the document that has been changed.

All revisions made on drawings shall be enclosed by a cloud except in cases where to add a cloud detracts from the readability of the drawing. At subsequent revisions all clouds and revision triangles from the previous formal revision shall be removed from the drawing.

7.3 As-Built / Final Revisions

Should documentation require changes upon completion of Construction, it shall be revised to an "As-Built" status, as well as bear the wording "Certified As-Built", which is indicated in the revision block of the documentation.

Should documentation not require any changes upon completion of Construction, it shall be revised to a "Final" status, as well as bear the wording "Certified Final", which is indicated in the revision block of the documentation.

8. Documentation Submission

8.1 Documentation Submission Format

All documentation shall be submitted under cover of a *Contractor's* Transmittal Note.

8.2 Electronic Transmission

The Contractor Documentation Schedule (CDS) defines which documentation shall be transmitted electronically. All electronic documentation shall be transmitted on CD ROM unless otherwise agreed as per Par 6.3.

Documentation submitted on CD ROM shall be contained in a zip file with the Transmittal Note enclosed.

Note:

In the event of documentation required urgently and the *Contractor* is not able to submit a CD ROM and (or) hard copy format timeously, then e-mail transmission may take place (but in extreme cases only)

Per e-mail - the file size may not exceed 5 MB and the Transmittal Note shall be attached.

The *Contractor* is still required to submit the relevant CD ROM to Document Control without delay.

When sending an e-mail the *Contractor* shall ensure that the subject field of the e-mail is completed as follows, i.e.,:

- Contract Number – *Contractor's* Transmittal Number and Description of documentation transmitted.

8.3 Hard Copy Transmission

Documentation shall be submitted in printed hard copy format unless otherwise stated on the Contractor Documentation Schedule (CDS).

8.4 Transmittal Notes (Annexure A)

All documentation shall be submitted under cover of the *Contractor's* Transmittal Note indicating all *Contract* references (i.e., Project No, *Contract* No, etc.), Project Documentation Number(s), Revision Number, Title and Chronological listing of transmitted documentation.

The *Contractor's* Transmittal Note shall state the purpose / issue reason of the documentation submission.

Documentation for different purposes must be sent on separate *Contractor* Transmittal Notes. The *Contractor* shall note that documentation will be rejected if this requirement is not met.

The *Contractor* Transmittal shall be signed, date stamped and returned to the *Contractor* by Document Control.

8.5 Formats and Quantities of Documentation

The required number of copies and formats of documents / drawings shall be specified in the Contractor Documentation Schedule (CDS).

A typical example of quantities and formats would be as follows:-

- Pre-Construction – Hard copy and PDF (to be specified in 'CDS')
- Construction – Hard copy and PDF (to be specified in 'CDS')
- As-Built – Red Lined – Hard copies (Normally 3 off) (to be specified in CDS')
- Certified As-Built / Final – Hard copies (full size) and CD ROMs containing PDF and 'Native' file formats (to be specified in 'CDS')

8.6 Address for Submission

The address of submission will be as specified in the *Contract* and all submissions will be identified with the Contract Number, and the responsible *Project Manager*. All deliveries will be made to Document Control who will distribute the documentation to the relevant *Project Manager*.

9. Review and Acceptance of *Contractor* Documentation

The *Contractor* submits documentation as the *Contract* requires to the *Project Manager* via Document Control for review and acceptance.

9.1 Contractor Review Label (CRL)

The purpose of the Contractor Review Label (CRL) is for the *Project Manager* to assign a review code to the reviewed documentation denoting the status of the documentation after consolidation of comments. The Contractor Review Label (CRL) is to be inserted by the *Contractor* as follows:-

9.1.1 First Submission of Documentation

The first revision is revision '0', with subsequent revisions '1', '2', '3', etc.

9.1.2 Review of Documentation

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*.

Once documentation has been reviewed by the Project, all comments are consolidated and a review code is assigned on the Contractor Review Label (CRL) to the original reviewed / marked-up drawing / document by the *Project Manager*.

9.1.2.1 Review Codes for Contractor Documentation

The Review Code resulting from the review is as follows, i.e.,:-

- Code C1 – Accepted

  The *Contractor's* design / submission of documentation is accepted and the *Contractor* only needs re-submit documentation only if major changes have been made. The next submission will be the for Approval of "Redline" and / or "Final " documentation.

- Code C2 – Accepted with Comments. Revise and Resubmit

  In the event that the Project returns documentation with comments noted, the *Contractor* shall, within the '*period of reply'* as defined in the *Contract Data*, make the required changes and submit the revised documentation for further review on the next revision.

- Code C3 – Not Accepted. Revise and Resubmit for Review

  In the event that the Project returns documentation with "Not Accepted, Revise and Re-submit" the *Contractor* , within the '*period of reply'*, make the required changes and re-submit the revised documentation on a new revision for further review. Should these revisions necessitate changes in other related documentation, the *Contractor* shall make the appropriate changes and re-submit all the revised related documentation for further review. The *Contractor* shall not proceed with any activities controlled by the *Contractor's* documentation until it has been re-submitted and acceptance indicated.

  The *Contractor* revises and re-submits documentation but on the next revision until a review code 'C1' is achieved. This review process shall not entitle the *Contractor* to submit any claims due to time loss.

- Code C4 – Review Not Required

  Documentation signed at "Code C4" level is considered to be for information only and does not require further submission, and shall not be returned to the *Contractor*. However, Document Control shall issue a Transmittal only to the *Contractor* in this regard as notification.

9.1.2.2 Return of Reviewed Documentation

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

Return of the reviewed documentation is either in hard copy format, in which case the original reviewed / marked-up drawing / document is returned, or on CD.

Contractors will be advised by e-mail or fax (accompanied by a copy of the Project's Transmittal Note) that documentation is available for their collection.

9.1.3 Review Period

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

9.1.4 Revised Documentation

On receipt of the reviewed documentation the *Contractor* shall make any modifications requested / marked-up and re-submit the revised documentation within *'the period of reply'* on the Contractor Documentation Schedule (CDS). Queries regarding comments / changes should be addressed with the *Project Manager* prior to re-submittal.

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 *'the period of reply'* of receipt of the marked-up documentation.

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.

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

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

10. As-Built / Final Documentation

This is Certified 'As-Built / Final Accepted' documentation or documentation for which no further review is required. The final documentation shall form part of the final *Contractor* Manual(s) or Data Packs

Contractors shall provide the 'As-Built' documentation that form part of the Operating, Instruction and Maintenance Manuals that were issued and accepted prior to 'As-Built' conditions for inclusion in these types of manuals by the *Project Manager*.

10.1 Definition of Final and As-Built Status of Documentation

10.1.1 "Final" Documentation

This applies to "As Manufactured and Delivered to Site".

Documentation submitted subsequently by the *Contractor* once "Final" status is reached shall be indicated as such in the Revision Notes Block as "Final" and shall also reflect the New Revision Number on the document in the revision block provided.

10.1.2 "As-Built" Documentation

This applies to "As Constructed or As Installed".

The Contractor Documentation Schedule (CDS) shall indicate the documents which are to be brought to "As-Built" status, and must be submitted only after practical completion when the documentation qualifies for "As-Built" status, and the period after completion by which they must be finalized.

10.2 Preparation of As-Built Documents

10.2.1 Transnet Capital Projects Documents

The *Contractor* responsible for completing the construction / installation works shall prepare three (3) marked up hard copies of the applicable documents to represent the As-Built condition(s). The mark-ups shall be in RED pencil or pen and be complete and accurate.

Once prepared the As-Built mark-up documentation is transmitted to Transnet Capital Projects for updating of the original design documentation.

Documents / drawings updated with information known by the *Project Manager* and as provided by *Contractors* at the completion of their *Contracts* is utilized by the *Project Manager* to update Engineering Deliverables / drawings to this status, i.e., "For Record Purposes".

Note:

File naming convention on drawings / documents shall be in accordance with the Project numbers assigned on the Contractor Documentation Register (CDR).

10.2.2 Design, Supply and Install Contractor Documents

Contractors responsible for the design, supply and installation of equipment are responsible for producing As-Builts of their own documentation.

The *Contractor* shall prepare three (3) marked up hard copies of the applicable documents to represent the As-Built condition(s). The mark-ups shall be in RED pencil or pen and be complete and accurate.

Once prepared the As-Built mark-up documentation is transmitted to the *Project Manager* for Approval through the normal process. Once approved C1 the *Contractor* can proceed to update his drawings and submit as part of the final package

The mark-ups are returned to the *Contractor* so that they can produce the As-Built revisions.

11. Installation, Maintenance and Operating Manuals and Data Books

These shall be supplied by the *Contractor* as manuals in an A4 hard covered, red, grease and waterproof binder using two (2) ring type binders.

Drawings and charts larger than A4 shall be folded and those greater than A3 shall be enclosed in an A4 plastic pocket of adequate strength.

Manuals shall be well indexed and user friendly. Manuals shall include a summarized Table of Contents and in manuals comprising a number of files / volumes there should be one summarized Table of Contents in each of the files / volumes. The draft Table of Contents shall be submitted for review to the Project Manager prior to the compilation and official submittal of the manuals. The technical content of manuals shall be specified by the *Project Manager.*

The originals of all brochures shall be issued to the *Project Manager*. When a general brochure is applicable to a range of equipment, then the specific item, catalogue number or model number shall be stated, which is best achieved by introducing a separate index page, which cross-references the specific item to a tag number.

The address, phone numbers, fax numbers and reference numbers of all *Sub-Contractors* shall be provided.

Where manuals include drawings that still need to be revised to “As-Built” status, and such manuals are required prior to ‘As-Built’ status, the manual will not be considered to be in its final form until the “As-Built” version of each such drawing has been incorporated.

The required number of copies of the manual(s) shall be as specified by the *Project Manager* and submitted per type or model number of equipment included in the contract, or as specified by the *Project Manager*.

A typical example of what the binder / file(s) shall be marked with on the spine and the front cover is as follows: -

- Project Name
- Manual Title, e.g., Installation, Maintenance and Operating Manual
- FBS No. and Title
- Manual Numbering (e.g., Volume 1 of 2, etc.)
- Contract Number
- Contractor Name

12. Cancelling and Superseding Documentation

The Document Control Procedure for cancelling and superseding is as follows:-

12.1 Superseding

If the document / drawing has been transmitted anywhere and is to be replaced by a different document number / drawing number, then it is superseded. The superseded item should go up a revision and always have the new drawing or document number written across it, as the normal practice.

The Document Controller is to check that this has been done on the drawing or document, and the revision title block should be preceded with:-

- e.g. "SUPERSEDED by 222057-2-211-M-GA-0030 …."

12.2 Cancelling

If the item is to be cancelled, it means the item has been previously transmitted and it is not being replaced by another drawing number / document number. In this case the Document Controller should check that the revision has gone up, the word “CANCELLED” is written across the drawing / document and the word "CANCELLED" is placed at the beginning of the revision title block

13. Records

All documents generated in terms of this standard are to be retained by Transnet Capital Projects as records in accordance with the requirements of Project Procedure DOC-P-0013.

Note: If hardcopy, check electronic system for latest revision

Annexure A – Typical Transmittal Note

TRANSNET

Document Transmittal Note

TO :		DATE :	
LOCATION :		FROM :	DOCUMENT CONTROL
ATTENTION :		ORIGINATOR :	
		PROJECT No :	
		TRANSMITTAL NO. :	

PURPOSE OF ISSUE *(indicate with an "X" in the appropriate block)*

☐ APPROVED FOR CONSTRUCTION	☐ FOR APPROVAL	☐ AS - BUILT
☐ APPROVED FOR DESIGN	☐ FOR INFORMATION ONLY	☐ FINAL HANDOVER
☐ FOR TENDER PURPOSES / ENQUIRY	☐ FOR REVIEW / COMMENTS	☐ OTHER (please specify)
☐ FOR CONTRACT / PURCHASE / SERVICES	☐ RETURN OF DOCUMENTATION	

ADDITIONAL REMARKS BY ORIGINATOR *(if applicable)*

DOCUMENT NUMBER	REV.	DESCRIPTION	COPY QTY	FORMAT E or H

DISTRIBUTION :

NAME

E = Electronic
H = Hardcopy

Sent by : _____ Received by : _____ Date : _____

Signature : _____ Signature : _____

PLEASE CONFIRM RECEIPT BY SIGNING ONE COPY OF THE TRANSMITTAL AND RETURN TO DOCUMENT CONTROL AS SOON AS POSSIBLE

DOC-TMP-0003 Rev.02

Note: If hardcopy, check electronic system for latest revision

Annexure B – Typical Example of CDR (can be supplied electronically)

TRANSNET CAPITAL PROJECTS

Project Number:_____

Contract Number: _____

Register Document Number: _____

TCP Document Number	Document Title (Description)	Contractor's Document number	Rev	Forcasted Submission date	Actual Submission Date	For-mat	Reason for Issue

DOC-FAT-0002.xls 1

Health and Safety Specification:

Deepening and Strengthening of N Berth at the Port of East London

SIGNATORIES:

Prepared by: S.Ahmed — 11/07/2023

Sharifa Ahmed — Date
Health and Safety Manager

Reviewed by: — 11/07/2023

Kaelan Veerasamy — Date
Project Manager

Approved by: — 11/07/2023

Siyabonga Gadu — Date
Principal Project Manager

Approved by: — 11.07.2023

Liezl Kroukamp — Date
Project Health and Safety Agent

Rev No	Date	Revision Details
01	07/2023	Issued for Approval
00	04/2023	Issued for Review

Table of Contents

List of Tables

1. Project Description

N-berth, located at the Car Terminal at Port of East London, is 300m in length, which is sufficient to accommodate modern car carriers, but the depth provided remains a limitation (current the depth is only -8.5m CD).

The West Quay is located on the West Bank of the Buffalo River, comprising of N-berth, R-berth and R-extension (Shown in Figure 1). The original West Quay (450m in length) is a gravity-quay wall and was built in the early 19th century and comprised of N-berth (300m) and R-berth (150m). West Quay Extension (R-Extension) was constructed between 1976 – 2005 with caissons (100m in length). In 2005, R-berth and R-extension were strengthened by a 1.5m coping beam (concrete fender panel), allowing vessels access to deeper waters through the provision of a 250m long berth, with a -10.5m (CD) draft.

The Port of East London (PoEL) needs to deepen and strengthen the remainder of the West Quay (N berth) in order to safely accommodate car carries in excess of 200m while also providing the ability to berth two car carriers simultaneously.

2. Scope and Purpose

This health and safety specification outlines the working behaviours and safe work practices that must be implemented and complied with by all Transnet employees, Contractors, Consultants, Visitors and Suppliers, that will be undertaking activities associated with the Deepening and Strengthening of N Berth at the Port of East London. The specification has been developed in accordance with the requirements of the Construction Regulation of 2014, Regulation 5(1)(b) as well as any other applicable legislation.

Appointed contractors must identify all requirements applicable to their scope of works and address these accordingly in their Contractor's Site Specific Health and Safety Management Plan. It is the contractor's responsibility to ensure that all sub-contractors comply fully with all legal requirements as well as the requirements of this Specification.

The *Employer*'s objective is to deepen the existing berth pocket to the desired depth, and strengthen the existing gravity-quay structure through the use of concrete fender panels, to allow car carriers access to deeper waters, without compromising the structural integrity of the existing infrastructure.

The scope covers the requirements for:

- The partial demolition of the existing Quaywall
- Supply and installation of steel section to Quaywall face
- Dowelling/anchoring of threaded bars
- Casting of reinforced concrete coping beam (extension)
- Replacement/installation of new fenders to the existing quay wall
- The installation of new wharf access ladders, etc. and any other work arising out of or incidental to the above or required of the Contractor to Provide the Works.
- Dredging and profiling of the N-Berth berth pocket and areas adjacent to the existing quay walls

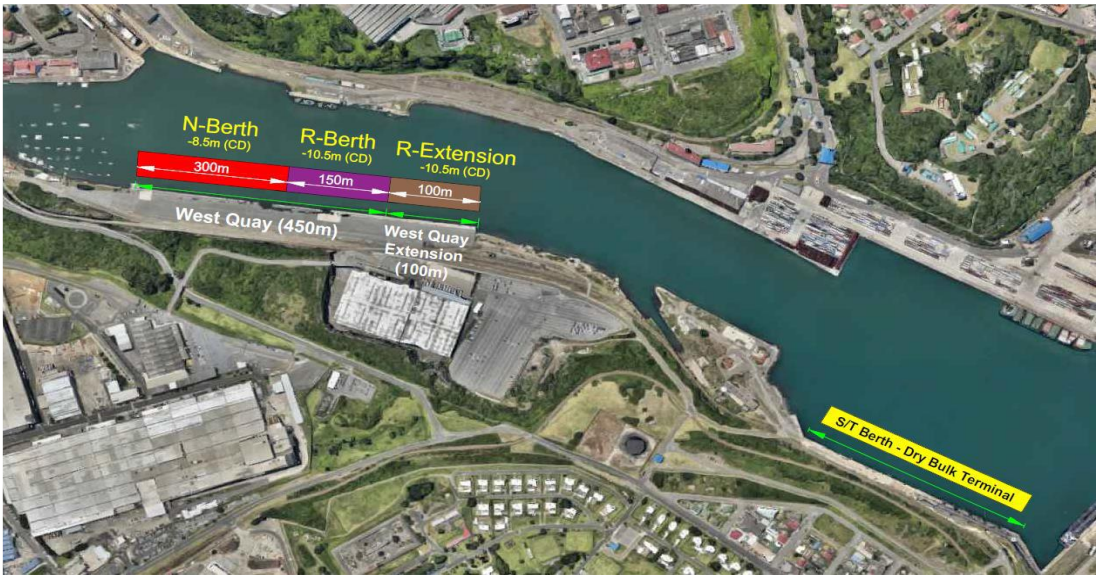

Figure 1: Orientation of the Port of East London Car Terminal Berths

The *Employer* shall provide detailed designs of the proposed works; therefore, the *Employer* shall undertake full design responsibility for the total design solution. The main parts of the works which the *Contractor* is to undertake shall be Execution phase deliverables.

Scope of Work: Civil/Structural

- The partial demolition of the existing Quaywall to expose the front face of the quay wall and a portion of the top-surface to install steel sections and dowels, and thereafter cast the concrete fender panels and capping beam.
- Supply and installation of steel section to Quaywall face as per the associated construction drawings and details.
- Installation of threaded bars as detailed

- Casting of reinforced concrete capping beam and fender panels (extension) as per the requirements of the works information.

- Replacement/installation of new fenders to the existing quay wall – dependent on the condition of existing fenders when removed. Removal of existing fenders will form part of the *Contractors* scope and should be priced for accordingly.

- The installation of new wharf access ladders, etc. and any other work arising out of or incidental to the above, or required of the Contractor to Provide the Works.

Dredging Scope

The scope for the dredging and profiling of the N-Berth berth pocket and areas adjacent to the existing quay walls as detailed as part of the Works Information.

This Health and Safety Specification will be reviewed and updated periodically as and when necessary to address and / or include:

- Changes in legislation;
- Client requirements;
- Leading practices; and
- Lessons learnt from incidents.

3. Definitions

Acceptable Risk
A risk that has been reduced to a level that can be tolerated having regard for the applicable legal requirements and the Health and Safety Policy adopted for the project.

ALARP (As Low As Reasonably Practicable)
The concept of weighing a risk against the sacrifice needed to implement the measures necessary to avoid the risk. With respect to health and safety, it is assumed that the measures should be implemented unless it can be shown that the sacrifice is grossly disproportionate to the benefit.

Applicant (Permit to Work)
A person requesting permission to perform work for which a Permit to Work is required. Applicants must be authorised (in writing) to receive (or accept) Permits to Work and must be competent to do so by virtue of their training, experience and knowledge of the area or plant in which the work is to be performed.

Authorised Person (Permit to Work)
A person (typically a Project employee or an employee of the client) who has been authorised (in writing) by the nominated project management representative to issue Permits to Work within the scope of his designation. A person may only be appointed to issue Permits to Work if he has undergone training and has been assessed and found competent in systems, plant and equipment operation within the scope of his designation.

Barricade
A temporary structure that is erected as a physical barrier to prevent persons from inadvertently coming into contact with an identified hazard.

Battering
Sloping the sides of an excavation to a predetermined angle (usually less than the natural angle of repose) to ensure stability.

Benching
The creation of a series of steps in the sides of an excavation to prevent collapse.

Consequence
The outcome of an event expressed qualitatively or quantitatively.

Contractor
An employer performing construction work, or providing related or supporting services, on a project site.

Competent Person
A person who has in respect of the work or task to be performed the required knowledge, training, experience and as per OHS Act, 1993 (Act 85 of 1993) and Construction Regulations 2014.

Construction Supervisor
A competent person responsible for supervising construction activities on a construction site

Clearance Certificate
A signed declaration by an Isolation Officer that a specified hazardous energy source associated with a particular system, plant or item of equipment has been isolated in accordance with an approved Isolation and Lockout Procedure.

Discipline Lock (many locks with a restricted number of identical keys)
Attached at a Lockout Station or at a Local Isolation Point in order to lock out a system, plant or equipment. A Discipline Lock (e.g. A Low Voltage Electricity Discipline Lock) is owned by an Isolation Officer who has been authorised in writing to isolate and lockout a particular hazard (e.g. Low voltage electricity).

Equipment Lock (many locks with one unique key)
Attached directly to pieces of equipment in order to lock them out. Equipment Locks may only be used by Isolation Officers who have been authorised in writing to perform isolation and lockout procedures. The key must have a solid key ring that fits over an Isolation Bar.

Excavation

Any man-made cut, cavity, pit, trench, or depression in the earth's surface formed by removing rock, sand, soil or other material using tools, machinery, and / or explosives. Tunnels, caissons and cofferdams are specifically excluded and are not addressed in this standard.

First-Aid Injury (FA)

A first-aid injury is any one time treatment and any follow up visit for observation of minor scratches, cuts, burns, splinters and the like which do not normally require medical care. Such treatment is considered to be first aid even if administered or supervised by a medical practitioner.

First aid includes any hands on treatment given by a first aider. (E.g. Band-Aid, washing, cleansing, pain, relief). The following procedures are generally considered first aid treatment:

- Application of Antiseptics.
- Application of Butterfly adhesive dressing or sterile strips for cuts and lacerations.
- Administration of tetanus shot(s) or booster(s). However, these shots are often given in conjunction with more serious injuries, consequently injuries requiring these shots may be recordable for other reasons.
- Application of bandages during any visit to medical personnel.
- Application of ointments to abrasions to prevent drying or cracking.
- Inhalation of toxic or corrosive gas, limited to the removal of the employee to fresh air or the one time administration of oxygen for several minutes.
- Negative X-Ray diagnosis.
- Removal of foreign bodies not embedded in the eye if only irrigation is required.
- Removal of foreign bodies from a wound if procedure is uncomplicated, for example by tweezers or other simple technique.
- Treatment for first degree burns.
- Use of non-prescription medications and administration of single dose of prescription medication on first visit for any minor injury or discomfort.

Hazard

A source of potential harm in terms of human injury or ill health, or a combination of these.

Hierarchy of Controls

A sequence of control measures, arranged in order of decreasing effectiveness, used to eliminate or minimise exposure to workplace health and safety hazards:

- Elimination – Completely removing a hazard or risk scenario from the workplace.
- Substitution – Replacing an activity, process or substance with a less hazardous alternative.
- Isolation (Engineering) Controls – Isolating a hazard from persons through the provision of mechanical aids, barriers, machine guarding, interlocks, extraction, ventilation or insulation.

- Administrative Controls – Establishing appropriate policies, procedures and work practices to reduce the exposure of persons to a hazard. This may include the provision of specific training and supervision.
- Personal Protective Equipment – Providing suitable and properly maintained PPE to cover and protect persons from a hazard (i.e. Prevent contact with the hazard).

Isolation and Lockout Procedure

A plant or equipment-specific procedure that describes the method, and sequence to be followed, for rendering equipment, plant and systems safe to work on.

Isolation Bar

A device used at a Lockout Station to which anyone is able to attach a Personal Lock making it impossible for an Isolation Officer to remove the key to the Equipment Locks, thus preventing the de-isolation of a system, plant or equipment while it is still being worked on. A Discipline Lock must always be the first lock attached to an Isolation Bar and last to be removed.

Isolation Officer

A person (typically a Project employee or an employee of the client) who has been authorised (in writing) by the nominated project management representative to perform isolation and lockout procedures. A person may only be appointed as an Isolation Officer if he has undergone training and has been assessed and found competent in the isolation and lockout of systems, plant and equipment within the scope of his designation.

Incident

An event (or a continuous or repetitive series of events) that results or has the potential to result in a negative impact on people (employees, contractors and visitors), the environment, operational integrity, assets, community, process, product, legal liability and / or reputation.

Likelihood

A description of probability or frequency, in relation to the chance that an event will occur.

Lost Time Injury (LTI)

Any occurrence that resulted in a permanent disability or time lost from work of one day/shift or more.

If an employee is injured and cannot return to work in the next shift (will ordinarily miss one whole shift), and the department brings the employee in to only receive treatment by the Supervisor/ Return to Work Coordinator in that shift, this is still considered an LTI.

Lost Time Injury Frequency Rate (LTIFR) - Number of LTI's multiplied by 1 million or 200,000 and divided by labour hours worked.

Light Vehicle

A vehicle that:

- Can be licensed and registered for use on a public road;

- Has four or more wheels, and seats a maximum of 12 adults (including the driver);
- Requires the driver to hold only a standard civil driving licence; and
- Does not exceed 4.5 tonnes gross vehicle mass (GVM), which is the maximum loaded mass of the motor vehicle as specified by:
  - The vehicle's manufacturer; or
  - An approved and accredited automotive engineer, if the vehicle has been modified to the extent that the manufacturer's specification is no longer appropriate.

Examples of light vehicles include passenger cars, four-wheel drive vehicles, sports utility vehicles (SUV's), pick-ups, minibuses, and light trucks.

Any vehicle falling outside of this definition must be considered mobile equipment.

Medical Treatment Injury (MTI)

A work injury requiring treatment by a Medical Practitioner and which is beyond the scope of normal first aid including initial treatment given for more serious injuries. The procedure is to be of an invasive nature (e.g. Stitches, removal of foreign body).

The following procedures are generally considered medical treatment:

- Application of sutures (stitches).
- Cutting away dead skin (surgical debridement).
- Loss of consciousness due to an injury or exposure in the work environment.
- Positive X-Ray diagnosis (fractures, broken bones etc.).
- Removal of foreign bodies embedded in the eye.
- Removal of foreign bodies from the wound by a physician due to the depth of embedment, size or shape of object or the location wound.
- Reaction to a preventative shot administered because of an occupational injury.
- Sprains and strains - series (more than one) of hot and cold soaks, use of whirlpools, diathermy treatment or other professional treatment.
- Treatment of infection.
- Treatment for second or third degree burns
- Use of prescription medications (except a single dose administered on first visit for minor injury or discomfort.)

Mobile Equipment

A vehicle (wheeled or tracked) that generally requires:

- The driver to hold a specific state or civil license; or
- The operator to hold a nationally recognized certificate of competency.

Examples of mobile equipment include, but are not limited to, dump trucks, water trucks, graders, dozers, loaders, excavators, forklifts, tractors, back-actors, bobcats, mobile cranes, tele-handlers, drill rigs, buses and road-going trucks.

Near-Miss
An incident that has occurred that did not result in any injuries, illnesses, environmental or property damage but had the potential to cause an injury, illness, environmental or property damage.

Personal Lock
A single lock with one unique key controlled by the owner. Used for personal protection.

Regulation
In the context of this guideline, 'Regulation(s)' refers to the Construction Regulations, 2014 required by Section 43 of the Occupational Health and Safety Act 85 of 1993, published under Government Notice R 84 in Government Gazette 37305 of February 2014.

Risk
A combination of the likelihood of an occurrence of a hazardous event or exposure and the severity of injury or ill health that can be caused by the event or exposure.

Risk Assessment
A process of evaluating the risk arising from a hazard, taking into account the adequacy of any existing control measures, and deciding on whether or not the risk is acceptable.

Risk Management
The systematic application of management policies, processes and procedures to identifying hazards, analysing and evaluating the associated risks, determining whether the risks are acceptable, and controlling and monitoring the risks on an ongoing basis.

4. Abbreviations

DSTI - Daily Safety Task Instruction

CR – Construction Regulations

HIRA - Hazard Identification and Risk Assessment

IMS - Integrated Management System

MS - Management System

OHS Act - Occupational Health and Safety Act

SOC - Safety Observation and Conversation

VFL - Visible Felt Leadership

OHS - Occupational Health and Safety

SACPCMP - The South African Council for Project and Construction Management Professions, here in refer to as the registrar of Health and Safety Professionals

5. Contractor Health and Safety Management Plan

The contractor must prepare, implement and maintain a project-specific Health and Safety Management Plan. The plan must be aligned with the requirements set out in this specification as well as all relevant/applicable legislation. It must cover all activities that will be undertaken as part of the Project from mobilisation and set-up to rehabilitation and decommissioning.

The plan must demonstrate the contractor's commitment to health and safety and must, as a minimum, include the following:

- A copy of the contractor's **Health and Safety Policy**; in terms of the OHS Act section 7
- Procedures concerning **Hazard Identification and Risk Assessment**, including both Baseline and Task-Based Risk Assessments;
- Arrangements concerning the identification of applicable **Legal and Other Requirements**, measures to ensure compliance with these requirements, and measures to ensure that this information is accessible to relevant personnel;
- Details concerning **Health and Safety Objectives** – a process must be in place for setting objectives (and developing associated action plans) to drive continual improvement;
- Details concerning **Resources, Accountabilities and Responsibilities** – this includes the assignment of specific health and safety responsibilities to individuals in accordance with legal or project requirements, including the appointment of a Project Manager, Health and Safety Officers, Supervisors, Health and Safety Representatives, and First Aiders;
- Details concerning **Competence, Training and Awareness** – a system must be in place to ensure that each employee is suitably trained and competent, and procedures must be in place for identifying training needs and providing the necessary training;
- **Communication, Participation and Consultation** arrangements concerning health and safety, including Safety Observations and Coaching, Toolbox Talks, Daily Safe Task Instructions, project health and safety meetings, and notice boards;
- **Documentation and Document Control** – project-specific documentation required for the effective management of health and safety on the project must be developed and maintained, and processes must be in place for the control of these documents;
- Processes and procedures for maintaining **Operational Control**, including rules and requirements (typically contained in Safe Work Procedures) for effectively managing health and safety risks, particularly critical risks associated with working at heights, confined spaces, mobile equipment and light vehicles, lifting operations, hazardous chemical substances, etc.;
- **Emergency Preparedness and Response** procedures;
- **Management of Change** – a process must be in place to ensure that health and safety risks are considered before changes are implemented;

- **Sub-contractor Alignment** procedures – a process must be in place for the assessment of sub-contractors and suppliers with regard to health and safety requirements and performance (before any contract or purchase order is awarded);
- **Measuring and Monitoring** plans, including a plan for the measuring and monitoring of employee exposure to hazardous substances or agents (e.g. Noise, dust, etc.) In order to determine the effectiveness of control measures;
- **Incident Reporting and Investigation** procedures describing the protocols to be followed with regard to incident reporting, recording, investigation and analysis;
- **Non-conformance and Action Management** procedures concerning the management of corrective actions;
- **Performance Assessment and Auditing** procedures concerning health and safety performance reporting, monthly internal audits to assess compliance with the project health and safety requirements, and daily site health and safety inspections; and
- Details concerning the **Management Review** process followed to assess the effectiveness of health and safety management efforts.

Prior to mobilisation, the Health and Safety Management Plan must be forwarded electronically, and as a hard copy, to the nominated TRANSNET project management representative for review. The plan will be audited for completeness and, if found to be adequate, will be accepted (typically "with comments"). Work may not commence until the plan has been accepted.

Once the plan has been accepted, the contractor must action and resolve any issues within 30 days from the start of work.

If the issues requiring corrective action are not resolved within this 30 day period, the contractor will be required to stop any work related to the outstanding actions until they have been resolved.

Any proposed amendments or revisions to the contractor's Health and Safety Management Plan must be submitted to the nominated project management representative for acceptance.

Should it be identified that the contractor has overlooked a high risk activity, and as a result has omitted the activity and associated control measures from the Health and Safety Management Plan, the plan will not be approved.

6. Policy

The contractor must develop, display and communicate a Health and Safety Policy that clearly states the contractor's values and objectives for the effective management of health and safety as required by OHS Act of 1993, 7(3). These values and objectives must be endorsed by the contractor's management representatives and must be consistent with those adopted for the project.

The policy must be signed and dated, and must be reviewed annually.

The policy must commit to:

- Compliance with all applicable legal requirements in the TRANSNET regulatory universe;
- The effective management of health and safety risks;
- The establishment of measurable objectives for improving performance, and the provision of the necessary resources to meet these objectives;
- The prevention of incidents; and
- Achieving continual improvement with regard to health and safety performance.

All employees of the contractor as well as the employees of any sub-contractors that may be appointed by the contractor must be made aware of the policy. This must be done through Health and Safety Induction Training and Toolbox Talks.

A copy of the policy must be displayed in each meeting room and on each notice board.

7. Hazard Identification and Risk Assessment

Detailed hazard identification and risk assessment processes must be followed for all work to be performed as well as for all associated equipment and facilities as required by the Construction Regulation of 2014, Regulation 9(1) – (7).

The Client will provide a baseline risk assessment informing the contractor on the hazards and risks on site. The Contractor must ensure that effective procedures and risk assessment systems are in place to control hazards and to mitigate risks to levels that are as low as is reasonably practicable.

The risk assessment processes must be applied to:

- The full life cycle of the project;
- Routine and non-routine activities;
- Planned or unplanned changes;
- All employees, sub-contractors, suppliers and visitors; and
- All infrastructure, equipment and materials.

The risk assessment processes and methodologies must be appropriate for the nature and scale of the risks, and must be implemented by competent persons.

The process of analysing and managing risk must include the following:

- Establishing the context of the risk assessment;
- Identifying hazards and determining possible risk scenarios (unwanted events);
- Evaluating risks and assigning ratings (classification);
- Recording the risk analysis in a risk register;
- Managing risks according to their classification (prioritising for action);

- Identifying and implementing control measures (through the application of the Hierarchy of Controls) to ensure that risks are managed to levels that are as low as is reasonably practicable (ALARP);
- Developing action plans for reducing risk levels (where possible);
- Verifying the completion of actions;
- Re-evaluating the risks and classifications as appropriate; and
- Reviewing and updating the risk register.

7.1 Baseline Risk Assessments

Prior to site establishment, TRANSNET (the Client) will conduct a Baseline Risk Assessment identifying foreseeable hazards and risk scenarios associated with the contractor's scope of work on the project site(s) as required by Construction Regulations of 2014, regulation 5(1)(a). Details concerning proposed control measures must be included. The risk assessment process must be facilitated by a competent person who has been appointed in writing and must involve the participation of the contractor's site management representatives, supervisory personnel and technical experts. An attendance register must be completed and retained for reference purpose.

A Risk Register comprised of all significant risks (i.e. Risks rated as major or catastrophic) identified for the project will be compiled using the information contained in the project Baseline Risk Assessment as well as the contractor's Baseline Risk Assessment. Key control measures for managing each of these risks will be specified in the register.

For the significant risks in particular, action plans will be developed for reducing the risk levels (where possible).

The project Risk Register will be reviewed and, if necessary, updated:

- On a quarterly basis during construction;
- When changes are made to a design and / or the construction scope, schedule, methods, etc. That result in a change to the risk profile; and
- Following an incident.

The contractor must ensure that the hazards, risk scenarios and control measures identified in the contractor's Baseline and Task-Based Risk Assessments are taken into consideration when developing, implementing and maintaining the various elements of the contractor's health and safety management system for the project (e.g. Competence, training and awareness requirements).

All persons potentially affected must be made aware of the hazards, risk scenarios and control measures identified in the contractor's risk assessments. This must be done through training, Toolbox Talks, and Daily Safe Task Instructions.

7.2 Task-Based Risk Assessments

The contractor must carry out detailed project-specific Task-Based Risk Assessments which must be reviewed and approved by the Client's Project Health and Safety Manager/Agent and Project Construction Manager prior to the commencement of any work.

The risk assessment process must be facilitated by a competent person who has been appointed in writing in terms Construction Regulations 9, clause (1). The contractor's site management representatives, supervisory personnel, technical experts (as required) and workforce personnel directly involved with the task being examined must participate in the risk assessment process. An attendance register must be completed and retained.

Please Note: Under no circumstances may a Contractor Health and Safety Officer perform a risk assessment in isolation. The active participation of all persons referred to above is mandatory.

A Task-Based Risk Assessment must at least:

- Be accompanied by a Work Method Statement (describing in sufficient detail how the specific job or task is to be performed in a logical and sequential manner);
- Provide a breakdown of the job or task into specific steps;
- Identify the hazards and potential risk scenarios associated with each step;
- Include consideration of possible exposure to noise, heat, dust, fumes, vapours, gases, chemicals, radiation, vibration, ergonomic stressors, or any other occupational health hazard or stressor;
- Describe the control measures that will be implemented to ensure that the risks are managed to levels that are as low as is reasonably practicable; and
- Assign an initial risk rating (without taking any control measures into consideration) and a residual risk rating (taking the identified control measures into consideration) to each risk scenario.

A Task-Based Risk Assessment must be reviewed and, if necessary, updated:

- On an annual basis (as a minimum);
- When changes are made to the associated Work Method Statement; and
- Following an incident.

7.3 Pre-Task Hazard Assessments

A pre-task hazard assessment must be completed whenever a change is identified while carrying out an activity. Any deviation from what was discussed during the Daily Safe Task Instruction (prior to the activity commencing), or anything that was not discussed, constitutes a change.

Before carrying out the particular task that involves the identified change, a few minutes must be spent identifying the hazards and risks associated with that task as well as suitable control measures.

8. Legal and Other Requirements

The Contractor must comply with the requirements of all applicable health and safety legislation as well as TRANSNET project-specific standards and procedures as amended from time to time.

The Contractor must compile and maintain a register of all legal and other requirements applicable to the work that will be carried out and / or services that will be provided. This register must be updated regularly to ensure that it remains relevant.

Applicable laws and standards must be appropriately communicated to all employees of the contractor (as well as the employees of any sub-contractors that may be appointed by the contractor) through training, Toolbox Talks, and Daily Safe Task Instructions.

Refer to TNPA Project Legal Register

9. Health and Safety Objectives

In order to drive continual improvement, the contractor must set project-specific health and safety objectives, and must develop improvement action plans to achieve these objectives. The contractor's objectives must be aligned with the objectives set for the project as a whole as required by the Construction Regulations of 2014.

Eliminating health and safety hazards, minimising health and safety risks, preventing incidents, injuries and illnesses, and ensuring legal compliance must be the primary considerations for setting objectives.

When setting objectives, consideration must be given to the following:

- Leading indicators such as inspection findings, audit findings, hazard reporting, and observations;
- Lagging indicators (i.e. Incidents including Near Hits);
- Leading practices and lessons learnt; and
- Injury frequency rates with due understanding that the goal is "no harm".

The objectives must be specific and measurable. The improvement action plans must specify the resources (both human and financial) required to achieve the objectives, the person's responsible, and realistic timeframes for completion. The contractor must ensure that adequate resources are allocated and that progress towards meeting the objectives is monitored regularly.

The objectives and associated improvement action plans must be documented and must be communicated to all contractor employees. Furthermore, to ensure that the objectives remain relevant, they must be reviewed on a quarterly basis and whenever significant change has taken place on the project (i.e. Changes to activities, scope of work, operating conditions, etc.).

10. Resources, Accountabilities and Responsibilities

The Contractor must adequately allocate resources, responsibility and accountability to ensure the effective implementation, maintenance and continual improvement of the contractor's health and safety management system on the projects required by Construction Regulation of 2014, regulation 7(2)(c).

For each role that carries health and safety accountability and / or responsibilities (including legislative requirements), a role description detailing the accountability and / or responsibilities must be documented.

All health and safety appointments (i.e. the assignment of specific health and safety responsibilities to individuals in accordance with legal or project requirements) must be done in writing. Documented proof of each appointment (i.e. a signed appointment letter) must be retained.

Contractor should not discharge any legal responsibilities to employees who are not legally appointed.

The contractor must comply with the requirements of all applicable legislation concerning health and safety related appointments and delegations for the project.

A health and safety organisational chart specific to the project must be documented and maintained. All roles that carry health and safety accountability and / or responsibilities must be included, and all individuals that carry health and safety appointments must be clearly identified.

The provision of dedicated health and safety professionals on the project must be appropriate for the nature and scale of the work to be carried out.

The contractor is solely responsible for carrying out the work under the contract whilst having the highest regard for the health and safety of all persons on the project site(s).

Health and safety is the responsibility of each and every individual on the project site(s), but in particular, it is the responsibility of the contractor's management team who must set the tone.

Visible commitment is essential to providing and maintaining a safe workplace. The contractor's managers and supervisors at all levels must demonstrate their commitment and support by adopting a risk management approach to all health and safety issues. These individuals must consistently take immediate and firm action to address violations of health and safety rules, and must actively participate in day to day activities with the objective of preventing harm.

The contractor's management representatives are responsible and accountable for health and safety performance on the project. Key responsibilities include the following:

- Preparing, implementing and maintaining a risk-based Health and Safety Management Plan specific to the work that will be carried out;
- Establishing, implementing and maintaining health and safety programmes and procedures to ensure that all work is carried out in compliance with the requirements of this specification, the contract, and all applicable legislation;
- Establishing, implementing and maintaining effective hazard identification and risk management processes and procedures to ensure that all reasonably foreseeable hazards are controlled in order to minimise risk;
- Providing the resources necessary to meet the requirements of this specification;

- Ensuring that all contractor employees have clearly defined responsibilities with regard to health and safety, and that these responsibilities are clearly communicated and understood;
- Establishing, implementing and maintaining a system for on-going training and assessment of skills and competence;
- Establishing, implementing and maintaining procedures to ensure that only qualified and competent personnel are permitted to work on the project site(s);
- Establishing, implementing and maintaining effective communication and consultative processes concerning health and safety for the duration of the contract;
- Maintaining operational control for the protection of all persons on the project site(s) as well as the public;
- Establishing, implementing and maintaining effective emergency preparedness and response procedures;
- Establishing, implementing and maintaining effective management of change processes and procedures;
- Establishing, implementing and maintaining effective incident reporting and investigation processes and procedures;
- Establishing, implementing and maintaining effective auditing and inspection processes and procedures; and
- Formally reviewing the contractor's Health and Safety Management System annually to ensure that the system continues to be effective in managing health and safety performance and meeting project requirements.

All costs associated with meeting these responsibilities shall be borne by the contractor.

Any cost associated with any work stoppage due to non-compliance with a health and safety requirement shall be for the contractor's account.

10.1 Contractor Construction Manager

The Contractor must appoint a competent full-time Construction Manager registered with SACPCMP as a Pr. CM who shall be responsible for the successful and safe completion of all work to be carried out by the contractor as required by the Construction regulations of 2014, regulation 8(1).

The contractor's Construction Manager shall be responsible for:

- Ensuring that a Health and Safety Policy that clearly states the contractor's values and objectives for the effective management of health and safety on the project is in place and is communicated to all contractor and sub-contractor employees;
- Ensuring that all applicable legal and project health and safety requirements are identified and complied with at all times;
- Ensuring that effective hazard identification and risk management processes are established and implemented for all work to be carried out by the contractor;

- Participating in the Baseline Risk Assessment for the contractor's scope of work (prior to site establishment);
- Participating in (and approving) all Task-Based Risk Assessments conducted for the work to be carried out by the contractor;
- Driving the achievement of agreed health and safety objectives;
- Ensuring that the necessary resources are made available for the effective implementation of the contractor's Health and Safety Management Plan;
- Ensuring that all work is adequately and competently supervised;
- Ensuring that all contractor employees have clearly defined responsibilities with regard to health and safety (assigned in writing), and that these responsibilities are clearly communicated and understood;
- Ensuring as far as is reasonably practicable that each contractor and sub-contractor employee is competent to perform his role, and has received appropriate workplace health and safety training and instruction;
- Managing all appointed sub-contractors with regard to health and safety performance;
- Establishing and maintaining effective communication and consultative processes to ensure that all contractor and sub-contractor employees are kept up to date with regard to health and safety information (e.g. Incidents and lessons learnt, leading practices, hazards, risks and control measures, etc.) And that feedback is provided promptly regarding issues and / or concerns raised;
- Participating in the project's Visible Felt Leadership (VFL) programme;
- Chairing monthly Contractor Health and Safety Meetings and attending monthly Site Health and Safety Meetings;
- Implementing programmes that encourage continual improvement and providing recognition for suggestions made by contractor and sub-contractor employees;
- Implementing the contractor's Health and Safety Management Plan and associated Safe Work Procedures;
- Acting consistently and strictly against any contractor or sub-contractor employee who transgresses a health and safety rule or requirement;
- Ensuring that an effective management of change process is in place;
- Implementing, testing and maintaining an effective Emergency Response Plan for all contractor and sub-contractor activities, and ensuring that the plan is adequately resourced;
- Ensuring that workplace exposure of contractor and sub-contractor employees to hazardous substances or agents is measured and monitored to determine the effectiveness of controls and compliance with legal (and project) requirements;
- Ensuring that all incidents are reported without delay and are investigated thoroughly;
- Participating in investigations into significant incidents;

- Ensuring that accurate health and safety statistics are maintained, and that health and safety performance reports are compiled as required;
- Providing the necessary resources for regular health and safety audits and inspections to be conducted, and supporting the auditing process;
- Participating in health and safety audits, and carrying out workplace inspections;
- Ensuring that corrective actions (arising from incident investigations, audits, inspections, etc.) Are implemented, and that adequate resources are provided for this purpose; and
- Participating in an annual review of the contractor's Health and Safety Management System.

10.2 Contractor Construction Health and Safety Officer/Manager

The contractor must appoint a full-time Construction Health and Safety Manager for the duration of the contract who is registered with the SACPCMP (The South African Council for Project Construction Management Professions).

The appointment of health and safety personnel for sub-contractors will depend on the discretion of the Project Health and Safety Agent.

The Construction Health and Safety Manager must be on site when work commences at the start of the day and must remain on site until all activities for that day (including the activities of sub-contractors) have been completed. A Construction Health and Safety Manager must be present during all shifts, so if work is carried out over more than one shift per day, the contractor must make provision for additional Construction Health and Safety personnel.

Each Contractor Construction Health and Safety Manager shall be responsible for:

- Reviewing all applicable legal and project health and safety requirements and providing guidance to contractor and sub-contractor personnel (particularly the contractor's Project Manager) to help ensure compliance at all times;
- Assisting with the implementation of effective hazard identification and risk management processes for all work to be carried out by the contractor;
- Participating in the Baseline Risk Assessment for the contractor's scope of work (prior to site establishment) and ensuring that identified control measures are implemented;
- Participating in all Task-Based Risk Assessments conducted for the work to be carried out by the contractor and ensuring that identified control measures are implemented;
- Conducting contractor health and safety induction training for all contractor and sub-contractor personnel;
- Compiling and maintaining all health and safety related documents and records required of the contractor;
- Communicating relevant health and safety information to contractor and sub-contractor personnel (e.g. Incidents and lessons learnt, leading practices, hazards, risks and control measures, etc.);

- Carrying out Safety Observations and Conversations (one per day);
- Evaluating (on a daily basis) the content of the Daily Safe Task Instructions (DSTI's) conducted by the contractor's appointed supervisors, and attending at least one DSTI each day;
- Attending monthly Contractor and Site Health and Safety Meetings;
- Assisting with the implementation of the contractor's Health and Safety Management Plan and associated Safe Work Procedures;
- Carrying out Planned Task Observations on an ad hoc basis;
- Assisting with the implementation, testing and maintenance of an effective Emergency Response Plan for all contractor and sub-contractor activities;
- Responding to workplace incidents (as appropriate);
- Participating in incident investigations;
- Maintaining accurate health and safety statistics (for the contractor and all sub-contractors), and compiling health and safety performance reports as required;
- Auditing the health and safety management system and workplace activities of the contractor and each sub-contractor on a monthly basis to assess compliance with the project health and safety requirements; and
- Tracking and reporting on the implementation of corrective actions (arising from incident investigations, audits, inspections, etc.).

The contractor must ensure that the Construction Health and Safety Manager is adequately equipped to enable him/her to perform his duties effectively. Each Construction Health and Safety Manager must be provided with the following:

- A computer with access to all necessary systems, including access to e-mail and the internet;
- A mobile telephone on contract or with adequate pre-paid airtime; and
- A vehicle where required or instructed by a nominated project management representative (depending on the size and location of the project site(s)).

A Construction Health and Safety Manager must over and above the SACPCMP registration as an manager; be computer literate, fluent in English, and must have the following minimum qualifications, training and experience:

- At least 5 years' experience as a Construction Health and Safety Manager on marine construction projects;
- B-Tech Safety qualification;
- SAMTRAC,NEBOSH or an equivalent training course with accredited health and safety service provider as a minimum qualification ;

- Experience and appropriate training with regard to implementing and maintaining a health and safety management system compliant with national legislation or an international standard;
- Experience and appropriate training with regard to construction related hazard identification and risk management processes;
- Competence, experience and relevant training with regard to incident investigation procedures and causation analysis;
- Health and safety auditing experience and training;
- A valid First Aid certificate of competency;
- Fire prevention and protection training; and
- A valid Driving Licence (light motor vehicle).

The Client will stipulate whether a CHSO or CHSM is required depending on the size of the project and on the risks. Before placing a Construction Health and Safety person on the project site(s), the contractor must forward a copy of the person's CV to the nominated TRANSNET Project Management Representative for review and acceptance. A proposed candidate may be rejected should he/she not meet the experience and/or qualification requirements, or due to poor work performance on previous projects. The candidate may also be accepted for a probationary period to the project.

A valid SACPCMP registered construction Health and Safety Manager is required for the Deepening and Strengthening of the N Berth project.

10.3 Contractor Construction Supervisors

The contractor must ensure that all project and/or construction works are supervised at all times by an adequate number of qualified, competent and appointed Construction supervisors who have experience in the type of work being carried out as required by Construction regulations of 2014, regulation 8(7) and 8(8).

No work may be carried out without an appointed Construction supervisor being physically present in the work area(s) and without a daily safety task instruction having been completed.

Each Contractor Construction Supervisor shall be responsible for:

- Ensuring that all work carried out under his supervision is done so in accordance with the requirements of all applicable legislation, rules, standards, specifications, plans and procedures;
- Participating in Baseline and Task-Based Risk Assessments;
- Ensuring that all employees under his supervision are made aware of the hazards, risk scenarios and control measures identified in relevant risk assessments;
- Ensuring that the control measures stipulated in all relevant risk assessments are in place and are implemented fully for all work carried out under his supervision;
- Ensuring that all employees under his supervision conduct pre-task hazard assessments when necessary;

- Driving the achievement of health and safety objectives set for his team;
- Ensuring that the necessary written appointments are in place for each employee under his supervision (e.g. First aider, mobile crane operator, etc.);
- Ensuring that all employees under his supervision attend all required training;
- Ensuring that no employee carries out any work that he is not competent to perform or has not been appointed to perform;
- Identifying training needs within his team;
- Carrying out Safety Observations and Coaching (one per day);
- Conducting a weekly Toolbox Talk with his team;
- Leading a Daily Safe Task Instruction discussion with his team;
- Attending Health and Safety Meetings as required;
- Maintaining a Health and Safety Management Information Notice Board in the work area for which he is responsible;
- Recording, on a daily basis, a description of the day's activities as well as a breakdown (by occupation) of the personnel on site under his supervision (e.g. 5 bricklayers, 2 carpenters, 3 welders, 22 general workers, and 1 supervisor);
- Ensuring that all Safe Work Procedures applicable to the work carried out under his supervision are adhered to and are fully implemented;
- Maintaining discipline and taking the necessary action whenever an employee under his supervision does not adhere to a rule or requirement;
- Carrying out Planned Task Observations (one per day);
- Ensuring that emergency response procedures are understood by all employees under his supervision and that these procedures are followed in the event of an emergency;
- Reporting all incidents immediately, participating in incident investigations, communicating the lessons learnt to all employees under his supervision, and implementing corrective actions where required; and
- Carrying out workplace health and safety inspections.

Each Construction supervisor must accept these responsibilities in writing as part of his appointment.

Each Construction supervisor must be equipped with a mobile telephone to ensure that effective communication can be maintained for the duration of the contract.

10.4 Health and Safety Representatives

The team of employees on site must have a health and safety representative deployed on the project site(s). A Health and Safety Representative must be elected and appointed. Taking into consideration the number of employees deployed, the geographical area in which the work is taking place, the different work disciplines, and the shift pattern (if applicable), the contractor must ensure that an adequate number of Health and Safety

Representatives (at a minimum ratio of one Health and Safety Representative per 50 employees) are elected and appointed to effectively represent all site personnel as required by the OHS Act 85 of 1993, section 17 - 18.

Each Health and Safety Representative must attend an accredited training course for health and safety representatives. The cost of this training shall be for the contractor's account.

The contractor must make the necessary allowances for the Health and Safety Representatives to carry out their duties as specified in the applicable legislation.

The contractor must ensure that an appropriate sticker is affixed to the safety helmet of each Health and Safety Representative for identification purposes.

10.5 First Aiders

At least one trained and competent First Aider must be in place and must be appointed for the project site(s). Taking into consideration the number of employees deployed, the geographical area in which the work is taking place, the different work disciplines, and the shift pattern (if applicable), the contractor must ensure that an adequate number of First Aiders (at a minimum ratio of one First Aider per 50 employees) are in place and have been appointed to administer first aid treatment should this be required.

First Aid training must be done through an accredited training institution. The cost of this training shall be for the contractor's account.

The contractor must ensure that an appropriate sticker is affixed to the safety helmet of each First Aider for identification purposes.

10.6 Duties of Client

The duties of the Client, Transnet are as per the Construction regulations of 2014, regulation 5(1) – (8).

A construction work permit is required for this project as contemplated in CR 3(1). The client has therefore appointed a competent person in writing as a Construction Health and Safety Agent to act as his or her representative and whose main responsibility, amongst others, is to obtain a construction work permit from the Provincial office of the Department of Employment and Labour before commencement of any construction activities.. The duties that are imposed by these Regulations upon a client, apply as far as reasonably practicable to the appointed Health and Safety Agent.
The Health and Safety Agent contemplated in CR sub-regulations (5) and (6) will manage, together with the project team, health and safety on this construction project for the client. This will include the preparation and coordination of the necessary documentation to facilitate effective execution of the works and project close-out.

10.7 Duties of the Designer

The duties of the Designer are as per the Construction regulations of 2014, regulation 6(1) &(2). Health and Safety Design Consideration

A design team must be established to review all health and safety issues that may affect the safety of the structure during construction and ensure that all HAZOP recommendations are considered by the appointed principal contractor. The team must consider plans, calculations, specifications, instructions or drawings for a structure, including variations to a plan or changes to a structure or making decisions for a design that may affect the health or safety of persons during construction, occupy, use or carry out other activities in relation to the structure.

10.8 Duties of Principal Contractor

The duties of the Principal Contractor are as per the Construction regulations of 2014, regulation 7(1) – (8).

10.9 Duties of Contractor

The duties of the Contractor as per Construction Regulations of 2014, Regulations 7(2).

11. Competence, Training and Awareness

Each employee (including sub-contractor employees) must be suitably trained and competent, and must understand the health and safety hazards, risks and control measures associated with his work as required by the OHS Act 85 of 1993.

The contractor must implement systems and procedures to ensure that:

- The necessary competencies required by employees are identified (by occupation), along with selection, placement and any training requirements;

Please Note: Specific competency profiles and selection criteria (fitness for work) must be developed for all roles where significant health or safety risk exists.

Please Note: A formal training needs analysis must be carried out based on the competency profiles and a training matrix must be developed for the project.

Roles requiring technical certification, registration or licensing are identified and documented, and these roles are filled only by suitably qualified personnel;

- Minimum core health and safety skills required by employees in leadership and supervisory roles are identified and suitable training is provided including hazard identification and risk assessment, incident investigation, and health and safety interactions (i.e. Observation and coaching techniques);
- Competency-based training is provided and it includes operational controls (procedures and work instructions), management of change, and emergency response;

- All employees hold and maintain the required competencies (including appropriate qualifications, certificates and licences) and are under competent supervision;
- A site-specific induction and orientation programme that highlights health and safety requirements, procedures, and significant hazards, risks and associated control measures is in place for all new employees and visitors (understanding must be assessed);
- Personnel are trained and / or briefed on new or amended standards, rules, safe work procedures, risk assessments, etc.;
- Refresher training is carried out as required (e.g. Re-induction following an absence from site);
- Records of education, qualifications, training, experience and competency assessments are maintained on site for all employees; and
- The effectiveness of training is reviewed and evaluated.

Prior to the commencement of any work, including mobilisation and site set-up activities, the contractor must provide, to the satisfaction of the nominated project management representative, current documentation verifying that the contractor's employees, as well as the employees of any appointed sub-contractors, are competent and have the necessary qualifications, certificates, licences, job skills, training and experience (as required by this specification and applicable legislation) to safely carry out the work that is to be performed.

The Contractor and sub-contractor must ensure that the following training takes place:

- health and safety induction training pertaining to the hazards prevalent on the site at the time of entry
- training for all persons required to erect, move or dismantle temporary works structures and instruction to perform those operations safely
- training of employees working from a fall risk position
- training to work or to be suspended on a platform which includes at least:
    - how to access and egress the suspended platform safely;
    - how to correctly operate the controls and safety devices of the equipment;
    - information on the dangers related to the misuse of safety devices; and
    - information on the procedures to be followed in the case of-
        - an emergency;
        - the malfunctioning of equipment; and
        - the discovery of a suspected defect in the equipment;
        - an instructions on the proper use of body harnesses.
- Training for all operators of construction vehicles and mobile plant.

A contractor must at all times keep on his or her construction site records of the health and safety induction training and such records must be made available on request to an inspector, the client, the client's agent or the principal contractor.

Please Note: Only certified copies of certificates, licences, etc. will be accepted.

An Employee Profile (dossier) must be completed for each employee who will be performing work on site. All documentation pertaining to an employee's competence (i.e. certified copies of qualifications, certificates and licences as well as proof of job skills, training and experience) must be maintained in this dossier.

If it is determined through observation that an employee is not yet competent to carry out a particular task in a safe and capable manner, the employee will be required to cease work immediately and must either be reassigned or be retrained at the contractor's expense.

The contractor must provide proof that the training institutions and trainers that are used are appropriately registered with a governing authority (a trainer's registration certificate or registration number alone will not be adequate). The following must be made available for verification purposes:

- Proof of registration of the training institution including the training programmes that the institution is accredited to provide; and
- For each trainer, proof of competency and registration for the specific training programmes presented.

Foreign qualifications held by employees in health and safety critical roles must be verified against the requirements of local legislation.

11.1 Health and Safety Induction Training

Each employee must attend all mandatory Health and Safety Induction Training applicable to the project. No employee will be permitted to enter any project work site until he has attended this training. Each employee must carry proof that he has completed the induction training and may be removed from a site if such proof cannot be produced on request, this as required by the Construction regulations of 2014, Regulation 7(5).

Furthermore, employees must attend (where applicable) Area-Specific Health and Safety Induction Training pertaining to the particular hazards identified in the area(s) where the employees will be working. No employee will be permitted to enter a work area until he has attended the relevant area-specific training.

All visitors must receive a visitor induction briefing before entering any project work site. However, this induction does not permit a visitor to enter a site unescorted. Visitors must be accompanied at all times by an appropriately senior employee who has been fully inducted.

11.2 Specific Training and Competency Requirements

The following specific training and competency requirements must be complied with, where applicable to the project.

Please Note: An employee must be trained, assessed and found competent before he will be given authorisation to perform certain tasks or fill certain roles.

Table 11-1: Specific Training and Competency Requirements

Training	Applicable To
Health and Safety Induction	All employees
Safety Observations and Conversations (Safety Interactions)	All employees
Risk Assessment*	All managers and supervisors
Incident Investigation*	All managers and supervisors
Safety Leadership	All managers and supervisors
Legal Liability*	All managers and supervisors
Health and Safety Rep*	All elected Health and Safety Representatives
First Aid Levels 1, 2 and 3*	All nominated First Aiders
Fire Fighting (Fire Extinguisher Use)*	All employees
Working at Height*	All employees working at elevated positions where using a safety harness is required
Permit to Work	All Authorised Persons (i.e. Permit issuers) and all Applicants (i.e. Employees who will be applying for permits)
Isolation and Lockout	All Authorised Persons (i.e. Persons who authorise work that requires Isolation and Lockout), all Isolation Officers, and all Applicants (i.e. Persons who request permission to work on systems or equipment requiring Isolation and Lockout)
Mobile Equipment Site Licence*	All mobile equipment operators

Training requirements marked with an * must be arranged by the contractor through accredited external training institutions.

12. Communication, Participation and Consultation

The contractor must establish and maintain effective communication and consultative processes (allowing for a two-way dialogue) for the duration of the project to ensure that:

- All personnel are kept up to date with regard to health and safety matters (e.g. Hazards and risks, incidents and lessons learnt, leading practices, performance against objectives, etc.);
- General health and safety awareness levels are kept high;
- Prompt feedback is given to personnel with regard to health and safety issues or concerns that they raise; and
- Relevant, and often critical, health and safety related information (e.g. Design changes, instructions, reporting of hazardous conditions or situations, etc.) is effectively disseminated.

This must be achieved as follows:

12.1 Visible Felt Leadership (VFL) and Safety Observations and Conversations (SOCs)

The contractor's supervisory personnel (i.e. Managers and supervisors) must participate in the project's Visible Felt Leadership (VFL) programme. Each manager and each supervisor must, as part of his normal duties, perform Safety Observations and Coaching (SOCs). The intention of this programme is to encourage interaction between supervisors and workers concerning health and safety matters in order to:

- Reinforce behaviours consistent with standards, procedures and management system requirements;
- Correct behaviours inconsistent with standards, procedures and management system requirements; and
- Verify whether employees have the necessary training, certification, equipment, etc. To perform the work that they are carrying out.

Each manager, construction supervisor, safety personnel has a required number of SOCs to be completed per week. All SOCs that are recorded must be submitted to the nominated project management representative on a weekly basis.

The information that is gathered must be analysed and any trends that are identified must be acted on to correct unsafe behaviour or conditions.

12.2 Toolbox Talks

The contractor must prepare a Toolbox Talk on a weekly basis and must share it with all personnel for which the contractor is responsible (including all sub-contractors). Toolbox talks must address health and safety issues that are relevant to the work performed on the project site(s) and must include information and / or knowledge sharing, lessons learnt from incidents that have occurred, information concerning specific hazards and / or risks and control measures to prevent injury, etc.

Attendance records must be kept and maintained in the contractor's health and safety file.

12.3 Daily Safe Task Instructions (DSTIs)

A Daily Safe Task Instruction (DSTI) is a pre-start discussion amongst the members of a work team, led by the appointed supervisor, aimed at anticipating hazards and potential risks associated with the activities planned for the day or shift, and ensuring that the necessary control measures are in place to prevent incidents.

At the start of each day or shift, prior to the start of any work, each appointed supervisor must inspect the work area for which he is responsible and ensure that it is safe. He must then conduct a DSTI with his work team specifically concerning the tasks that they will be performing during the course of the day or shift. The relevant Task-Based Risk Assessment for the activity must be used as the basis for the discussion. The correct work method must be reiterated and the identified hazards, risks and control measures must be discussed with the team (each team member must be given the opportunity to contribute and participate in the discussion).

Any team member arriving late must first be taken through the information that was discussed (work method, hazards, risks and control measures) before being permitted to

start working. If the work method changes after activities have already begun, the DSTI must be revisited, updated and re-communicated with the team, and the changes must be signed off by the relevant Contractor Health and Safety Officer.

Every member of the work team must sign the DSTI attendance register. The attendance records must be kept and maintained in the contractor's health and safety file.

The contractor's Health and Safety Officer must evaluate the content of the DSTI's daily to ensure that they are task-specific. Furthermore, the Health and Safety Officer must attend the DSTI discussion but must not lead the DSTI discussions, as this is the responsibility of the appointed supervisor.

12.4 Health and Safety Suggestions

All employees must be encouraged to submit suggestions to enhance health and safety management on the project site(s). A process must be in place for documenting, evaluating, implementing (as appropriate), archiving and recognising the improvement ideas.

12.5 Health and Safety Meetings

12.5.1 Contractor Health and Safety Meetings

The contractor must schedule and consistently hold monthly health and safety meetings. These meetings must be chaired by the contractor's Project Manager and the following persons must be in attendance:

- Contractor and sub-contractor management representatives;
- Contractor and sub-contractor supervisors;
- Contractor and sub-contractor appointed Health and Safety (Employee) Representatives;
- Contractor and sub-contractor Construction Health and Safety Officers; and

The meeting must address the following as a minimum:

- New incidents for the period and corrective actions taken or to be taken;
- Implementation status of outstanding actions associated with previous incidents;
- SOCs, PTOs and DSTIs carried out for the period and action required to correct trends identified;
- Results of any audits, inspections (including H&S Rep inspections) or site visits carried out;
- A look ahead to ensure that appropriate health and safety planning and preparation is done for upcoming work;
- Risk Assessments, Safe Work Procedures, etc. That are outstanding or due for review (as well as the quality of these documents); and
- Any other health and safety related matter.

The contractor must compile minutes of each meeting and such minutes must be signed off by the Chairperson as a true reflection and attendance records must be kept. These records must be maintained in the contractor's health and safety file.

12.5.2 Site Health and Safety Meetings

In addition to the Contractor Health and Safety Meetings, the Project will schedule monthly Site Health and Safety Meetings that the contractor must attend. These

meetings will be chaired by the Project Construction Manager and the following persons must be in attendance:

- Contractor management representatives;
- Contractor Health and Safety Officers;
- The Project Health and Safety Manager;
- Project Health and Safety Advisors; and
- Client representatives (ad hoc).

The meeting will address the following as a minimum:

- Feedback from the contractor concerning health and safety performance for the period;
- New incidents for the period and corrective actions taken or to be taken;
- Implementation status of outstanding actions associated with previous incidents;
- SOCs, PTOs and DSTIs carried out for the period and action required to correct trends identified;
- Results of any audits, inspections or site visits carried out;
- A look ahead to ensure that appropriate health and safety planning and preparation is done for upcoming work;
- Risk Assessments, Safe Work Procedures, etc. that are outstanding or due for review (as well as the quality of these documents); and
- Any other health and safety related matter.

12.6 Health and Safety Performance Boards

The contractor must provide and maintain a Health and Safety Performance Board to be approved by the nominated project management representative and to be positioned at the entrance to the contractor's site office area. This board must display the following information as a minimum:

- The contractor's logo;
- Current manpower (heads) on site;
- Man-hours worked for the current month and project to date;
- Lost Time Injury Frequency Rate (LTIFR);
- Dates of last injuries (FAI, MTI and LTI);
- Number of hours worked since the last recorded LTI; and
- Names and contact telephone numbers for the appointed Project Manager and the Health and Safety Officers.

12.7 Health and Safety Management Information Notice Boards

The contractor must provide, for each construction site, a portable Health and Safety Management Information Notice Board to be placed in the work area. The following information and documentation, as a minimum, must be posted on these boards:

- The relevant Method Statements, Risk Assessments and Safe Work Procedures for the work that is being performed that day;
- The DSTI for the day;
- The most recent Toolbox Talk;
- Where applicable, all required permits and permissions for the work that is being performed;
- Material Data Sheets (MDS) for any chemical substances being used;

- The health and safety objectives for the work team;
- Details of the last incident involving the work team;
- The most recent weekly health and safety report;
- Emergency procedures;
- A site plan indicating evacuation routes and emergency assembly point locations;
- First Aider and Health and Safety Representatives names, contact telephone numbers as well as recent photo; and
- The appointed supervisor's contact details.

12.8 Involvement (Other)

The participation of all contractor (and sub-contractor) employees in activities that promote improvements in health and safety performance must be encouraged. In particular, this must include their appropriate involvement in:

- Hazard identification, risk analysis and determining control measures;
- Incident investigation; and
- Reviewing policy and objectives.

All regulations, instructions, signage, etc. Must be communicated in a language understood by all employees.

Health and safety personnel must be actively involved in planning activities so that they have the opportunity to highlight hazards and risks associated with upcoming work well in advance to ensure sufficient time to arrange and / or implement the necessary control measures.

13. Documentation and Document Control

The contractor must develop and maintain project-specific documentation required for the effective management of health and safety on the project.

All documents related to the contractor's health and safety management system must be effectively controlled.

The document control process must:

- Provide for the review, revision and version control of documents;
- Uniquely identify documents (as appropriate) to control their use and function;
- Require approval of the documents for adequacy prior to issue;
- Clearly identify changes and record the status of any revisions to documents; and
- Provide for the effective distribution of documents to, and where necessary the timely removal of obsolete documents from, all points of issue and use.

The contractor must establish a process for the systematic control of health and safety records and related data. Controls must be in place for the creation, receipt, secure storage, maintenance, accessing, use and disposal of such records and data.

Each record must be legible, identifiable and traceable, and must contain adequate information and data for its purpose.

The confidentiality and security of records and data must be maintained in a manner that is appropriate for the nature of the records and data, and in accordance with any applicable data or privacy protection legislation.

Personal information originating from medical surveillance and occupational hygiene monitoring must be reported in a form that respects the privacy of the individual, but

enables management to fulfil their duty of care obligations to employees. The names of individuals must not be disclosed without their written authorisation.

Retention periods for all records (based on legal requirements and / or knowledge preservation considerations) must be established and documented in accordance with applicable legislation.

13.1 Contractor Health and Safety File Requirements

The contractor must compile and maintain a file containing all necessary health and safety related documentation. The contents of the file will be audited by the PrCHSA or a nominated Project Health and Safety Representative on a monthly basis.
The contents of the HS file will be communicated to the Contractor.
The contractor must ensure that an equivalent file is compiled and maintained by each appointed Contractor.

14. Construction Work Permit (CWP)

Transnet appointed Construction Health and Safety Agent will obtain Construction Work Permit prior to commencement of any construction work on the project. A copy of the permit will be issued to the Principal Contractor. The Principal Contractor must conspicuously display the permit at the entrance to the site for which that number is assigned.

The Principal Contractor must keep a copy of the permit in the health and safety file for inspection.

NB: No construction work must commence or be carried out before the CWP and number has been issued and assigned by the Department of Employment and Labour. A site specific number is not transferrable.

15. Operational Control

For project operations and activities, the contractor shall implement and maintain:

- Operational controls, as applicable to the organization and its activities;
- The organization shall integrate those operational controls into its overall OH&S Management System;
- Controls related to purchased goods, equipment and services;
- Controls related to contractors and other visitors to the workplace;
- Documented procedures, to cover situations where their absence could lead to deviations from the OH&S policy and the objectives;
- Stipulated operating criteria where their absence could lead to deviations from the OH&S policy and objectives.

15.1 Safe Work Procedures

The contractor must develop, document and implement Safe Work Procedures for all activities involving significant health or safety risk. These procedures must detail the control measures required to effectively manage the health and safety risks associated with the work activities.

Each Safe Work Procedure must be consistent with the Task-Based Risk Assessment completed for the activity.

Every person engaged in an activity for which a Safe Work Procedure has been developed must receive suitable training on the procedure.

Furthermore, the contractor must develop, document, communicate and implement formal procedures, work instructions and / or programmes for the operation, maintenance, inspection and testing of all plant and equipment (including protective systems and devices) brought onto the project site(s).

15.2 Planned Task Observations

All contractor, management supervisors must perform Planned Task Observations (PTOs) to verify that the control measures that have been identified in Safe Work Procedures (and associated Risk Assessments) are being adhered to and are being properly implemented, and to provide guidance where deviations are noted.

Each supervisor must complete at least two PTO per week involving one or more employees in his work team. This number of PTOs is at the discretion of TRANSNET's Project Manager or appointed Representative.

When an unsafe act or condition is identified, the supervisor must coach the work team to correct the act or condition in line with the Safe Work Procedure.

Where valid changes to the work method are identified, the supervisor must ensure that the Safe Work Procedure and Risk Assessment are updated to reflect the current practice.

Project representatives will carry out PTOs on contractor employees on an ad hoc basis. Should deviations from the contractor's Safe Work Procedures be observed, the work may be stopped until these deviations are rectified.

15.3 General Rules of Conduct

All persons are required to conform to the following rules of conduct while on the site.

The following acts are prohibited:

- Engaging in practical jokes, horseplay, scuffling, wrestling, fighting, or gambling;
- Assault, intimidation, or abuse of any person;
- Insubordination towards any supervisor or manager;
- Refusing to carry out a reasonable and lawful instruction concerning health and safety;
- Entry into any restricted area (including barricaded areas), unless authorised to do so by the responsible person;
- Unauthorised use / operation of any equipment or machinery;
- Negligently, carelessly or wilfully causing damage to any property;
- Destroying or tampering with safety devices, signs, or signals;
- The use of water from fire hydrants or hose reels for any purpose other than extinguishing a fire;
- The wilful and unnecessary discharging of fire extinguishers;
- Refusing to give evidence or deliberately making false statements during incident investigations;
- Bringing alcohol, drugs, or any other intoxicating substance onto site;

- Bringing a firearm, ammunition, or any other offensive weapon onto site;
- Bringing animals onto site;
- Running, except in an emergency;
- The use of cell-phones (or similar devices) whilst working on site;
- Sleeping on the job;
- Building fires on site, unless in a suitably constructed barbequing facility; and
- Pouring / pumping / flushing any substance (chemical / hydrocarbon / waste water) into a storm water drain, onto bare soil, or into any area where the substance is not effectively contained.

Any of the above actions may result in the temporary or permanent removal of the offending person(s) from site, as well as possible prosecution. The decision of the nominated project management representative shall be final and binding in respect of any dispute that may arise from the interpretation of these requirements.

TRANSNET will not get involved in contractor disciplinary rules and procedures. The contractor will simply be informed (with reasons) that the offending employee(s) will be denied access to the project site. Once the contractor has been informed, the employee(s) must be removed from the site immediately.

15.4 Site Access

The contractor may not hire any security services for the project site unless authorisation has been obtained in writing from a nominated project management representative.

15.4.1 Access Control

The contractor must comply with all access control, procedures and systems applicable to the project site. Clients PM to liaise with the Contractor for co-ordination of site access

Failure to comply with these requirements will be viewed as a serious safety breach and may result in the permanent removal of the individual(s) / contracting company from site or suspension without payment.

Access will be controlled as follows:

Contract period access – an access card valid for the full contract period will be issued to an individual once the following requirements have been met:

- Completion of a pre-employment medical examination which states that the employee is fit for duty;
- Completion of all required project induction training;
- Completion of special training / licensing if applicable (e.g. Driving/operating Licence).

Note: No access card will be issued unless proof of identification is provided (i.e. an identity document or a valid passport). For foreign labour, an access card will only be issued if a valid work visa is produced.

Note: A driving licence will not be accepted as proof of identification.

15.4.2 Visitors

Visitors (including reps and suppliers) must be advised in advance of the mandatory Personal Protective Equipment (PPE) requirements for the site, and must arrive with all of this PPE.

Upon arrival, all visitors must report to the Contractors designated Site Office where they must sign in.

All visitors must undergo a visitor induction briefing before entering the site.

Whilst on site, visitors must be accompanied at all times by an appropriately senior employee who has been inducted fully. The visitor(s) must be met at the designated Site Office, and when the visit is over, must be escorted back to the Site Office.

Note: Visitors are not permitted to perform any work on site.

Note: Any request (typically made by a government official) to carry out a site inspection must be referred to the nominated project management representative. The contractor must not arrange any such inspection without prior approval from the nominated project management representative.

15.4.3 Alcohol, Drugs and Other Intoxicating Substances

The contractor must ensure that all personnel under his authority do not at any time enter the site or perform any work whilst under the influence of alcohol, a drug, or any other intoxicating substance.

Selling or possessing drugs, alcoholic beverages or any other intoxicating substance on the site is strictly prohibited.

A drugs and alcohol testing program will be implemented. Persons entering the site will be daily tested. Any person who tests positive for alcohol or drug consumption will be subject to disciplinary action and shall be permanently removed from the site.

Any person have the opportunity to rather report that he/she is under the influence before accessing the project site – in these case the employee may only be send home for the day by the responsible project manager representative but will then be tested for the following five days (each day) on his return to the project site. If it is found that the same person is frequently reporting that he/she is under the influence before even accessing the project site, It shall be the responsibility of the nominated project management representative to take disciplinary action and remove such a person's form the project site.

Should the actions and / or demeanour of an employee suggest possible narcosis or drunkenness, the employee must be removed from the site. This may be done without testing.

Note: All personnel involved in an incident / accident must immediately be subjected to an alcohol test and a drug test as part of the investigation.

15.4.4 Firearms, Ammunition and Offensive Weapons

Firearms, ammunition, and offensive weapons of any kind are strictly prohibited. No person may enter /shall not be permitted to enter the site carrying any such item.

15.5 Construction Vehicles

Construction vehicles, such as transportation vehicles, vehicles being used by the Contractors team, that is brought onto site must meet safety requirements. Each vehicle to be used on site must be inspected and approved by the nominated project management representative before a site access permit will be issued for the vehicle / equipment. No

vehicle shall be permitted to enter the site unless it is duly authorised. Access permits are vehicle-specific and may not be transferred between vehicles.

The contractor must allow any vehicle that is brought onto site (including privately owned vehicles) to be searched at any time while on the premises, or when entering or leaving the premises.

The contractor is solely responsible for the safety and security of all vehicles (including private vehicles) that is brought onto the site. All road-going vehicles used by the contractor on the site must be roadworthy and registered with the relevant traffic authority.

A vehicle will not be permitted to enter the site in an un-roadworthy condition. Access will be denied if, for example, but not limited to:

- The vehicle has a defective exhaust system;
- A serious oil or fuel leak is evident;
- The vehicle has unsafe bodywork or is carrying an unsafe load;
- The vehicle is fitted with extraneous or non-standard equipment;
- Passengers are not seated properly;
- The vehicle is not fitted with a seat belt for each occupant; or
- The vehicle has any obvious mechanical defect;
- Pre-inspection requirements are not met.

Overloaded vehicles will not be permitted to enter the site. The driver / operator of any vehicle / mobile equipment must carry a copy of his appointment with him at all times. Each driver / operator must:

- Comply with all site / project rules and regulations pertaining to traffic and the safe operation of vehicles / mobile equipment;
- Obey all road signs;
- Obey all instructions given by security or emergency services personnel;
- Remain within the boundaries of the site; and
- Ensure that the vehicle that he is operating is never overloaded, and that loads are always properly secured.

In the interest of safety, only the minimum number of vehicles required by the contractor to complete the work under the contract will be permitted to enter the site. When not in operation, the contractor's vehicles / mobile equipment must be parked within the boundaries of his lay-down area or yard.

Parking is only permitted in designated parking areas. All cars are parked on site at the owner's risk.

In the event of a vehicle accident on site, the driver(s) must report the incident immediately and must remain at the scene until a nominated project management representative arrives, or until a nominated project management representative authorises him to leave (unless, of course, the driver requires medical attention).

15.5.1 Mobile Equipment

All Contractors must ensure that mobile equipment and light vehicles comply with relevant/applicable legislation.

Each contractor must provide evidence to the nominated project management representative that all light vehicles and mobile equipment to be used on the project (including, but not limited to, lift and carry cranes (or mobi-lifts), mobile cranes, forklifts, mobile elevating work platforms (e.g. Cherry pickers), tractors, dozers, dump trucks, haul trucks, graders, excavators, loaders, back-actors, drill rigs, and road-going cars, light delivery vehicles, and trucks) comply with the requirements of relevant/applicable legislation. This evidence must be provided prior to the equipment being brought onto the project site. The contractor remains responsible for meeting this requirement even if the equipment to be used is leased or provided by a sub-contractor (i.e. not owned directly by the contractor).

An Equipment Profile (dossier) must be compiled for each light vehicle and each item of mobile equipment to be used on the project site. All mobile equipment and light vehicles (used for work purposes) must be subject to a risk assessment. The assessment must:

- Involve operators and maintenance personnel who will use and work on the equipment; and
- Address all aspects of safe operation including but not limited to handling, driver vision, brake failure, tyre blow out, and access and egress for operators and maintenance personnel.

Each light vehicle and each item of mobile equipment must be serviced and maintained as prescribed by the manufacturer of the vehicle or equipment. No major repairs or services may be carried out on site. No repairs may be carried out by a driver or operator. Only suitably qualified and competent persons may carry out repair work.

An appropriate pre-operation safety check based on a risk assessment must be carried out for each light vehicle or item of mobile equipment driven or operated for work purposes. For each vehicle or equipment type, an approved checklist must be in place (and must be used). The pre-operation check must include, but not be limited to, inspection and / or testing of the following safety critical features:

- Brakes (testing method must be provided);
- Wheels and tyres (including the spare);
- Lights and indicators;
- Steering;
- Seats and seat belts; and
- Windscreen and windows, including windscreen wipers and washers.

Should any critical feature be defective or damaged, the vehicle or equipment may not be operated until it has been fully repaired.

Supervisors must review the completed checklists on a daily basis to satisfy themselves that there are no major deficiencies that could place a driver or operator at risk. No person may drive or operate any light vehicle or item of mobile equipment without

authorisation. All drivers and operators must be appointed in writing by the contractor's Project Manager.

No driver or operator may be appointed without proof that the individual has been trained, tested and found competent, or is currently licensed. The appointment letter must specify the type of vehicle or equipment for which authorisation is being given and must clearly confirm that the driver or operator:

- Is 18 (eighteen) years of age or older;
- Has undergone a medical examination and has been declared fit for work by an occupational medical practitioner; and
- Has received suitable training and has been found competent, or is in possession of a valid driving licence issued by a state, provincial or civil authority that is applicable to the class of vehicle or equipment that is to be driven or operated.

The principal accountability for preventing accidents and incidents lies with the driver or operator of a light vehicle or item of mobile equipment, as he is in full control of any given situation at any given time. It must be stressed to each driver and each operator that safety is his prime responsibility – this must be clearly instructed and understood.

Drivers and operators must be empowered to stop driving or operating immediately should an unsafe condition arise, and refuse to drive or operate any light vehicle or item of mobile equipment that is defective and / or has any inoperative safety features. Similarly, a supervisor must never force a driver or operator to drive or operate a defective vehicle or item of equipment.

If a driver or operator does not adhere to the site rules and regulations, his appointment must be withdrawn and he must not be permitted to continue with his duties. If necessary, site access will be denied (either temporarily or permanently) to any driver or operator who is deemed to not be adhering to site requirements.

No person may drive or operate a light vehicle or item of mobile equipment if he suffers from a medical condition that places both him and those around him at risk of injury. A fit-for-work policy must be in place. Daily alcohol testing and random drug testing must be carried out.

Supervisors must regularly check on the physical condition of drivers and operators during the course of a shift. A system must be in place to manage driver fatigue. No eating or drinking is permitted while driving or operating a light vehicle or item of mobile equipment.

A mobile phone, whether hands-free or not, may not be used by the driver or operator of a light vehicle or item of mobile equipment unless the vehicle/equipment is parked in a safe location and not operational. Behaviour-based observations and coaching must include the operation of light vehicles and mobile equipment.

A site-specific traffic management plan must be compiled and submitted to the nominated project management representative for approval. The plan must include, but not be limited to, (where relevant to the scope of work) the following:

- Segregation of pedestrians, light vehicles, and mobile equipment where possible (using barriers where feasible);
- Systems to control the movement of mobile equipment in areas accessible to pedestrians, the movement of mobile equipment into and out of workshops, and pedestrian and light vehicle movement around mobile equipment;
- Setting of appropriate speed limits for vehicle types, road surfaces and environmental conditions;
- Installation and maintenance of road traffic control signs;
- Right-of-way rules (including overtaking restrictions);
- Overtaking protocols;
- Clear communication protocols for interactions between all vehicles and equipment;
- Procedures for light vehicles and / or mobile equipment entering hazardous or restricted areas;
- Standards for safe following distances based on operational circumstances, environmental conditions and near sight (blind spot) limitations of mobile equipment;
- The minimum safe distance to be maintained between light vehicles and mobile equipment (i.e. 50 metres unless positive contact is made);
- Designated parking areas for mobile equipment and light vehicles, including parking associated with maintenance areas;
- Parking procedures (e.g. Safe parking distances, safe parking locations, requirements for reverse parking, etc.);
- Systems to control approaching, refuelling, parking, boarding and disembarking mobile equipment (a driver or operator must exit the cabin and must disembark the vehicle or equipment entirely when his direct involvement with maintenance or servicing is not required);
- Guidelines for abnormal road conditions (e.g. Heavy rain, fog, or high winds) providing "go / no go" criteria and contact details for the person(s) responsible for making the "go / no go" decisions;
- Truck loading and unloading procedures to avoid material or objects falling from the vehicle;
- Guidelines for wide or abnormal loads including offsite transport; and
- Systems to control mobile equipment use in the vicinity of overhead power lines.

The Traffic management Plan must be reviewed/revised where changes to the works areas require. A risk assessment must be carried out prior to any changes being made to traffic movements or road systems.

Designated walkways (both indoors and outdoors) must be provided for pedestrians, and pedestrians must make use of these walkways. Good lighting must be provided along all walkways, particularly at road junctions. Wherever possible, rigid barricading must be used to separate pedestrians from moving light vehicles and / or mobile equipment.

All personnel must be transported to site and must be dropped off at a designated area. Controls must be in place to ensure the safety of people working on roads, including those working on broken-down vehicles.

High visibility clothing must be worn at all times whilst on the project site. Speed limits and traffic rules must be reviewed regularly and must be rigorously enforced. Local traffic rules must be complied with at all times.

Pedestrians must give way to light vehicles and / or mobile equipment except at pedestrian crossings. All light vehicles and mobile equipment must give way to emergency vehicles. Pedestrians and light vehicle drivers must be made aware of the blind spots associated with mobile equipment.

The driver or operator of a light vehicle or item of mobile equipment must stop the vehicle or equipment and sound the horn before proceeding at blind corners, where his view of the path or intended path is obstructed, and when entering or leaving a building. Whenever a light vehicle or item of mobile equipment is stopped or parked, the handbrake (if applicable) must be applied.

No light vehicle or item of mobile equipment may be left unattended with the engine running or with a key in the ignition. No light vehicle or item of mobile equipment may be parked so as to cause an obstruction to any roadway, passage or access way. No light vehicle or item of mobile equipment may be parked within 50 metres of a loading or off-loading point.

All loads must be secure and must be within the load limit of the vehicle or equipment. A load must be properly secured before the vehicle or equipment is set in motion. Adequate precautions must be taken for any overhanging load. No unauthorised light vehicle or item of mobile equipment may enter a restricted area or building.

15.5.2 Light Vehicles

All Contractors must ensure that Light vehicles have the following minimum safety features:

- Fixed seats and suitable seat (safety) belts for all occupants (i.e. Driver and all passengers);
- Roll-over protection for all vehicles intended to be driven on dirt or steep roads;
- Cargo barriers and load restraints for all vehicles designed for carrying loads (other than passengers), or that are unable to have cargo separated from the occupant-carrying space of the vehicle; and
- An air bag on the driver's side, and where available as a manufacturer fitted item, a passenger's air bag;
- A Reverse Alarm.

All Contractors must ensure that Light vehicles that interact with mobile equipment are equipped or fitted with:

- Systems that enable positive communication with the equipment operators (e.g. A two-way radio);
- A high visibility flag (e.g. A whip flag or buggy whip);
- An amber flashing light (revolving or strobe);
- Reflective taping; and
- High visibility signage (i.e. Vehicle call numbers) facilitating easy and positive identification from a reasonable distance.

All Contractors must ensure that Light vehicles carry:

- Emergency roadside triangles or beacons (three of either);
- Chock blocks for preventing uncontrolled movement of the vehicle when parked;
- A flashlight;
- A fire extinguisher (2.5kg DCP);
- A first aid kit; and
- Survival or emergency equipment (e.g. a vehicle recovery kit) suitable for the operating environment.

A change management process must accompany all vehicle modifications, including the attachment of any equipment. Examples of changes or modifications include, but are not limited to, any change or modification:

- Made to the overall structure or design of the vehicle body;
- Made to the original manufacturer-fitted type of tyres or wheels;
- Made to the suspension system of the vehicle;
- Made to the mechanical system of the vehicle;
- That may adversely alter the centre of gravity of the vehicle;
- That alters the load carrying capacity of the vehicle; and
- That may affect the ability of the vehicle to withstand a crash (e.g. the fitment of a "bull bar").

Vehicle selection must be based on a risk assessment where consideration is given to the tasks, the application, the environment, roll-over protection and the rating of sturdiness in the event of a crash.

All Contractors must have a formal inspection and preventative maintenance system in place to ensure that vehicles are maintained in a safe and roadworthy condition at all times and, as a minimum, are serviced in line with the vehicle manufacturer's service schedule.

Should any safety critical feature be defective or damaged, the vehicle must be withdrawn from service until it has been fully repaired. Inspection and maintenance must be undertaken on critical features such as:

- Wheels and tyres (including the spare);
- Steering, suspension and braking systems;
- Seats and seat belts;
- Lights, indicators and reflectors;
- Windscreen and windows, including windscreen wipers and washers;

- The vehicle structure itself; and
- Other safety-related items on the vehicle body, chassis or engine, including instrumentation.

Persons may only be transported in vehicles equipped with manufacturer fitted or approved seats and seat belts. Seat belts must be worn by all occupants of a light vehicle (i.e. the driver and all passengers) at all times.

Only the driver and one passenger are permitted in the cab (front) of a light delivery vehicle. No personnel may be transported in the load-bin of a light delivery vehicle, even if the vehicle is fitted with a canopy. Only tools and equipment may be transported in the load-bin. Furthermore, no persons may be transported in a trailer behind a vehicle.

A pre-operation vehicle safety check and familiarisation system must be in place and must be used by the driver. An approved checklist must be used. All vehicle faults that are recorded must be attended to immediately.

Light vehicle running lights (low-beam headlights) must be switched on at all times when the vehicle is in operation.

All Contractors must have a system is in place to ensure that drivers receive adequate training to ensure that the vehicle intended to be operated or driven can be operated or driven safely. As a minimum, training must include:

- Behaviour-based defensive driving principles;
- Vehicle familiarisation, taking into account the handling dynamics of the vehicle, maximum number of passengers, load limits and various features;
- Loading and restraining principles where the vehicle to be operated is designed for carrying cargo loads;
- Education and awareness concerning driving and travel risks that may be encountered within the environment where the vehicle may be operated or driven, and the requirements pertaining to traffic rules and speed limits;
- Securing (locking) equipment to prevent unauthorised use;
- Emergency crash and breakdown procedures; and
- Basic mechanical principles, including how to change a tyre and perform an adequate pre-operation check.

15.5.3 Machinery

The contractor must ensure that all plant and equipment brought onto the site is:

- Appropriate for the type of work to be performed.
- Approved, inspected, tested, numbered and tagged (if appropriate) before being brought onto site.
- Properly maintained in accordance with the manufacturer's recommendations; and
- Placed on a register and checked at least once per month or as required by the applicable legislation.

Items of plant or equipment brought onto site by the contractor or his sub-contractors may be inspected by a nominated project management representative. Should the nominated project management representative determine that any item is inadequate, faulty, unsafe or in any other way unsuitable for the safe and satisfactory execution of the work for which it is intended, the contractor must, on instruction from the nominated project management representative, immediately remove the item from the site and replace it with a safe and adequate substitute.

15.5.4 Training and Licensing

No person may drive a light vehicle or operate an item of mobile equipment unless he has been trained, tested and found competent, or is currently licensed to drive or operate that specific vehicle or item of equipment. The training must address hazards and risks assessed for that specific vehicle; and the tasks for which it is to be used.

No person may be appointed to drive a light vehicle or operate an item of mobile equipment unless he is in possession of a valid medical certificate of fitness (issued by an occupational medical practitioner).

Each person required to drive a light vehicle or operate an item of mobile equipment on the project site must have a project-specific site licence or appointment to drive or operate that vehicle or item of equipment.

The Contractor must ensure that Licenses and Operators' competency certificates are valid for the duration of their activities on site. No training of drivers or operators may be carried out on site unless authorised by a nominated project management representative.

15.6 Barricading

Barricading requirements found within the Construction Regulations, 2014 as well as TRANSNET's barricading standards, but not limited to, must be complied with at all times.

Each contractor required to erect barricading on the project site(s) must develop, document and implement Safe Work Procedures that are aligned with the requirements of this standard.

Barricading must be erected to:

- Prevent persons from making contact with an identified hazard;
- Provide warning of the existence of a hazard;
- Prevent unauthorised access (by people, vehicles and mobile equipment) into an area where a hazard exists or where a hazardous activity is being carried out;
- Define the boundaries of a hazardous location and / or restricted area; and
- Allow a work team to perform hazardous tasks without persons unfamiliar with the hazard(s) accessing the area.

Although not limited to these situations, barricading must be erected or installed:

- Around excavations (trenches, pits, etc.);
- To protect openings and edges (to prevent persons from falling, all openings and edges associated with structures during the course of construction must be protected

by sturdy, rigid barriers capable of withstanding a force of at least 110 kilograms applied in any direction at any point);

- To prevent access into areas where overhead work is in progress;
- To route vehicles safety through (or around) construction areas; and
- To protect members of the public who may be in the vicinity of a work or construction site (by preventing access).

In all cases, the erection of barricading must be a temporary measure. It must only remain in place until the hazard is eliminated or the potentially dangerous situation is rectified.
A barricade must present a sturdy physical barrier to entering an area. Therefore, plastic cones, post and chain systems, "danger tape" and "snow netting" will not be accepted as barricading and may only be used for the purposes of low risk demarcation.
For example, snow netting may be used for the demarcation of lay down areas.

Acceptable forms of barricading include:

- Hoarding panels (no less than one metre in height) that can be securely fastened together to form a fence line may be used. Hoarding panels may be constructed from a variety of materials (e.g. wooden board, steel sheeting, wire mesh on a steel frame, etc.)
- Wire mesh fencing (no less than one metre in height with sturdy posts spaced at intervals of no more than 3 metres) may be used in certain circumstances, e.g. Around excavations.
- Sturdy, rigid, and securely fixed (i.e. bolted, welded, clamped, etc.) metal guard rails may be used, particularly for protecting openings, holes and edges associated with floors, platforms, walkways, etc. The top rail must be positioned at a height of one metre above the working surface, and a mid-rail must be provided.
- Concrete Jersey barriers must be used for the routing of traffic and when work is being conducted in or alongside a roadway.

Regardless of the type of barricade used, the following requirements must be met:

- The installation, alteration and removal of barricades must be supervised by a competent person;
- The barricading must be uniformly and intelligently configured;
- The barricading must be stable, conspicuous and effective;
- The barricading must completely surround the work or hazardous area;
- General access requirements around the work or hazardous area (such as pedestrian walkways, operational access, or general thoroughfares) must be taken into consideration when erecting a barricade;
- The extent of the area that is barricaded must be kept to a minimum so as not to unnecessarily restrict access to other areas. If access routes to other areas are blocked by the barricade, alternative routes must be identified and signposted.
- All barricaded areas must have properly designated points of entry and exit for persons and / or vehicles. Each pedestrian access point must be fitted with a self-closing gate. A sign indicating, "DESIGNATED ACCESS POINT – AUTHORISED PERSONNEL ONLY", must be fitted to each gate;

- Additional signage providing warning of specific hazards (e.g. falling objects, electricity, etc.) Including, "NO UNAUTHORISED ENTRY", must be attached to all gates and, where required, to the barricading itself. The signage must be visible from all angles and must be large enough to be read from a distance of 10 metres;
- Barricading must be clearly visible at all times (day and night). If necessary, flashing warning lights must be used;
- Tags must be attached to the barricading displaying the name and cell phone number of the person responsible for the barricade, and specifying the reason for the barricading and the date on which it is scheduled to be removed;
- Should a person require access to a barricaded area, authorisation must be obtained from the person responsible for the erection of the barricade. The hazards that are present and the Personal Protective Equipment that must be worn within the barricaded area must be communicated to the person seeking access;
- Each barricade must be listed in a register, and each must be inspected daily to ensure that it is still intact and that its positioning is still effective;
- All barricades must be properly maintained and repaired as required;
- When the work has been completed and the hazard has been eliminated, all barricading must be removed without delay. A barricade may not be left in place if no hazard exists;
- Before a barricade is removed (allowing general access), the area must be inspected by the person responsible for the work that was carried out, to ensure that the area is once again safe. If applicable, the person accepting the area back for general use shall do so on completion of his own safety inspection;
- Authorisation to remove (or modify) a barricade may only be granted by the person responsible for the erection of the barricade.

15.7 Excavations

Excavation work or activities which are required as part of the scope shall be undertaken in accordance with the requirements of this Specification as well as all applicable legislation concerning excavation work.

Before issuing a Permit to Work for excavation works, the Authorised Person (i.e. Permit issuer) must verify that:

- A detailed Risk Assessment has been conducted for the work to be performed;
- A Safe Work Procedure is in place; and
- No buried services are present in the area where the excavation works are to be carried out.

15.8 Cranes and Lifting Equipment

All applicable legislation concerning cranes and lifting equipment must be complied with at all times (Driven Machinery Regulation, Construction Regulations, but not limited to).

15.9 Working at Heights – Cantilever

All applicable legislation concerning work performed from an elevated position must be complied with at all times (refer to CR 2014 section 16&17). Working on heights risk

assessment to be carried out, Fall prevention or fall protection measures must be in place whenever the potential exists for a person to fall. Life-saving equipment, life jackets is a must. The scaffold must comply with SANS 10085 standards, drawings approved by a structural engineer.

15.9.1 Work Platforms

Wherever practical, a safe working area must be provided in the form of a work platform with fixed edge protection. This may include:

- a permanent work platform or walkway (i.e. A fixed steel structure);
- a fixed or mobile scaffold; or
- an elevating work platform such as a scissor lift, man lift, boom lift or cherry picker.

All work platforms and walkways elevated one metre or more must have complete floors, and edge protection must be in place in the form of toe boards and sturdy guard rails properly secured (i.e. bolted, welded, clamped, etc.) to prevent accidental displacement. Safe means of access and egress must be provided.

Guard rails must be capable of withstanding a force of at least 100 kilograms applied in any direction at any point. The top rail must be positioned at a height of one metre above the working surface, and a mid-rail must be provided.

15.9.2 Floor openings, holes and edges

Any opening or hole (temporary or permanent) in a floor, platform or walkway must be protected by sturdy guard rails (removable if required) or a cover to prevent a person from stepping into or falling through the gap. Covers must be strong enough to support the loads that will be imposed on them and must be secured to prevent accidental displacement.

Ladder way floor openings and platforms must be protected by guard rails of standard construction and toe boards must be fitted along all edges, except at the entrance to an opening where a gate must be installed and so arranged that a person cannot walk directly into the opening.
When open, hatchways and floor openings must be protected by removable guard rails and toe boards of standard construction. When these openings are not in use, covers of adequate strength must be put in place and must be secured to prevent accidental displacement.

Where doors or gates open directly onto a stairway, a platform must be provided and the swing of the door or gate must not reduce the effective width of the platform to less than 500mm.

15.9.3 Fall Protection

Whenever there is a risk of falling, or whenever work must be carried out near an opening through which (or an edge over which) a person could fall, no work may commence unless:

- A fall protection (and rescue) plan is in place (prepared by a competent person, approved by the nominated project management representative, and implemented by the contractor);
- A detailed task-specific risk assessment has been carried out;
- A safe work procedure is in place for the task to be performed;
- A permit to work has been obtained;
- Each person has undergone formal training; and
- Each person has been provided with suitable fall protection equipment.

15.9.4 Elevating Work Platforms

Before hiring or purchasing an elevating work platform (e.g. a scissor lift, man lift, boom lift, cherry picker or similar equipment), the certification of the equipment (with regard to suitability of design and construction) must be verified.

Before using an elevating work platform, it must be verified that the equipment is in good working order and has been serviced regularly. The service record and instruction manual must be kept on site. A system must be in place to ensure that the equipment is maintained and inspected as required by the manufacturer and / or local regulations.

Persons (operators) must be formally trained through an accredited training provider and certified competent in the operation of the equipment. Once a person has been issued with the necessary licence or qualification as required under local regulations, he must be appointed in writing to operate the equipment.

Before using an elevating work platform, the operator must inspect the equipment and a pre-use checklist must be completed. The operator of an elevating work platform must be in the "basket" unless it can be demonstrated to the satisfaction of the nominated project management representative that this is not possible or practical.
Every person in the "basket" must keep his feet on the floor at all times. Every person in the "basket" must be secured at all times by means of personal fall protection equipment attached to an approved anchorage point, and systems must be in place to prevent tools and equipment from falling.

A mobile elevating work platform must not be driven unless the "basket" has been lowered and secured in a stable position. Every elevating work platform that is used must be equipped with a dead man's switch or foot pedal at the operator controls. An elevating work platform must only be operated on a firm surface with the outriggers extended (where fitted).

An elevating work platform must not be operated on a grade or slope beyond the capability of the machine (every mobile elevating work platform that is used must be fitted with an inclinometer which sounds an audible alarm before the maximum safe incline has been reached).

The area beneath the "basket" and the boom must be barricaded. A second competent operator of the mobile elevated work platform to be in place on the ground level – to

ensure that the elevated work platform could be lowered in case of an emergency. A spotter must be used at all times when moving a mobile elevating work platform and when the "basket" is in an elevated position.

15.9.5 Man Baskets, Suspended Scaffolds and Boatswain's Chairs

The use of a man basket, suspended scaffold or a boatswain's chair may only be considered when all other avenues to safely perform the work (e.g. ladder, scaffolding, mobile elevating work platform, etc.) have been exhausted. Authorisation to use a man basket, suspended scaffold or a boatswain's chair must be obtained from the nominated project management representative. If permission is granted, the use of such equipment must be in strict compliance with all applicable legislation.

Each person working from a man basket, suspended scaffold or a boatswain's chair must be in possession of a valid medical certificate of fitness and must be trained (and assessed competent) in the Safe Work Procedures pertaining to the use of the equipment, as well as the Fall Protection Plan.

Each person working from within a man basket or suspended scaffold or from a boatswain's chair must wear personal fall protection equipment at all times (i.e. an approved full body harness connected by means of a shock absorbing lanyard to an anchorage point or lifeline that does not form part of the basket or chair).
If suspended using a crane, the man basket, suspended scaffold or boatswain's chair must be visible to the crane operator at all times. A suitable means of communication must be in place to ensure that the suspended person(s) are able to communicate with the crane operator and personnel on the ground.

The crane operator must remain at the controls at all times while the man basket, suspended scaffold or boatswain's chair is occupied. Where feasible (and if it is safe to do so), tag lines must be used to stabilise the man basket, suspended scaffold or boatswain's chair.

A man basket or suspended scaffold (including the suspension system) must be designed by a qualified engineer. Only an approved and certified man basket or suspended scaffold from a Regulatory Body can be used. Regulations require approval by an authority or certification to a national or international standard. The manufacturer's procedures and conditions for use must be strictly complied with at all times.

Each man basket or suspended scaffold must be fitted with an information plate indicating the maximum weight and number of persons that may be lifted. Copies of the welding x-rays and engineering drawings must be kept on site.

Any work involving the use of a man basket, suspended scaffold or boatswain's chair must be carried out under the supervision of a competent person who has been appointed in writing.

A man basket, suspended scaffold or boatswain's chair must be thoroughly inspected (examined for damage) by a competent person prior to use (every time the equipment is

used) and the results of each inspection must be recorded in a register. The crane or hoist as well as all lifting equipment (tackle) that is used to suspend the man basket, suspended scaffold or boatswain's chair must be tested and inspected as stipulated according to applicable Legislation.
All suspended scaffold erectors, operators and inspectors must be appointed in writing and proof of competency must be provided.

15.10 Working along, near and/or on water

All applicable legislation concerning working along, near, adjacent and/over/in water must be complied with at all times, but not limited to OSHAct, Diving Regulations, SAMSA etc. Each contractor carrying out work along, near, adjacent and/over/in water must develop, document and implement Safe Work Procedures that are aligned with the requirements of this specification as well as any applicable legislation, standards and codes. A task specific risk assessment for the relevant work to be carried out along, near, adjacent and/over water should be conducted before any such work commences and submitted to the Transnet Project Manager or Representative for approval before any work can commence. The Risk assessment should be reviewed periodically. All potential hazards involved in the work to be carried out along, near, adjacent and/over/in water e.g. drowning, plant/equipment falling into water, dredger/barge sinking or defective/non complaint to SAMSA standards should be identified and mitigated.

Health and Safety documents for such work should include, but not be limited to:

- Competencies of operators and conditional reports/assessments of all plant involved in working along/near/adjacent and over/in water.
- Methodology for carrying out such work (dredging activities, working from a barge);
- Formulation of method statements/risk assessments/safe work procedures (dredging activities, working from a barge);
- Emergency preparedness e.g. contingence plans, rescue plans, evacuation plans (dredging activities, working from a barge,).

Lifting equipment/mobile plant should be kept a safe distance from dangerous locations e.g. openings, edges close to the water. Lifting equipment/mobile plant/barges/dredgers carrying out work along, near, adjacent and/over/in water should be fixed and securely anchored. The operating zone should be clearly demarcated. No lifting equipment/mobile plant/barges/dredgers should be allowed to operate beyond its safe working load and capacity. The suitability of the ground on which the lifting equipment/mobile plant will be stationed should be identified before work commences with these activities.

The dredger and working barge to be used must comply to all SAMSA requirements and mut be inspected first before a permit for use will be issued.
River and weather conditions to be closely monitored and documented to ensure that the dredger/barge operate under safe conditions.

15.11 Permit to Work

All personnel must comply with the Permit to Work system applicable to the project.
A Permit to Work must be obtained before carrying out any work that involves:

- Hot work outside of designated workshops;
- Excavation; or
- A service (e.g. water supply, fire suppression systems, etc.).

Note: A Permit to Work may only be issued by an Authorised Person, and may only be received (or accepted) by an appointed Applicant.
All costs associated with the Compliance to Permits section is for the Contractors account.

15.12 Electrical Safety

All electrical work must be carried out by competent personnel in accordance with all legal requirements, codes, design criteria and safety standards applicable to the project. Certificates of Compliance to be issued after such electrical work including site establishment.

15.13 Portable Electrical Equipment

Prior to site establishment, each contractor must provide a complete inventory of all portable electrical equipment that he and his sub-contractors intend to use on the site (including plant, machines, appliances, generators, hand tools, lighting, extension cords, etc.). The nameplate data for each item of equipment must be included.

All portable electrical equipment to be used on the site must be supplied and maintained in a serviceable condition. Any electrical equipment that is in poor condition or is not in proper operating order may not be used. Any electrical equipment that a nominated project management representative deems to be unsafe or unsuitable must be removed from site.

Electrical repair work or diagnostic work on electrical equipment may only be performed by personnel who are competent and authorised to perform this work (i.e. qualified electricians). With the exception of double-insulated equipment, all electrical equipment must have an equipment grounding (earthing) conductor that connects the frame of the equipment being utilised to the grounding (earthing) conductor of the electricity supply system.

All electrical equipment and all electricity supply systems used (including generators) must be inspected and tested by a registered and competent electrician to ensure that all equipment is properly grounded (earthed).

All electrical equipment used on site must be supplied electricity through (i.e. must be protected by) an approved and tested residual current device (or earth leakage device or unit). If a socket outlet does not have a residual current device in the circuit, a portable

residual current device must be used. Outlets without residual current device protection must be labelled as such.

Any electrical equipment that causes an earth leakage device to trip or deactivate the circuit may not be used again until an electrician has inspected and tested the equipment and has recorded in a register that the equipment is safe to use.

All generators must be fitted with suitable overcurrent protective devices (i.e. circuit breakers or fuses). All generators must be used in compliance with the manufacturer's requirements. Any proposed modification to a generator must be authorised in writing by the manufacturer prior to the modification being made.

Each welding machine used on site must be fitted with a Voltage Reduction Device (VRD). If this is not practical (i.e. for arc welding processes other than stick welding), a dead man's (isolation) switch in the electrode circuit (operated by a trained observer) may be used as an alternative. All welding machines must be properly grounded (earthed).

All portable electrical hand tools used on the site must be double-insulated. Electrical equipment must be disconnected or unplugged when not in use. Portable lights must be stable and each light bulb must be protected by a substantial guard.

No person may wear a watch or any jewellery, or carry any metal objects such as a lighter or keys, while working on any electrical system or equipment. No person may work on or use electrical equipment if his clothing is wet or any part of his body is in contact with water.

No person may handle electrical equipment, equipment cords or extension cords with wet hands or if the floor or ground surface is wet.
Fire extinguishers filled with carbon dioxide must be used to fight electrical equipment fires (water may never be used). If possible, the electrical equipment should be de-energised before fire-fighting activities commence (refer to the Fire Protection and Prevention Standard).

When cleaning or performing maintenance work on an item of electrical equipment, the equipment must be unplugged.

Equipment may not be unplugged while that equipment is switched on. Nor may equipment be plugged into a receptacle (socket) with the equipment's switch turned on. Electrical equipment that has a defective plug or wiring may not be used. Repair work to defective or damaged electrical equipment may only be carried out by a qualified electrician. Extension cords may be used for temporary applications only. Permanent cabling must be installed for long-term needs.

Extension cords may not be run through doors, windows, ceilings or holes in walls. An extension cord must be uncoiled completely before it is used. An extension cord must be of sufficient current-carrying capacity to power the equipment that it is supplying

electricity to. Cords must not be overloaded. Extension cords must be unbroken and continuous (i.e. no joins or splices in the cord are permitted). Extension cords may not be daisy-chained (i.e. one extension cord plugged into another extension cord).

Extension cords and equipment cords may not be modified to fit a receptacle (socket). Two-conductor extension cords may not be used. A three-conductor extension cord (i.e. a grounded or earthed cord) must be used even if the equipment that it is supplying electricity to uses a two-prong plug.

Extension cords that are frayed, have insulation tears, cracks or abrasions, have exposed conductors, or have bent, broken or "spread" plug prongs may not be used. Extension cords that will be used outdoors must have heavy duty insulation and must be weather and UV resistant.

All electrical equipment cords and extension cords must be covered or elevated to protect them from damage and to eliminate tripping hazards. Each contractor is responsible for protecting his electrical equipment from the weather and from possible mechanical damage.

All portable electrical equipment (including generators) must be inspected, tested and tagged by a competent and appropriately qualified electrician on a monthly basis. Details of these inspections and tests must be recorded in a register which must be made available to the nominated project management representative for inspection.

The inspection and testing must include a continuity test of the grounding (earthing) conductor (as applicable) and a complete examination of the equipment or system to assure safe use. The following colour coding system must be used for the tagging of all electrical equipment:

Any item of electrical equipment that does not pass an inspection or test must be removed from service (and tagged, "Out of Service") immediately and must then either be repaired (if possible) or removed from site. Any item of electrical equipment without a tag or with an out-of-date inspection or test may not be used.

Any item of electrical equipment found without a tag or with an out-of-date inspection or test must be removed from service until it has been inspected and tested. If it is found that more than one item of equipment being used by a contractor has not been inspected and tested as required, all work with electrical equipment must be stopped until it can be demonstrated to the satisfaction of the nominated project management representative that the contractor's systems and controls are adequate and fully implemented.

In addition to the formal monthly inspections and testing carried out by an electrician, electrical equipment (particularly extension cords, portable hand tools, welding machines, compressors and pumps) must be visually inspected by the user on a daily basis prior to use. Users must be trained to look for cracks in casings, loose casings, outer cord

sheathing that is not being held firmly in position at the equipment, cuts or cracks in cord or cable insulation, exposed conductors, damaged plugs or sockets, and missing covers. Damage and / or defects must be reported immediately.

Personnel must immediately stop using and report any electrical equipment or machinery that is shocking, sparking, overheating or smoking. Corroded outlets, switches and junction boxes must also be reported.

15.14 Compressed Gas Cylinders

The contractor must establish a suitable storage area for oxygen, acetylene, LPG and argon cylinders in compliance with the following requirements:

- The storage area must be located at least 10 metres away from any building, and must be well ventilated;
- The storage area must have a concrete floor;
- The storage area must be enclosed using wire mesh fencing (as this will ensure adequate ventilation). This enclosure must be kept locked. Access into the storage area must be limited and controlled;
- A protective covering or roof must be fitted to the enclosure to provide shade;
- The enclosure may not be used for the storage of any other materials / equipment, and must be kept completely free of all combustible materials at all times;
- Appropriate warning signage (i.e. "No Smoking" and "No Naked Flames") must be prominently displayed on the enclosure;
- A 9kg dry chemical powder fire extinguisher must be mounted near the entrance to the enclosure;
- If electrical lighting is required, it must be of an approved intrinsically safe type;
- Oxygen, acetylene, argon and LPG cylinders must be stored separately in the enclosure. Furthermore, full and empty cylinders must be separated. Separate storage sections must be clearly designated within the enclosure for the different gas types, and for full and empty cylinders, i.e. oxygen – full, oxygen – empty, acetylene – full, acetylene – empty, etc.;
- When a cylinder is empty, the cylinder cap must be replaced to protect the valve. Empty cylinders must be clearly marked (there must be no need to open valves to check if cylinders are full or empty);
- All cylinders must be stored in an upright position and must be secured in this position by chaining, strapping or clamping them individually to a wall, a cylinder trolley, rack or carrier, or some other rigid structure;
- Cylinders must be stored in rows (when necessary due to the number of cylinders) with aisles between the rows to facilitate easy and rapid removal in the event of a fire;
- Oxygen cylinders may never be stored near highly combustible materials, particularly oil and grease, or near fuel gas cylinders. When in storage, oxygen cylinders must be separated from fuel gas (LPG and acetylene) cylinders by a distance of 6 metres or by a 2 metre high wall made of fire-resistant material;
- The total quantity of gases stored on site must be limited to a 2 week supply.

Compressed gas cylinders must always stand upright (i.e. when being used, stored or transported) and must be properly and individually secured to prevent them from falling

over. Cylinders must be protected from flame, heat and from being struck by moving equipment and falling objects.

When handling gas cylinders (whether full or empty), care must be taken to prevent sudden impacts. Whenever a cylinder is not in use, the protective cap must be in place to prevent the valve from being damaged. Gas cylinders may not be carried, dragged, rolled or slid across a floor or surface. When gas cylinders are to be moved / used, they must be placed in a proper cylinder trolley fitted with a 1.5kg dry chemical powder fire extinguisher.

Gas cylinders may not, under any circumstances, be used as rollers or work supports. If transported by crane, hoist or derrick, compressed gas cylinders must be placed in a suitable cradle, net or skip box. Cylinders may NEVER be lifted using wire rope, fibre rope, a web sling or a chain sling. Before moving / transporting a gas cylinder, the regulator must be removed and the protective valve cap must be replaced.

Gas cylinders may not be taken into a confined space. Gas hoses that are run into a confined space must be removed during breaks. Gas cylinders may not be placed on scaffolding.

Cylinder valve keys must be in place. If no suitable valve key is available then the cylinder may not be used. Nothing but the manufacturer-supplied key may be used to open the valve. A flashback arrestor and a check valve (non-return valve) must be installed between the regulator and the hose and between the hose and the torch on the oxygen line and on the fuel (acetylene) line.

Connection fittings may not be forced and safety devices associated with cylinder valves or regulators may not be altered / tampered with. Gas hoses may not be joined. Only approved hose connectors of the crimp type are permitted. Wire and jubilee clamps are prohibited. Only high quality ancillary equipment may be used. This includes flashback arrestors, hoses, clamps, spindle keys, nozzles and torches. Only trained and competent personnel may operate gas welding / cutting equipment and appliances.

When an employee opens the valve to a cylinder, he must stand to one side and open it slowly. Valves may never be left partly open – they must either be closed or be opened fully. Leaking cylinders must immediately be removed from service and the workplace (if it is safe to do so).

Suitable firefighting equipment must be at hand wherever gas cylinders containing oxygen and / or fuel gas are being used. Gas cylinders must be prevented from coming into contact with electrical circuits, e.g. welding leads. Never strike an arc on a cylinder.

Oxygen may only be used for the purpose for which it is provided. Do not use oxygen in pneumatic tools or tyres, as an explosion may occur. Empty cylinders must immediately be marked as such and must be removed to the cylinder storage area at the end of each day / shift.

15.15 Electrically Powered Tools and Equipment

All powered hand tools, such as circular saws, drills, chainsaws, percussion tools, jigsaws etc., must be equipped with a constant pressure switch that will shut off the power when the pressure is released. (Exception: this requirement does not apply to concrete vibrators, concrete breakers, powered tampers, jack hammers, rock drills, and similar hand operated power tools).

Electrical power tools must be of the approved double-insulated type. The electric cord, pneumatic or hydraulic supply line of powered tools must not be used for hoisting or lowering of the tool. Loose clothing, jewellery or gloves that could get caught in the tool must not be worn when operating powered tools. Operators of powered tools who have long hair must keep their hair tied up.
The power source must be disconnected from the tool before making any repairs, servicing, adjustments, or replacing attachments such as drill bits.

15.16 Angle Grinders

The following personal protective equipment must be worn when using angle grinders:

- Safety helmet;
- Gloves;
- Safety glasses (or safety goggles) and a full face shield (i.e. double eye protection);
- Overalls with long sleeves and long pants, avoid any form of loose clothing;
- Safety boots with steel toe protection;
- Hearing protection;
- Breathing apparatus where dust or fumes may be generated;
- Where grinding machines are used, a face shield is to be worn as extra protection to the safety glasses; and
- Certain tasks may require the use of a leather apron as determined by a risk assessment.

A 230mm angle grinder may not be used for free cutting purposes. Exceptions may be approved only if alternative methods evaluated proved more hazardous or no alternative exists. The risk assessment for the task must then specifically include mitigating measures to ensure the safest possible way of performing the task.

The use of 230mm angle grinders for grinding purposes is acceptable, however should this form of grinding be required, the 115mm or 125mm grinders would be preferable. All angle grinders must have a dead man switch incorporated, with a pressure switch in the handle. A 230mm electrical angle grinder unit must incorporate a soft start to reduce the starting strain and a braking system to reduce run on after the unit has been switched off.

All angle grinders must have a spindle lock to assist with changing the disc or grinding wheel. Anti-vibration handles are recommended to further reduce the stress if used for extended periods. Angle grinders must be equipped and operated with disc guarding at all times. Angle grinder must not be stored with fitted discs, as this will lead to damaging of the discs.

Before use and mounting of discs it is essential to check the safety codes and specifications printed on the upper side of the disc. Such specifications include the following:

- Revolutions per minute (RPM). The allowable speed of the disc must be equal to or greater than the maximum achievable speed of the grinder;
- Physical dimensions of the disc must meet grinder specification; and
- The disc must be suitable for the material type to be cut / ground as indicated on the disk. Cutting discs must never be used for grinding and vice versa.

It is critical that the correct disc mounting procedure is followed:

- Check that the machine is plugged out;
- Check the machine spindle, backup washer and thread;
- Check the condition of spindle nut - ensure spanner drive holes are not elongated;
- Ensure spindle nut spanner is the tool recommended by machine manufacturers;
- Do not use a hammer, pipe or chisel to tighten the nut, or apply additional mechanical advantage to nut torque. A firm "nip" is sufficient to retain the disc;
- Ensure the spindle diameter is suited to disc bore. Excessive clearance will cause the machine to vibrate due to eccentricity;
- Check to see that the nut and backup washer do not "bottom out". This will result in the disc not being correctly clamped on the spindle;
- Ensure the spindle speed is marked on the grinder and that it is less than the allowable disc speed; and
- Fit the disc, with the metal ring or writing to the nut side.

15.17 Pneumatically Powered Tools and Equipment

Pneumatic powered tools must only be driven by filtered compressed air with an in-line lubrication system, or be lubricated prior to use if there is no in-line lubrication system. When using pneumatic powered tools the designated tool pressure must be attained by the use of a regulator.

Pneumatic powered tools must be disconnected when not in use. They must not be disconnected from the air supply until all the residual pressure has been released or contained by a shut-off device. Hoses must not be kinked as a means of containment.

Employees operating pneumatic powered tools, and any potentially affected employee in the vicinity of use, must wear suitable personal protective equipment. All rotary compressed air tools (e.g. drills) must have the rated revolution per minute (RPM) permanently marked on the casing. Only attachments of compatible RPM must be used with these machines.

The actual RPM of the tool must be checked every three months to ensure that the speed is as rated to manufacture specifications.

Pneumatic powered tools must be secured to the air supply hose by an approved positive means to prevent the tool from becoming accidentally disconnected. Safety clips or

retainers must be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.

All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 kPa pressure at the tool, must have a safety device on the muzzle to prevent the tool from ejecting fasteners unless the muzzle is in contact with the work surface.

Compressed air must not be used for cleaning purposes except where reduced to less than 30kPa, and then only with effective chip guarding and personal protective equipment in place. The 30kPa requirement does not apply to concrete form, mill scale and similar cleaning purposes.

The use of compressed air for cleaning purposes must be approved by the nominated project management representative. Compressed air must not be pointed at any part of the body or used for cleaning clothing.

Airless spray guns of the type which atomize paints and fluids at high pressures must be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger to prevent release of the paint or fluid until the safety device is manually released. A diffuser nut which will prevent high pressure, high velocity release while the nozzle tip is removed, plus a nozzle tip guard which will prevent the tip from coming into contact with the operator, or other equivalent protection must be provided in lieu of the above.

Abrasive cleaning nozzles must be equipped with an operating valve, which must be held open manually to enable operation. A support must be provided on which the nozzle may be mounted when it is not in use.

15.18 Fuel Powered Tools and Equipment

Fuel powered tools must be shut down and allowed to cool before being refuelled, serviced, or maintained. Fuel must be transported, handled, and stored in approved fuel containers. Where possible, diesel driven engines must be used in preference to petrol driven engines. All fuel powered tools must be included on the contractor's Equipment Register and the register must be submitted to the nominated project management representative prior to the relevant work commencing.

When fuel powered tools are used in enclosed spaces, the space must be ventilated and the atmosphere monitored to measure toxic gas concentrations. Persons in the space must wear the necessary personal protective equipment. Confined Space Entry clearance may apply. This type of activity must only be undertaken in exceptional circumstances and requires the approval of the nominated project management representative.

15.19 Hydraulically Powered Tools and Equipment

Hydraulic powered tools must use only approved fluid that retains its operating characteristics at the most extreme temperatures to which it will be exposed. The manufacturer's stated safe operating pressures for hoses, valves, pipes, filters and fittings

must not be exceeded. Only manufacturer approved hoses, valves, pipes, filters and fittings must be used.

15.20 Hand Tools

Employees required to use hand tools must receive training relevant to the tool and have their competency assessed in the operation, inspection and maintenance of the tool. Where necessary, additional applicable personal protective equipment must be worn when using hand tools.

Wrenches, including adjustable, pipe, end, and socket wrenches, must not be used when the jaws are sprung to a point where slippage occurs. Impact tools such as drift pins, wedges and chisels, must be kept free of mushroomed heads. The wooden handles of tools must be kept free of splinters or cracks.

Adjustable wrenches must not be used in lieu of ring or open-end type spanners, unless a risk assessment has been conducted and the use of the adjustable wrench is approved by the nominated project management representative. Wherever possible, ring spanners must be used in preference to open end spanners.

Correct hand tools for the job must be used, e.g. screwdrivers must not be used as chisels, and pliers must not be used as hammers. All wedges and drifts that may spring, fly or fall to lower levels upon impact must be fitted with an attachment which attaches a safety "lanyard" to a solid structure to restrain the impact tool from becoming a projectile.

All hand tools used in elevated areas, that may be dropped or fall to lower levels must be fitted with safety lanyards and attached to solid structures or in the case of podges, scaffold keys etc., attached by wrist lanyard to the user.

A utility knife must be used as a last resort, when it is the safest tool to use. Always consider alternatives that pose less of a risk to the operator.

Whenever a utility knife is used, ensure that a complete risk assessment is done and that all possible hazards have been addressed. Only utility knives with retractable blades are to be used. The blade is to be retracted at all times when the knife is not in use or is being stored.

Before using the utility knife, ensure that the tool is in a good condition and the blade is secure in the holder (seated correctly and that there is no play). Ensure that the blade is always sharp and in good condition. This will prevent the use of excessive force.

Always wear cut resistant gloves and safety glasses when using a utility knife. There is always a risk of the blade breaking under tension and becoming a projectile. Always ensure that you cut away from your body, and that no part of your body is in the firing line. Always ensure cleanliness of all equipment in use during the cutting operations.

15.21 Inspection of Equipment and Tools

All tools must be inspected by the user before, during and after use. If any faults are identified, the tool must be taken out of service and not used until repaired. Faulty tools that are not able to be repaired must be tagged "out of service" and removed from site.

15.22 Manual Handling and Vibration

Any handling or lifting task that can only be done manually must be planned and rehearsed before the task is done. If more than one person is involved in a task a communication procedure must be agreed in advance. Lowering the load must be done in a controlled manner. Dropping a load is dangerous and must be avoided.

As a guideline 25 kg is considered to be the limit of what a person can safely handle. Where there are loads exceeding 25 kg the risk of handling the load must be mitigated to assure minimal potential for any injury. When mechanical lifting aids are provided, they should be used.
Extra care should be taken when lifting awkwardly shaped objects. Correct lifting techniques must be used at all times when lifting a load manually.

The following, but not limited to, should be considered with conducting the Risk Assessment with regards Manual Handling and also take into consideration the task factors, physical demands and tools involved in the task:

- Load weight/frequency;
- Hand distance from lower back;
- Asymmetrical trunk/load;
- Postural constraints;
- Grip on the load;
- Floor surface;
- Environmental factors;
- Carry distance; and
- Obstacles on route.

Team Manual Handling:

- Load weight;
- Hand distance from lower back;
- Vertical lift region;
- Trunk twisting/sideways bending;
- Postural constraints;
- Grip on the load;
- Floor surface;
- Environmental factors; and
- Communication, co-ordination and control.

As far as possible, exposure to vibration must be eliminated. However, if this is not possible, short-term solutions to decrease exposure include:

- Reducing the vibration levels;
- Removing the person from the vibrating equipment / tools;

- Reducing the period of time that the person works with the vibrating equipment / tools (at least 40 minutes break after 20 minutes working with a machine that vibrates excessively).

In order to reduce exposure to vibration:

- Consider buying equipment that operates effectively at lower speeds;
- Buy equipment with built-in damping materials;
- Buy lighter tools if they are available - they require less of a grip;
- Maintain the equipment;
- Make sure equipment is balanced and there are no worn parts;
- Use remote controls when they are available;
- Reduce your grip on the equipment when it is safe. The less time you actually have your hands on the equipment the better. Relax your hands during these brief breaks;
- Take scheduled breaks; and
- Do other tasks that allow you to move away from vibrating tools and equipment.

The workplace must be assessed by a competent person for compliance with good design, layout and practice, to avoid or minimise adverse health consequences due to manual handling and vibration issues.

Quantitative evaluations of vibration produced by specific equipment must include the following measurement parameters: direction of movement, frequency, intensity, and variation with time and duration, as per documented methods.

Employees and contractors must be informed of the results of assessments and instructed in appropriate manual handling techniques, where the risk assessment indicates a need. Workplace vibration sources that could contribute to the exceedance of an Occupational Exposure Limit (hence potential for impact on worker musculo-skeletal fitness) must be identified and adequately characterised.

Manual handling tasks assessed as having the potential to cause a Lost Time Injury (i.e. with potential for impact on worker musculo-skeletal fitness) must be identified and adequately characterised. Workplace manual / materials handling tasks risk rated as "significant" must be assessed and recorded to include biomechanical factors (e.g. posture, bending, twisting, repetitive motions, working overhead, and exerting force away from the body).

15.23 Demolition Work

Demolition work must be carried out as per the requirements of Construction Regulations, 2014, Regulations 14.

The contractor must appoint a competent person in writing to supervise and control all demolition work on a project site.

15.24 Temporary Works

The contractor must appoint a temporary works designer in writing to design, inspect and approve the erected temporary works on site before use.

The contractor must ensure that all temporary works operations are carried out under the supervision of a competent person who has been appointed in writing for that purpose. The contractor must ensure that, all temporary works structures are adequately erected, supported, braced and maintained by a competent person so that they are capable of supporting all anticipated vertical and lateral loads that may be applied to them, and that no loads are imposed onto the structure that the structure is not designed to withstand.

All temporary works structures are done with close reference to the structural design drawings, and where any uncertainty exists the structural designer should be consulted. Detailed activity specific drawings pertaining to the design of temporary works structures are kept on the site and are available on request to an inspector, other contractors, the client, the client's agent or any employee.

All persons required to erect, move or dismantle temporary works structures are provided with adequate training and instruction to perform those operations safely. All equipment used in temporary works structure are carefully examined and checked for suitability by a competent person, before being used.

All temporary works structures are inspected by a competent person immediately before, during and after the placement of concrete, after inclement weather or any other imposed load and at least on a daily basis until the temporary works structure has been removed and the results have been recorded in a register and made available on site;

No person may cast concrete, until authorization in writing has been given by the competent person; if, after erection, any temporary works structure is found to be damaged or weakened to such a degree that its integrity is affected, it is safely removed or reinforced immediately. Adequate precautionary measures must be taken in order to:

- Secure any deck panels against displacement; and
- Prevent any person from slipping on temporary works due to the application of release agents;
- As far as is reasonably practicable, the health of any person is not affected through the use of solvents or oils or any other similar substances;
- Upon casting concrete, the temporary works structure is left in place until the concrete has acquired sufficient strength to safely support its own weight and any imposed load, and is not removed until authorization in writing has been given by the competent person contemplated in paragraph (a);
- The foundation conditions are suitable to withstand the loads caused by the temporary works structure and any imposed load in accordance with the temporary works design.
- Provision is made for safe access by means of secured ladders or staircases for
- A temporary works drawing or any other relevant document includes construction sequences and methods statements;
- The temporary works designer has been issued with the latest revision of any relevant structural design drawing;

- A temporary works design and drawing is used only for its intended purpose and for a specific portion of a construction site; and
- The temporary works drawings are approved by the temporary works designer before the erection of any temporary works.

No contractor may use a temporary works design and drawing for any work other than its intended purpose.

15.25 Structure

The contractor must ensure that:

- All reasonably practicable steps are taken to prevent the uncontrolled collapse of any new or existing structure or any part thereof, which may become unstable or is in a temporary state of weakness or instability due to the carrying out of construction work;
- No structure or part of a structure is loaded in a manner which would render it unsafe; and
- All drawings pertaining to the design of the relevant structure are kept on site and are available on request to an inspector, other contractors, the client and the client's agent or employee.

An owner of a structure must ensure that;

- Inspections of that structure are carried out periodically by competent persons in order to render the structure safe for continued use;
- The structure is maintained in such a manner that it remains safe for continued use;
- The records of inspections and maintenance are kept and made available on request to an inspector.

15.26 Personal Protective Equipment

Applicable legislation, standards, procedures and safe work procedures (such as but not limited to Construction Regulations, General Safety Regulations, Client HS Specification) concerning Personal Protective Equipment (PPE) must be complied with at all times. As a minimum, the following PPE must be worn by all persons (including visitors) at all times whilst on the project site:

- Safety footwear with steel toe protection;
- Safety glasses (individuals who wear prescription spectacles must be provided with either over-spec safety glasses or prescription safety glasses);
- Safety helmet (hard hat) including chin straps;
- High visibility protective clothing with reflective taping (long trousers and long-sleeved shirts with collars and cuffs);
- Life-jackets;
- Gloves;
- Dust masks; and
- Hearing protection

Each contractor must provide each of his employees with all required PPE (at no cost to the employee).

15.27 Fuel / Flammable Liquid Storage and Refuelling

No fuel (diesel, petrol, paraffin, etc.) or any other flammable liquid (paints, solvents, etc.) may be stored on site unless approved in writing by the nominated project management representative.

15.28 Fire Protection and Prevention

The contractor must compile a Fire Protection and Prevention Plan for the work that will be carried out on site.

The contractor must assess / survey his area of responsibility and identify locations where the risk of fire is high. Cognisance must be taken of the fact that certain locations may need to be designated as high risk due to the presence of large quantities of flammable or combustible materials / substances. For all high risk areas, the contractor must ensure that additional precautions are taken to prevent fires and strict control is exercised over any hot work (i.e. welding, cutting, grinding, etc.) that is carried out.

The contractor must supply and maintain all required fire-fighting equipment. The type, capacity, positioning, and number of fire-fighting appliances must be to the satisfaction of the nominated project management representative and must meet the requirements of the applicable legislation. Fire mains, hydrants and hose reels will rarely be available on site, so use must primarily be made of portable fire extinguishers.

Fire-fighting equipment, fixed and portable, must be strategically located with a view to being able to rapidly deploy the equipment in order to bring potentially dangerous and destructive fires under control while still in their infancy.

All fire extinguishers (and any other fire-fighting equipment) placed on site must be:

- Conspicuously numbered;
- Recorded in a register;
- Visually inspected by a competent person on a monthly basis (the results of each inspection must be recorded in the register and the competent person must sign off on the entries made); and
- Inspected and serviced by an accredited service provider every six months (the nominated project management representative may require that this frequency be increased depending on the environmental conditions (e.g. high dust levels, water, heat, etc.) to which the fire extinguishers are exposed).

Any fire extinguisher that has a broken seal, has depressurised, or shows any sign of damage must be sent to an accredited service provider for repair and / or recharging. Details must be recorded in the register.

Fire-fighting equipment may not be used for any purpose other than fighting fires. Disciplinary action must be taken against any person who misuses or wilfully damages any fire-fighting equipment.

Access to fire-fighting equipment, fixed or portable, must be kept unobstructed at all times. Approved signage must be in place to clearly indicate the location of each permanently mounted fire extinguisher, fire hose reel, etc.

The contractor must ensure that all persons working in / entering his area of responsibility are made aware of where all fire-fighting appliances and alarm points are located. The contractor must ensure that his employees (and those of any appointed sub-contractors) are trained in fire-fighting procedures and the use of fire-fighting equipment.

The contractor must compile an emergency response procedure detailing the actions that must be taken in the event of a fire or a fire / evacuation alarm. All personnel working within the contractor's area of responsibility must be trained, and all visitors must be instructed, on this procedure. Copies of the procedure must be prominently displayed in the workplace in all languages commonly used on the site.

Used fire extinguishers must be replaced by the contractor without delay.
No hot work (i.e. welding, cutting, grinding, etc.) or any other activity that could give rise to a fire may be performed outside of a designated workshop without a Permit to Work having been issued.

Wherever hot work is being carried out, a fire extinguisher must be at hand. Where the risk assessment determents that it is necessary, a fire watch must be stationed. Supervisors must carry out workplace inspections regularly to ensure adherence to fire prevention measures and procedures.

At the end of every working period (i.e. before each tea / lunch break and at the end of every shift / day), the workplace must be thoroughly inspected to ensure that no material is left smouldering and no condition / situation exists that could give rise to a fire.

The contractor must ensure that all supervisors and all employees carrying out or assisting with any hot work or any other activity that could give rise to a fire have been trained in fire-fighting procedures and the use of fire-fighting equipment. The training must be conducted by an accredited training provider.

When using electrical equipment, all cables must be in good condition and the nearest convenient socket must be used. No power socket may be loaded beyond its rated capacity through the use of adaptors, etc. Makeshift electrical connections are not permitted under any circumstances. Water-based fire-fighting equipment must not be used on electrical equipment or burning liquids.

Each vehicle used on site for work purposes and each item of mobile equipment with a diesel or petrol engine must be fitted with a permanently mounted fire extinguisher. Smoking is only permitted in designated smoking areas. Cigarette ends / butts must be properly stubbed out in the ashtrays provided and never thrown into waste bins.
The contractor must ensure that good housekeeping practices are enforced, as this is crucial to the prevention of fires.

All combustible waste materials must be removed from the workplace on a daily basis (at the end of each shift) and placed in waste receptacles located at least 5 metres away from any structure.
The accumulation of waste materials in out-of-the-way places is prohibited. Offices, desks, cabinets, etc. must always be kept tidy and uncluttered. Waste paper bins must be emptied regularly.

The storage of combustible materials under stairways or in attics is prohibited. The storage of any materials against the exterior of a building or any other structure is prohibited. All walkways, passages and stairways must be kept clear (i.e. must be unobstructed) at all times, as they may need to be used as a means of escape.

The areas around and the routes to all exits, fire escape doors, fire hydrants, fire hose reels and fire extinguishers must be kept clear (i.e. must be unobstructed) at all times. "No Smoking" signs must be conspicuously displayed in and around all storage areas / rooms. Waste may not be burned under any circumstances.
No flammable liquid (such as petrol, acetone, alcohol, benzene, etc.) may be used for starting fires or as a solvent for cleaning clothes, tools, equipment, etc. Only solvents approved by the nominated project management representative may be used for cleaning purposes.

Whenever any work is carried out involving the use of a flammable substance / material, the area must be cordoned off and appropriate warning signage (i.e. "No Unauthorised Entry", "No Smoking" and "No Naked Flames") must be displayed.

15.29 Smoking

The contractor must not permit smoking on site except within designated smoking areas selected in accordance with the applicable legislation. Such an area must be clearly demarcated and the required signage must be displayed.

Any person found smoking or discarding a cigarette butt outside of a designated smoking area may be removed (temporarily or permanently) from site. In all designated smoking areas, adequate non-combustible commercial ashtrays and / or cigarette butt receptacles (butt cans) must be provided.

Ashtrays and other receptacles provided for the disposal of smoking materials must not be emptied into rubbish bins or any other container holding combustible materials. "No Smoking" signs must be strictly observed.

15.30 Housekeeping

The contractor must maintain all work areas in a tidy state, free of debris and rubbish. Unless directed otherwise, the contractor must dispose of all debris, rubbish, spoil and hazardous waste off site in a designated and authorised area or facility. The contractor must familiarise himself with the waste management plan for the site including collection and disposal arrangements, and must align his waste management activities accordingly.

In cases where an inadequate standard of housekeeping has developed and compromised safety and cleanliness, a nominated project management representative may instruct the contractor to cease work until the area has been tidied up and made safe. Neither additional costs nor contract deadline extensions will be allowed as a result of such a stoppage. Failure to comply will result in a clean-up being arranged through another service provider at the cost of the non-complying contractor.

The contractor must carry out housekeeping inspections on a weekly basis to ensure maintenance of satisfactory standards. The contractor must document the results of each inspection. These records must be maintained and must be made available to the nominated project management representative on request.
The contractor must implement a housekeeping plan for the duration of the contract ensuring that the site housekeeping is maintained. Furthermore, at the end of every shift, the contractor must ensure that all work areas are cleaned, all tools and equipment are properly stored, and construction rubble is removed.

Where the contractor fails to maintain housekeeping standards, the nominated project management representative may instruct the contractor to appoint a dedicated housekeeping team for the duration of the project at the contractor's expense. Littering is prohibited.

15.31 Waste Management

Waste may not be disposed of unless the disposal of that waste is authorised by law. The contractor must therefore ensure that all waste that is generated is handled, stored, transported and disposed of in accordance with the requirements of the applicable legislation / local authority.

15.32 Stacking and Storage

All irregular shaped items will be stacked at floor / ground level in designated stacking areas on a level, firm base capable of withstanding the weight of the commodities being stacked and stacked in such a manner that the items do not topple over or change position due to subsidence or weight transfer when being moved.

Where these commodities are stacked on shelves or racks, the shelves or racks must be designed to carry the weight of the commodity being stacked. All racks or shelves where heavy material or commodities are stacked will have a weight carrying limitation clearly marked on the structure and have a safety factor of at least +10% of maximum total carrying capacity.

All materials, commodities or articles, which could be damaged due to inclement weather, must be stored under cover. Waste material that is combustible must not be allowed to accumulate in sufficient quantities to create a hazard.
No commodities or equipment may be stacked or stored within 500mm of rolling stock tracks or where mobile equipment travels. The storage of material, small equipment, tools, files and general items in cupboards and on shelves must be neat and controlled at all times. Incompatible substances must not be stored in or on the same cupboard or shelf.

No equipment, tools, files or documents may be stored or stacked on top of cupboards which are higher than 1.5 metres in height.

15.33 Facilities

Sanitary conveniences must be provided and maintained at a rate of at least one shower facility for every 20 workers, at least one toilet facility for every 10 workers, separate male and female changing facilities and sheltered eating areas.

Where chemical toilets are provided, one toilet for every 10 employees must be allocated. All toilets must be cleaned daily, disinfected and provided with toilet paper. All employees making use of these facilities have the responsibility to help keep the facilities neat, clean and hygienic.

Washing facilities, including soap and towels, must be made available for use by the contractor's employees.
Drainage from all washing / toilet facilities must be properly designed and constructed to prevent employee exposure to waste water (and the associated biological hazards). Waste water may not accumulate or stand in pools at any location on the project site.

Change rooms must be provided and must be kept clean and free from odours at all times. No chemicals, except those normally used for domestic cleaning of these facilities, may be stored in the facilities.

No equipment or items (other than those normally associated with hygiene facilities) may be stored in the facilities. All entrances must be constructed in a way to afford privacy to users.

Drinking water must be provided from an approved source. A sheltered (covered) area must be set aside on site to be used as a dining facility (eating area). Adequate seating must be provided for the maximum number of employees. The facility must be kept clean and tidy.

A suitably sized, impervious receptacle (bin) must be provided for the disposal of waste food and other refuse generated at the dining facility. This bin must be emptied and cleaned regularly (i.e. promptly after meal times).

Food may only be consumed in authorised sheltered areas. Adequate refrigerated storage must be provided to the contractor's employees for the storage of food and drinks. Fridges must not be overstocked and must maintain sufficiently low temperatures.

16. Occupational Health and Hygiene

The contractor must ensure that the exposure or potential exposure of his employees to any of the following stressors is assessed and measured:

- Noise;

- Thermal stress (heat and cold);
- Particulates (dust);
- Silica (free crystalline silica);
- Gases or vapours;
- Lead;
- Chemicals;
- Ionising radiation;
- Non-ionising radiation;
- Vibration (hand / arm vibration and whole body vibration);
- Ergonomics; and
- Illumination.

If it is determined that exposure levels for a particular stressor are unacceptable, then a monitoring and control plan must be implemented to manage any risk of overexposure.

Note: Where chemical substances are to be used as part of the refurbishment process, the contractor must ensure that the chemical composition of each substance is known.

Carcinogenic (cancer-causing) ingredients must be specifically identified with due understanding that no chemical known to cause cancer will be permitted for use on site (an alternative will need to be sourced).

TRANSNET Health and Hygiene Department is required to provide the following monitoring services where relevant and required:

- Chemical agents =Gases, vapours, solids, fibres, liquids, dusts, mists, fumes, etc.
- Physical agents =Noise, Vibration, Heat, Cold, Electromagnetic fields, lighting etc.
- Biological agents =Bacteria, fungi, etc.
- Ergonomic factors =Lifting, stretching, and repetitive motion.
- Psychosocial factors =Stress, workload and work organisation

TRANSNET Health and Hygiene must provide the contractor with a project specific health risk assessment in respect of existing Occupational Health Risk on Sites.

The contractor must conduct an Occupational Health Risk Assessment in respect of their project activities. The contractor will be required to appoint an Approved Inspection Authority (AIA) for Occupational Hygiene to conduct Occupational hygiene Surveys should such a need arise.

16.1 Lighting

For all work areas and access ways, if the natural lighting available is inadequate it must be supplemented by artificial lighting to meet the minimum levels required.

A lighting survey to determine luminance must be conducted for all work areas, at least once prior to work commencing for the first time in any area.

Emergency lighting must be provided in all indoor workplaces that do not have adequate natural lighting or in which persons work at night. The emergency sources of lighting that

are provided must be such that, when activated, an illuminance of not less than 0.3 lux is obtained at floor level, to enable employees to evacuate safely.

Where it is necessary to stop machinery or shut down plant or processes before evacuating the workplace, or where dangerous materials are present or dangerous processes are carried out, the illuminance must not be less than 20 lux.

Neon lights must not be installed in areas where moving parts of machinery or equipment cannot be fully guarded, i.e. lathes, bench grinders, etc. in order to eliminate the stroboscopic effect. No person may use a portable electrical light where the operating voltage exceeds 50 volts, unless:

- It is fitted with a non-hydroscopic, non-conducting handle;
- All metal parts which may become live are protected against accidental contact;
- The lamp is protected by means of a guard firmly attached to the handle; and
- The cable can withstand rough use.

No person may use a portable electric light in damp or wet conditions or in closely confined spaces, inside metal vessels or when in contact with large masses of metal, unless:

- The lamp is connected to a source incorporating an earth leakage; and
- The operating voltage of the lamp does not exceed 50 volts.

All lighting on site must comply with the requirements of the Environmental Regulations for Work Places GNR2281 of 16 October, 1987.

16.2 Noise

A hearing conservation program must be implemented and protection against the effects of noise exposure must be provided when the noise exposures equal or exceed an 8-hour time-weighted average sound level of 85 decibels measured on the A-weighted scale of a standard sound level meter at slow response.

For the hearing conservation program to be effective it must include as a minimum:

- Monitoring of the workplace to determine the representative exposure of employees to excessive noise levels;
- An audiometric testing program for employees, which must include:
    - A baseline audiogram for all employees exposed to noise levels equal to or in excess of the standard;
    - Audiograms for each overexposed employee at a frequency determined by the OMP;
    - Analysis of audiogram results with retesting and/or referral to an otolaryngologist or qualified physician when a significant threshold shift (STS) occurs; and
    - Written employee notification of the STS.
- A training program for all employees exposed to noise;
  Provision of personal protective equipment to all affected employees when administrative or engineering controls fail to reduce sound levels to within the levels of the standards.

Monitoring of employee exposures to noise shall be conducted by an Approved inspection Authority (AIA).

The monitoring requirement may be met by either area monitoring or personal monitoring that is representative of employee exposures. Personal monitoring is preferred, and may be required based on the type(s) of noise sources.
For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with local legislation. A person-task specification shall be available for every job category and shall be submitted with an employee for audiometric testing.
Audiometric test results obtained from the pre-employment medical examination for a new employee shall be used as the baseline audiogram. Testing to establish a baseline audiogram shall be preceded by at least 14 hours without exposure to workplace noise.

Hearing protectors shall not be used as a substitute for the requirement that baseline audiograms be preceded by 14 hours without exposure to workplace noise. Employees shall be notified of the need to avoid high levels of non-occupational noise exposure during this 14-hour period.

Record-keeping for the audiogram shall include, as a minimum:

- Name and job classification of the employee;
- Date of the audiogram;
- The examiner's name;
- Date of the last acoustic or exhaustive calibration of the audiometer;
- Employee's most recent noise exposure assessment.

Audiometric test results shall be maintained in the employee's medical file. To control noise exposure, its three basic elements shall be examined, i.e. source of the sound, travel path, and effect on receiver or listener. Solution of a given noise problem might require alteration or modification of any or all of these three basic elements.

Controlling noise at the noise source can be achieved by the following:

- Select quiet equipment initially. In selecting quiet equipment the following features shall be considered:
- Low-noise certification;
- Advertisement of "quiet" operation, evidence of noise control design;
- Evidence of "lower" and "slower" operating characteristics;
- Side-by-side noise testing of equipment; and
- "On-site" or "in operation" inspection of mechanical equipment before purchase.
- Reduce operating noise by considering the following control measures:
- Reduce impact or impulse noise by reducing weight, size, or height of fall of impacting mass;
- Reduce speed in machines and flow velocities and pressure in fluid systems;
- Balance rotating parts – to control machinery noise and vibration of fans, fly wheels, pulleys, cams, etc.
- Reduce frictional resistance between rotating, sliding or moving parts in mechanical systems: frequent lubrication, proper alignment of moving parts; static

and dynamic balancing of rotating parts; correction of eccentricity or "out-of-roundness" of wheels, gears, rollers, pulley, etc.;

- Reduce resistance in air or fluid systems: use of low flow velocities, smooth boundary surfaces of duct or pipe systems, and long-radius turns and flared actions in pipes, etc., to reduce turbulence noise;
- Isolate vibration elements in machinery; install motors, pumps, etc. on most massive part of machine; use belt or roller drives in place of gear trains; use flexible hoses and wiring instead of rigid piping and stiff wiring, etc.
- Apply vibration damping materials such as liquid mastic; pads of rubber, felt, foam or fibrous blankets; or sheet metal visco-elastic laminates or composites to vibrating machine surfaces; and;
- Reduce noise leakage from the interior of machines such as compressors by sealing or covering all openings or applying acoustical materials to machine interiors.

Controlling noise in the transmission path can be achieved by the following:

- Separate the noise source and receiver as much as possible;
- Use sound-absorbing materials on ceiling, floor or wall surfaces as close to the machine as possible;
- Use sound barriers and deflectors in the noise path;
- Use acoustical lining on inside surfaces of such passageways as ducts, pipe chases, or electrical channels;
- Use mufflers, silencers or snubbers on all gasoline or diesel engines, regardless of size; and particularly on equipment when large quantities of high-pressure, high-velocity gases, liquids, steam or air are discharged into the open air; and
- Use vibration isolators and flexible couplers where the noise transmission path is structure borne in character.

Protection for the receiver – when engineering controls fail to reduce the levels to within the levels specified in local legislation, the following measures shall be implemented:

- Personal protective equipment shall be provided and replaced as necessary at no cost to employees;
- Supervisors shall ensure that hearing protective devices are worn by all employees who are exposed to a time-weighted average of 85 decibels or greater and who have experienced a significant threshold shift;
- Employees shall be given the opportunity to select their hearing protectors from a variety of suitable protectors.

Noise zones shall be indicated by means of signs at every entrance to such zones. When noise levels exceed 100 dB(A), a combination of earplugs and earmuffs may be required to achieve protection of the worker. It is important to note that using double protection will add only 5 to 10 dB of extra attenuation above that of a single Hearing Protection Device. Where an earmuff and earplugs are used together, OSHA recommends using this simple calculation: Take the higher rating of the two devices, and add five. Hearing Protection Devices should be worn for the full noise exposure period.

Where an audiometry programme is required, it must meet the following standards:

- All testing must be by pure tone audiometry in an approved audiometry booth or quiet room, with measured noise levels less than 40 dB(A);
- The initial audiogram must be taken prior (minimum of 24 hours) to exposure to significant noise. Further audiograms must be taken periodically; annually where exposures are over 85 dB(A) Leq or where continued deterioration to hearing is occurring;
- Testing must be performed by trained and competent personnel;
- Audiometers must be calibrated according to the manufacturer's guidelines. As a minimum these will be a weekly biological calibration using an employee unexposed to noise, or a bio-acoustic simulator, and an annual quantitative check. All results must be documented; and
- Audiograms must be read by trained persons who will identify any increasing hearing loss and then determine if this is noise induced. Any employee with a significant downward shift in one or both ears (measured as an average non age-adjusted loss from baseline of 10 dB at 2, 3 or 4 kHz) must be retested following removal from noise for a minimum of 24 hours, usually after a days-off period. If the downward shift persists the employee must be reviewed by a physician and improved hearing protection considered.

16.3 Hazardous Chemical Substances

No chemical substance may be brought onto site unless it has been approved for use by the nominated project management representative. The contractor must develop and maintain a hazardous chemical substance register specifying as a minimum the type and volumes of substances on site.

16.4 Fitness for Work

The contractor must develop and implement a programme to manage employee fitness for work. All employees working on site for whom the contractor is responsible (i.e. direct employees of the contractor as well as the employees of any appointed sub-contractors) must be subject to this programme.

All safety critical jobs (i.e. roles where fatigue or other causes of reduced fitness for work could lead to serious injury, illness or death to employees, significant equipment / plant damage, or significant environmental impact) must be identified and the risks associated with reduced fitness for work in these roles must be assessed.

A programme to manage these risks must be implemented, and it must include:

- Mechanisms for managing fatigue, stress and lack of fitness;
- An alcohol and other (including prescription, pharmaceutical or illicit) drugs policy that includes testing;
- An Employee Assistance Programme providing confidential access to resources and counsellors; and
- Training and awareness programmes.

Each employee has an obligation to present himself fit for work at the start of the day/ shift, and to remain fit for work throughout the work period. Reporting for work under the influence of alcohol or any other intoxicating substance will not be tolerated. Any transgression concerning the alcohol and other drugs policy applicable to the project may result in the offending employee's access to the project premises being temporarily or permanently withdrawn.

Alcohol and drug testing on the project premises will be carried out randomly (as employees report for duty and during the course of the day / shift), following any incidents (all persons involved), and whenever there is reasonable suspicion. Alcohol and drug testing must also be carried out as part of a Pre-Employment Medical Examination.

Sleep deprivation during shift work or from excessive working hours is a known cause of fatigue. Fatigued employees are at increased risk of accidents. Shift system design must consider:

- The effect on worker fatigue;
- The effects of activities carried out during scheduled and overtime hours;
- The impact on sleep cycles of activities such as commuting to and from site; and
- The monitoring and control of working hours.

The contractor is responsible for the administration of the working hours of his employees as well as the employees of any appointed sub-contractors. The maximum working hours per day and the minimum rest times between shifts must be specified in the contractor's Health and Safety Management Plan and must comply with all applicable legislation.

All employees are required to undergo fitness assessments (medical examinations) which must be carried out prior to the commencement of employment on the project, prior to a change in role, periodically based on an employee's individual risk profile, and on termination of employment on the project:

- Pre-Employment Medical Examination – to assess the physical suitability of the person for the role and environment in which he will work (carried out prior to the commencement of employment on the project and prior to induction). The contractor must take note that employee medicals for this project must include a drug test;
- Periodic (Surveillance) Medical Examination – to assess the on-going physical condition of an employee to determine if his role is impacting on his health and whether the employee's fitness level is still adequate for the role he holds (these medical examinations are "risk driven" – the specific protocol followed and the frequency of the examinations will depend on the applicable legal requirements and the employee's individual risk profile as determined by his personal fitness, the nature of his role / duties, and the environment in which he works / occupational health hazards to which he is exposed).
- The periodic medical assessment programme must include:
  - The identification of modifiable risk factors that may impact fitness for work;
  - Education and support to maintain health or address identified risk factors; and
  - Education and support to help employees regain their fitness for work.

- Role Change Medical Examination – to assess an employee's physical suitability for a different role and work environment (carried out prior to a change in role / duties);
- Exit (Post-Employment) Medical Examination – to determine the total physical impact of the work the employee performed (carried out on termination of employment on the project).

Note: The results of an Exit Medical Examination from previous employment will not be accepted as a Pre-Employment Medical Examination.
Note: The medical examinations described above may only be carried out by an Occupational Medical Practitioner (i.e. a medical doctor who holds a qualification in occupational medicine).

A detailed job (role) description and an exposure profile (noise, dust, heat, fumes, vapours, etc.) must be provided for each employee or group of employees. The medical examinations that an employee undergoes must be based on (i.e. the employee's fitness must be assessed against) the information contained in these documents as well as the baseline risk assessment for the work. This information must be made available to the occupational medical practitioner performing the medical examination.

For each role, the medical criteria for fitness must be documented and these must be based on an evaluation of the physical and medical requirements for the role. Depending on the circumstances, certain vaccinations may need to be provided to employees.
The medical examinations carried out for all drivers and operators must include testing / assessment for medical conditions that could affect the safe operation of vehicles or equipment.

Specific testing / questioning must be carried out to determine if an individual:

- Suffers from epilepsy or any other medical condition deemed to be a risk by the occupational medical practitioner;
- Makes use of chronic medication that could affect performance;
- Is colour-blind; or
- Has poor day or night vision.

The medical examinations carried out for employees that are required to work at height must include testing / questioning to determine if an individual suffers from epilepsy, hypertension (high blood pressure) or any other medical condition deemed to be a risk (with regard to working at height) by the occupational medical practitioner. Electricians must be tested for colour-blindness.

With regard to the placement of new employees:

- Prospective employees must be referred to a suitable occupational medical practitioner (doctor) for a "Pre-Employment Medical Examination";
- If an individual is found to be medically "unfit for placement", the doctor will indicate which work activities cannot be performed by the person;

- The individual may still be employed on the project if his medical restrictions can be accommodated and provided that no legislation is transgressed.

A process must be established to manage medical restrictions that may be placed on an employee. For every employee with a medical restriction, regular follow up visits with the occupational medical practitioner must be arranged to ensure that each case is proactively managed.

An employee in a safety critical job must report (to his supervisor) any condition that might impair his ability to safely perform the duties associated with his role. A mechanism must be in place for such reports to be referred to an occupational medical practitioner to determine if the employee is fit to continue with his work.

Proof of all medical examinations (i.e. certificates of fitness signed by an occupational medical practitioner) must be kept on site and these records must be readily available for inspection by the nominated project management representative.

An employee's certificates of fitness must be included in his Personal Profile (dossier). If an Employee Personal Profile (dossier) hasn't already been compiled for a particular employee, then this must be done without delay following the employee's Pre-Employment Medical Examination.
No employee may commence work on site without proof that he has undergone a Pre-Employment Medical Examination.

Occupational medical examinations and data interpretation may only be carried out by medical practitioners that are appropriately qualified and certified to do so. Occupational medical data contained in reports to management must be grouped and summarised to ensure that the confidentiality rights of each individual employee are maintained. All occupational medical data and records must be retained for at least 40 years.

16.5 Measuring and Monitoring (Dust)

The workplace exposure (or potential exposure) of persons to hazardous substances and/or dust must be measured and monitored to determine the effectiveness of control measures as well as compliance with legal and other requirements. Procedures to be developed and compliance to their implementation to be monitored.

17. Emergency Preparedness and Response

The contractor must develop, implement, test and maintain an Emergency Response Plan (incorporating emergency evacuation procedures) that focuses specifically on the contractor's team and work activities. The plan must be risk-based and must detail the procedures that must be followed when responding to all potential emergency scenarios such as a medical emergency (including first aid response), a fire, an explosion, a hazardous substance spill, flooding, rescue from height, etc.

Potential off-site emergency scenarios must be included (e.g. emergency scenarios related to the transport of personnel, the transport of hazardous materials, and personnel performing work in remote locations).

Consideration must be given to surrounding Port users and tenants, and to the availability and capability of local emergency services. Details of any arrangements with external emergency response service providers must be included.

The Emergency Response Plan must satisfy and comply with all applicable legal requirements. The plan must be adequately resourced to ensure effective implementation. These resources must include appropriate personnel, external emergency response service providers, emergency response equipment, and warning devices. All equipment and warning devices must be identified, maintained and tested to ensure availability at all times.

Accountability for the Emergency Response Plan must be clearly defined. An Emergency Response Team (ERT) responsible for the implementation, management and execution of the Emergency Response Plan must be established. The roles and responsibilities of each team member must be clearly defined in the plan. Each team member must receive appropriate training to ensure that each role is performed competently.

The process for managing incident communication, notification, and reporting must be incorporated into the Emergency Response Plan. The responsible person(s) must be clearly identified, and the protocols for communicating with internal and external stakeholders must be defined.

Emergency evacuation procedures must be developed and included in the Emergency Response Plan. A copy of the plan must be provided to the nominated project management representative for approval prior to site establishment. The Emergency Response Plan must be formally reviewed (and amended if necessary) when project needs require, and following any emergency situation, to ensure that it remains appropriate and effective.

At each project work site, as a minimum:

- A suitable evacuation alarm (siren) must be provided. All persons working in an area where an evacuation alarm is sounded must respond to it immediately.
- Suitable fire-fighting equipment must be provided and maintained, and personnel must be trained in fire-fighting procedures and the use of fire-fighting equipment.
- Suitable first aid equipment and supplies must be provided and maintained, and an adequate number of appropriately trained First Aiders must be in place.
- Emergency assembly points positioned in safe locations away from buildings, plant and equipment must be designated (and conspicuously signposted). In the event of an evacuation, all persons (i.e. personnel and visitors) must assemble and be accounted for at these emergency assembly points.

- All personnel must receive awareness training on the applicable emergency response procedures, and all visitors entering the site must be properly instructed in these procedures.
- The emergency response procedures must be displayed on each notice board.
- A diagram (site plan) indicating evacuation routes, emergency assembly point locations, and the positioning of emergency equipment (fire extinguishers, first aid boxes, etc.) must be prominently displayed in all buildings and plants, in all offices, on all notice boards, and in other locations on the site as may be required.
- An up-to-date list of emergency telephone numbers must be compiled and maintained. A copy of this list must be posted at each site entrance, in each office, near each telephone, and on every notice board.
- Emergency response drills must be conducted to test the effectiveness of the emergency procedures and equipment, as well as the knowledge and proficiency of the response personnel. Where appropriate, drills must include liaison with and the involvement of external emergency response service providers. A variety of emergency scenarios must be tested including, but not limited to, medical emergencies, fires, rescues, and hazardous substance spills. A drill must be carried out one month after site establishment and then again six months thereafter.

Each drill must be monitored and the outcomes (highlights and shortcomings) must be documented. Corrective actions must be identified and implemented to address the shortcomings, and the Emergency Response Plan and associated procedures must be amended as required.

17.1 Fire Fighting

The contractor must ensure that Fire Fighting requirements are complied with.

17.2 First Aid and First Aid Kits

The contractor must ensure that First Aiders are trained and appointed as described in this Specification and in accordance with relevant legislative requirements.
A suitable first aid kit (i.e. appropriate to the level of training) must be readily available to each First Aider. All kits must be provided and maintained by the contractor.

Taking into account the type of injuries that are likely to occur in the workplace, each first aid kit must contain suitable equipment and supplies. First aid equipment and supplies required by applicable legislation must be provided as a minimum.

The contents of each first aid kit must be kept clean and dry. Each kit must be contained in either a portable weather-proof case / bag or a steel box mounted to a fixed structure. Access to first aid equipment / supplies must be limited to train First Aiders only. Access to portable kit bags must be controlled and steel first aid boxes mounted in the workplace must be kept locked. Approved signage must be in place to indicate the locations of the first aid boxes / bags. A record of each treatment administered must be kept in a suitable register.

No tablets or medication are to be stored in the first aid box.

No tablets or medication to be administered by first aiders or other personnel to employees who are not feeling well or have been injured.

Additional items / supplies may need to be provided depending on the nature of the workplace (specific hazards) and the level of training of the first aider in position of the kit.

18. Management Review

A review of the contractor's Health and Safety Management System must be undertaken as required within the project timeframe to ensure that the system continues to be effective in managing health and safety performance and meeting project requirements. The review must evaluate if there is any need for change and must identify actions to improve the system.

The review must be led by senior management and the following must be considered:

- The suitability of the policy adopted for the project;
- The impact of changing legislation;
- The management of risk;
- Health and safety objectives and performance indicators;
- Changing expectations and requirements of relevant stakeholders;
- Changes to the contractor's scope, schedule, designs, etc.;
- Changes to the contractor's organisational structure;
- Communication and feedback (particularly from employees, Project representatives, and client representatives);
- The effectiveness of the management of change process;
- Workplace exposure monitoring and medical surveillance;
- The status of corrective actions;
- Performance statistics, including an annual summary of safety statistics, and occupational hygiene monitoring and medical surveillance results;
- Non-conformances (findings) from completed audits;
- Follow up on actions from previous management reviews; and
- Recommendations and opportunities for improving the effectiveness of the management system.

A record of each completed management review must be retained and it must include all decisions and identified actions concerning alterations, modifications or improvements to the management system that demonstrate a commitment to continual improvement.

19. Contractor / Sub-contractor Alignment

Processes must be in place to ensure that the health and safety risks associated with the procurement of materials, equipment, services and labour are identified, evaluated and effectively managed.

A process for evaluating a sub-contractor's (or supplier's) ability to provide materials, equipment, services and labour that meet defined specifications must be in place. A

prospective sub-contractor's health and safety management expertise, experience and capability (including previous health and safety performance) must be formally assessed prior to any contract or purchase order being awarded.

Each appointed sub-contractor must develop and implement a detailed Health and Safety Management Plan based on the requirements of the contractor's Health and Safety Management Plan and the Health and Safety Specification for the project. This plan must be reviewed and approved by the contractor prior to the commencement of any work.

The properties of all materials provided to the project must be adequately understood, documented and integrated into operating procedures where exposure to these materials presents a significant health or safety risk.

Procedures, commensurate with the evaluated risk, must be in place for the receiving, storing, dispatching and transporting of all equipment and materials.

Before work commences on any contract, all sub-contractor personnel must receive comprehensive orientation and induction training as required by this Specification. All work carried out by a sub-contractor must be managed (activity supervised) throughout the contract period and performance must be reviewed (audited) on a regular basis.
All health and safety requirements imposed by the Client onto the Contractor is applicable to all sub-contractors as well.

20. Incident (Occurrence) Management

The contractor must establish a procedure for the management of all health and safety incidents. This procedure must define the responsibilities, methodologies and processes that must be followed for:

- Reporting an incident;
- Investigating an incident;
- Analysing an incident to determine the root cause;
- Identifying and implementing corrective actions to prevent a recurrence; and
- Communicating information concerning an incident to relevant persons and / or groups.

Please Note: Arrangements must be in place to ensure that proper medical care is provided to any contractor (or sub-contractor) employee that suffers an occupational injury or illness. These arrangements must be described briefly in the contractor's Health and Safety Management Plan and in detail in the Incident Management Procedure.

An incident may have multiple impacts. For each impact, the Actual Consequence and the Maximum Reasonable Outcome must be evaluated. Each impact must be evaluated independently, with the most significant classification forming the primary rating of the incident.
A near-miss is an incident. All near-miss incidents must be reported.

An incident must be reported on the same work day or shift on which it occurs and preliminary details must be recorded and a TRANSNET Incident Flash Report must be completed and submitted within 24 hours to the relevant TRANSNET representative. Depending on the Actual Consequence, the relevant internal and external parties must be notified in accordance with specified protocols and timeframes, and legislative requirements.

In the event of a significant incident (i.e. an incident with an Actual Consequence of Moderate, Major or Catastrophic), work must cease and must only resume once the necessary actions (including the re-evaluation of any relevant risk assessments) have been taken to eliminate or reduce the risk of recurrence. Work must only be permitted to recommence once formal authorisation has been granted by the Project Construction Manager. In the case of incidents with an Actual Consequence of Major or Catastrophic, work must not be permitted to recommence until authorisation has been granted by the relevant government authorities (i.e. the South African Police, the Department of Employment and Labour/Department of Mineral Resources/SAMSA).

The Project Construction Manager must ensure that an investigation is completed for each incident that occurs, and that appropriately senior personnel participate in, and authorise the outcomes of, each investigation. Incident investigations must be facilitated by competent and experienced persons who have been trained in the appropriate methodology.

All significant incidents must be investigated using the approved Transnet investigation methodology. Such an investigation must be facilitated by a trained project representative within 7 calendar days.

For all other incidents other methodologies approved by the Project Health and Safety Manager may be used.

Each incident (including near-miss incidents) must be investigated.
Each incident must be analysed to determine the root cause, and corrective actions must be identified and prioritised for implementation to eliminate or reduce the risk(s) in order to prevent recurrence of the incident.

For each corrective action, a responsible person must be designated and an appropriate timeframe (target date) for completion of the corrective action must be specified. Progress on implementing corrective actions (i.e. closing incidents) must be monitored and reported on. The implementation of corrective actions must be verified during monthly audits by the TRANSNET Project Health and Safety Representatives but also no later than 30 calendar days after the conclusion of the incident investigation. The contractor must document the results of each investigation and a report must be submitted to the nominated project management representative within a stipulated time frame as determined by the nominated project management representative.

As a minimum, each incident report must include:

- The date, time and location of the incident;
- A detailed description of the incident, including photographs;
- The names of any injured persons;
- Injury details (if applicable);
- A summary of the first aid and / or medical treatment provided (if applicable);
- The current status of any injured persons;
- The root causes of the incident; and
- Detailed corrective actions, including responsible persons and target dates for implementation.

Each significant incident must be summarised for its lessons learnt following the investigation. This information must be reviewed by the contractor's Project Manager to assure completeness, accuracy and relevance before it is shared with (communicated to) all project personnel.

21. Non-conformance Reports/Stop work stoppages

Non-conformance Reports (NCR) will be issued to Contractors upon the identification of non-compliances to this specification. NCR's will be issued to Contractors for their response and implementation of corrective actions. NCR's must be closed out within a 48hour period depending on the severity of the non-conformance.

Stop work instructions will be issued by the Project Health and Safety Agent as and when the situation/observation requires.

22. Performance Assessment and Auditing

The contractor must establish and maintain programmes for measuring and monitoring health and safety performance on a regular basis. Metrics must include leading and lagging indicators, and be based on qualitative and quantitative data.

22.1 Reporting on Performance

Reports summarising the contractor's health and safety performance on the project must be compiled on a weekly and a monthly basis. Monthly reports to be submitted by the Contractor via document control on/near the 30th of every month.

The contractor must be prepared to discuss the content of these reports at scheduled health and safety meetings.

The reports must contain the following minimum information:

- Number of contractor and sub-contractor employees on site;
- Total hours worked on site by contractor and sub-contractor employees (by company);
- Number of incidents by category (i.e. Near-miss, FAI, MTI and LTI);
- Lost Time Injury Frequency Rate (LTIFR) (project to date and 12-month rolling);
- Details of all new incidents for the reporting period and the corrective actions taken or to be taken;
- Feedback (progress updates) on all open incidents and outstanding corrective actions;

- Status and feedback on any employee that may have been injured and has not yet returned to work;
- Details of all health and safety training carried out during the reporting period;
- Number of SOCs (Safety Observations and Coaching) carried out during the reporting period;
- SOC trends identified and proposed action for the coming week or month to maintain positive trends and / or address negative trends;
- Details of all audits, inspections and site visits carried out during the reporting period, and the corrective actions taken (or to be taken) to address all non-conformances;
- Feedback (progress updates) on all open non-conformances and outstanding corrective actions;
- Number of Toolbox Talks conducted during the reporting period (monthly);
- Number of Planned Task Observations (PTOs) carried out during the reporting period (monthly);
- Details of all active risk assessments and Safe Work Procedures highlighting those that are due for review in the coming month (monthly);
- A look ahead (to the coming week, month or quarter) to ensure that appropriate health and safety planning and preparation is done for upcoming work;
- Challenges faced with regard to health and safety; and
- Any other health and safety related information specific to the project that may be required.

Leading indicators (e.g. audit findings, observations, etc.) must be analysed, and any negative trends identified with regard to unsafe behaviour or conditions must be appropriately addressed to prevent incidents.

Lagging indicators (e.g. injuries, illnesses, near-miss, etc.) must be investigated in detail to determine the root causes. Corrective actions must be identified, implemented and integrated into Safe Work Procedures to prevent recurrences.

22.2 Audits and Inspections

On a monthly basis, the health and safety management system and workplace activities of the contractor will be audited by the project CHSA or HS representative to assess compliance with the project health and safety requirements. Any deviation from these requirements (i.e. non-conformance) that places the health or safety of any person in immediate danger will result in the specific activity being stopped until the non-conformance is corrected.
The finalised audit report will be issued, through document control, by the project CHSA to the Contractor within 10 days of the date of the audit.

For each non-conformance determined during any audit, the contractor must identify and implement appropriate corrective actions.
For each corrective action, a responsible person must be designated and an appropriate timeframe (target date) for completion of the corrective action must be specified. Progress on implementing corrective actions (i.e. closing non-conformances) must be monitored and reported on. The implementation of corrective actions will be verified during the monthly audits.

Should it be determined that the contractor's level of compliance is unsatisfactory, all work being performed by the contractor on the project site may be stopped (at the contractor's expense) until an investigation into the reasons for the poor performance has been carried out, a corrective action plan has been developed, and corrective actions have been implemented.

In addition to the audit carried out by the Project Health and Safety Agent or representative, the contractor must carry out an internal audit on a monthly basis to assess compliance with the project health and safety requirements (including the requirements of this specification and the contractor's Health and Safety Management Plan). Furthermore, the contractor must ensure that each appointed sub-contractor is audited and measured to the same standard. Copies of these audit reports must be submitted to the Project Health and Safety Practitioner on a monthly basis.

The contractor must carry out internal health and safety inspections as follows:

- General site health and safety inspections on a daily basis; and
- Inspections of plant, tools and equipment prior to establishment or use on site, and at least monthly thereafter.

All audits and inspections must be carried out by competent persons who have been appointed in writing.
A schedule of planned audits and inspections must be compiled and maintained ensuring that:

- All work areas and all activities are covered at regular intervals;
- All applicable legal requirements are complied with; and
- Areas or activities with significant associated hazards or risks receive greater attention.

23. Reference Documents

1. Refer to the Project Legal Register as a guideline

Deepening and Strengthening of N-BERTH at the Port of East London

Document Number: SRA-PLN-0001

Deepening and Strengthening of N-BERTH project at the Port of East London

Baseline Risk Assessment

Prepared by:	S.Ahmed Sharifa Ahmed Health and Safety Manager	10/07/2023 Date
Reviewed by:	 Kaelan Veerasamy Project Manager	10/07/2023 Date
Approved by:	PP Siyabonga Gadu Principal Project Manager	10/07/2023 Date
Approved by:	 Liezl Kroukamp Project Health and Safety Agent	11/07/2023 Date

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Table of Contents

1. Definitions and Abbreviations

ABBREVIATION	DESCRIPTION
DSTI	Daily Safe Task Instruction
HME	Heavy Mobile Equipment
MDS	Material Data Sheet
PPE	Personal Protective Equipment
SWP	Safe Work Procedure

1.1 Project Background

N-berth, located at the Car Terminal at Port of East London, is 300m in length, which is sufficient to accommodate modern car carriers, but the depth provided remains a limitation (current the depth is only -8.5m CD).

The West Quay is located on the West Bank of the Buffalo River, comprising of N-berth, R-berth and R-extension (Shown in Figure 1). The original West Quay (450m in length) is a gravity-quay wall and was built in the early 19th century and comprised of N-berth (300m) and R-berth (150m). West Quay Extension (R-Extension) was constructed between 1976 – 2005 with caissons (100m in length). In 2005, R-berth and R-extension were strengthened by a 1.5m coping beam (concrete fender panel), allowing vessels access to deeper waters through the provision of a 250m long berth, with a -10.5m (CD) draft.

The Port of East London (PoEL) needs to deepen and strengthen the remainder of the West Quay (N berth) in order to safely accommodate car carries in excess of 200m while also providing the ability to berth two car carriers simultaneously.

2. Project Scope

The *Employer*'s objective is to deepen the existing berth pocket to the desired depth, and strengthen the existing gravity-quay structure through the use of concrete fender panels, to allow car carriers access to deeper waters, without compromising the structural integrity of the existing infrastructure.

The scope covers the requirements for:

- The partial demolition of the existing Quaywall
- Supply and installation of steel section to Quaywall face
- Dowelling/anchoring of threaded bars
- Casting of reinforced concrete coping beam (extension)
- Replacement/installation of new fenders to the existing quay wall
- The installation of new wharf access ladders, etc. and any other work arising out of or incidental to the above or required of the Contractor to Provide the Works.
- Dredging and profiling of the N-Berth berth pocket and areas adjacent to the existing quay walls

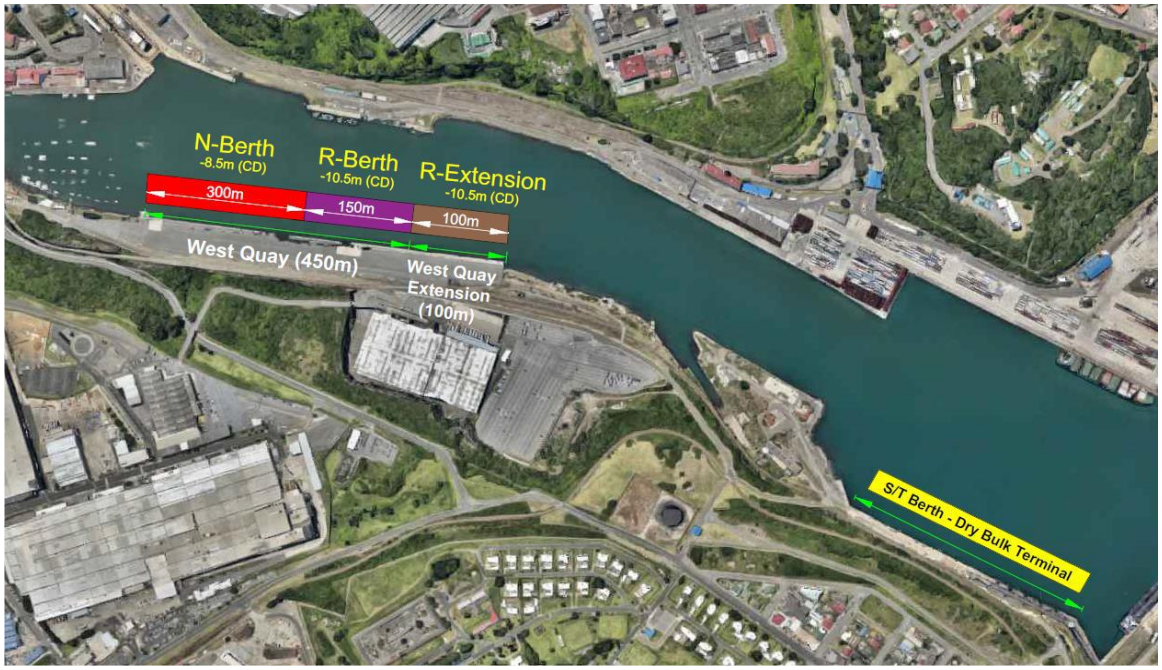

Figure 1: Orientation of the Port of East London Car Terminal Berths

3. Risk Assessment

Risk Assessment Title	Baseline Risk Assessment for the Deepening and Strengthening Project at the Port of East London

Risk Assessment Team				
	Name	Designation	Contact Number	E-mail
Facilitator	Sharifa Ahmed	Health and Safety Manager	083 400 6108	@transnet.net
Team Member 1	Kaelan Veerasamy	Project Manager	081 237 4619	@transnet.net
Team Member 2	Siyabonga Gadu	Principal Project Manager	081 036 7548	@transnet.net
Team Member 3	Liezl Kroukamp	Project Health and Safety Agent	083 277 8331	@transnet.net

Activities Covered
This baseline risk assessment focusses on the high-level health and safety hazards and risks anticipated during construction taking into consideration all construction methods.
Geographical location: Within the Port of East London, Eastern Cape

Risk Controls
Legal requirements pertaining to the specific task step's control measures are assumed to be implemented and will not be repeated in the baseline risk assessment. Proposed Risk Controls focus on unique risks anticipated, and/or specific client requirements.

Scope of Risk Assessment
The risks identified are those that will have a direct effect on the contractors during construction but also those that could have a detrimental effect on the project directly or indirectly from a time delay and / or cost point of view.

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	**Hazards**	**Associated risk event**	**Risk controls**	**Risk rating with controls**		
					L	**C**	**R**
	Occupational Health & Hygiene						
1.	Noise - Working close or adjacent to the moving of construction plant (equipment and machinery), and public/port vehicles	Noise exposure due to operation or working in close proximity of noisy mobile plant, equipment/machinery (i.e., drilling machine, dredger).	Overexposure to noise levels - Short and long term may result in potentially permanent health impact (noise induced hearing loss)	Occupational hygiene monitoring and medical surveillance. Hearing conservation programme. PPE (Ear protection-ear muffs) Compliance to Project Health and Safety Specification	**Possible**	**Major**	**High**
2.	Working in extreme temperatures/ adverse weather conditions	Exposure to extreme ambient temperatures during winter and summer days, UV exposure, windy/rainy conditions	Overexposure may result in health conditions such as heat exhaustion and hypothermia. Lung/chest/eye infections from particles being blown into eyes and inhaled	Occupational hygiene monitoring and medical surveillance. Specialised PPE (e.g. lined gloves, balaclavas, eye protection, dust masks/specialised FFP1/FFP2), Compliance to Project Health and Safety Specification (i.e.	**Possible**	**Minor**	**Medium**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	**Hazards**	**Associated risk event**	**Risk controls**	**Risk rating with controls**		
					L	**C**	**R**
				drinking sufficient potable water). Weather forecast updates			
3.	Ergonomics – including Manual handling	Working on awkward work positions (i.e. restricted space). Use of self-improved /improper tools and machinery. Heavy load manual handling; repetitive work	Musculoskeletal injuries due to manual handling, bending, twisting, prolonged, muscle strains; fatigue	Compliance to Project Health and Safety Specification (i.e., lifting techniques), Task based risk assessment, DSTI and Toolbox Talks, Correct lifting and handling practices and ergonomic awareness.	**Rare**	**Moderate**	**Low**
4.	Dust Particles – i.e., demolition and drilling	Excessive exposure to solid dust airborne particles from construction activities.	Inhalation exposure to solid dust results in Respiratory infection (potentially permanent health impact). Lung Irritation / damage to eyes/ red eyes.	Compliance to Project Health and Safety Specification, Occupational health assessment; Hygiene monitoring; Medical surveillance;	**Possible**	**Major**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	**Hazards**	**Associated risk event**	**Risk controls**	**Risk rating with controls**		
					L	**C**	**R**
				Dust suppression; FFP2 dust masks and safety goggles. Ergonomics			
5.	Vibration and fumes – earthworks, HCS related activities	Exposure to vibrations as well as fumes emitting from various construction activities such as earthworks, drilling, demolition and associated plant/equipment. Fumes from various HCS used.	Vibrations from various plant/equipment can result in carpal tunnel syndrome/white finger vibration as well as have an effect on employees kidneys Inhalation exposure to fumes results in Respiratory infection (potentially permanent health impact). Lung Irritation / damage to eyes/ red eyes.	Compliance to Project Health and Safety Specification, Occupational health assessment; Hygiene monitoring; Medical surveillance; FFP2 masks and safety goggles and all other required PPE	**Possible**	**Major**	**High**
6.	Communicable and other infectious diseases (e.g.	Contact with an infected person or area; Sneezing or coughing without closing the mouth;	Fatalities and diseases	Training on communicable and infectious diseases during DSTI and	**Possible**	**Major**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	**Hazards**	**Associated risk event**	**Risk controls**	**Risk rating with controls**		
					L	**C**	**R**
	COVID-19, HIV/AIDS, etc.)	Unhygienic practices; unprotected sexual practices		Toolbox talks; Practice social distancing; Washing of hands regularly; use of face masks; Employees reporting to management when sick; Drink plenty of water and keep hydrated, Practice protected sex e.g. use protection Hazardous Biological Agents to be identified and monitored			
	Site Establishment						
7.	Transportation of personnel to site	Sub-standard/un-roadworthy vehicles; Driver under the influence of intoxicants; incompetent/unlicensed drivers; speeding by driver; overcrowding of	Road accidents with potential for injuries and fatalities; property damage	Use of Vehicles to comply with the National Road Traffic Act (No. 93 of 1996); Compliance to Project Health and Safety Specification,	**Possible**	**Critical**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
		vehicles, loading equipment and tools with employees, vehicle not fitted with seat belts.					
8.	Use of equipment and tools	Improper use of tools and equipment Incompetent/untrained operators/users Substandard tools and equipment No safeguards where required Homemade tools, no SWP.	Pinch points, cuts, laceration incidents (caught by, in between) resulting in LTI's, medical treatment cases or First Aid Injuries; damage to property.	Compliance to Project Health and Safety Specification; Correct tools for the job and correct use of the tools; All tools and equipment to be numbered and placed on registers and inspected when required by competent persons; Operators/users to have competency/training and experience. All machine guarding to be in place before equipment is used;	**Likely**	**Major**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
				PPE (use of suitable gloves mandatory, eye protection).			
9.	Lifting Operation- Placement of containers/offices /drill rig	Incompetent crane drivers/operators and riggers performing lifting activity; Heavier loads exceeding lifting capacity of cranes; No rigging studies done before lifts; Mobile cranes /lifting equipment not in safe and serviceable condition; No valid inspections and load test certificates available; Sub-standard lifting tackle equipment being used may cause loads to fall; Incorrect use of Lifting tackle may cause load to fall;	Objects falling onto people (employees) and or property resulting in Fatalities, Injuries and Property Damage from crane failure, unfavourable conditions, incompetent operators; Property damage to existing buildings, cars, vegetation.	Compliance to Project Health and Safety Specification; Crane operator and rigger competency to be verified before activities take place. Rigging studies to be done where required. Ground stability, weights and placement of outriggers to be verified and ensured. Load test certificates and Inspections by competent persons to be in place prior.	**Possible**	**Critical**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	**Hazards**	**Associated risk event**	**Risk controls**	**Risk rating with controls**		
					L	**C**	**R**
		Use of mobile cranes in high wind conditions; Employees falling from top of containers while tying/untying ropes; Uneven/unsuitable ground surfaces on which crane will stand.		Ensure registration and verification of LMI's and LME's. Wind monitoring tools to be available. Employees to undergo formal height work training.			
10.	Underground services	Failure to detect or undetected existing ground services; Live underground services (i.e. electrical cables and water pipes)	Electrocution by live electrical wires; Damage to cables and services results in disruption to operations and services; Fires, explosions and water wastage from damaged cables pipes.	Permit system must be followed; Survey and detection results to be made known; Additional use of detection equipment where required. Updated drawings indicating services, manual proof trenching.	**Possible**	**Major**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
11.	Employees Facilities	Failure to provide employees facilities on site (i.e. eating and ablution facilities)	Health, hygiene and environmental sicknesses (i.e. food poisoning)	Compliance to Project Health and Safety Specification; Awareness Training on health and hygiene requirements; Comply to Facilities Regulations; site layout plan to be approved by Transnet.	**Unlikely**	**Moderate**	**Medium**
12.	Temporary Electrical Installations	Incompetent Installers; Unsafe installations due to faulty wiring; Lack of insulation & openings; Substandard electrical tools (e.g. portable electrical grinders, drills) being used; Contact with live electrical conductors	Fatality and Injuries resulting in permanent disabilities (electrocution, burns etc.) and property damage	Compliance to Project Health and Safety Specification; Ensure competency of electrical installers and use of certified equipment. Inspections of installations and fire safety equipment by competent inspectors. Task Risk assessment with SWP and work	**Possible**	**Critical**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
		Failure to adhere to isolation and lockout procedures		permits; Issuing of COC upon completion			
13.	Stacking and Storage	Incorrect control of stacked materials; incorrect method of stacking materials/articles may cause injury to Employees and property damage	Medical Treatment Injury Lost time injury Damage to property	Compliance to Project Health and Safety Specification; PPE compliance; Appointment of stacking and storage personnel.	**Rare**	**Moderate**	**Low**
14.	Site Access	Failure to obtain site access certificate; Failure to provide security or unauthorised person entering site. Failure to test for intoxication	Injuries, property damage/loss and theft	Compliance to Project Health and Safety Specification; Security Management Plan including Site Access Control Plan; Mandatory alcohol testing	**Possible**	**Minor**	**Medium**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	**Hazards**	**Associated risk event**	**Risk controls**	**Risk rating with controls**		
					L	**C**	**R**
	Project Construction Activities						
15.	Site Establishment area to be confirmed	Working closed to water environment Pollution Falling into water	Possible drowning Water/ground pollution	Compliance to Project Health and Safety Specification and Client inductions; Contractor emergency management plan including employee awareness training; rescue plan for water environments Required PPE, lifejackets to be worn by operators and site personnel. Site layout plan to be provided by the Contractor for Transnet approval.	**Likely**	**Critical**	**Extreme**
16.	Designers - Use of Temporary Works (scaffolding, false	Incompetent erectors and inspectors when building support structures; incomplete support	Incidents resulting in fatalities, injuries such as cuts, lacerations due to sharp edges, property	Compliance to Project Health and Safety Specification; temporary works to comply with	**Possible**	**Critical**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
	work, formwork, and support work)	structures (1.e. no access ladders, no toe boards, insufficient bracing); overloading support structures; support structures not erected as per drawings; no CR 12 (temp work designer) appointee or incompetent CR 12; sharp edges of material and structures; sharp edges Collapsing/Falling into water	damage from structures and material falling into water Possible fatalities	SANS 10085 (scaffolding) and Construction Regulations; Competent and certified temporary works personnel to be appointed; inspections of temporary work as required, Temporary work design and drawings to be signed off by structural engineer competent CR 12 appointee and constructed accordingly.			
17.	Use of mobile Plant (i.e. HME - TLB, graders, excavators, tipper trucks, water trucks, cranes)	Defective mobile plant, incompetent operator, open/uneven surfaces; collision with Port equipment; intoxicated operator; medically unfit operator; lack of plant	Multiple injuries/fatalities; property damage	Compliance to Project Health and Safety Specification, legislation, policies and procedures; Client inductions to be conducted before work to commence; Pre-use	**Possible**	**Major**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
		inspection and service history; man/machine interface; congested areas; speeding of operators; collision of operators with Port users; property damage caused by operators		and daily inspections of Plant; Plant to be checked and approved for site before plant mobilisation on site, plant service history to be available; Competence verification of operators; valid medical assessments; solid barricading of potential hazards; daily alcohol testing of all personnel; required PPE to be worn and especially reflector vests for high visibility; appointment of spotters/flagmen at strategic locations as per traffic management plan; designated walkways for personnel			

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
				to prevent plant/people interface; speeding checks to be conducted by the Port at ad hoc times and locations.			
18.	Piling	Exposure to noise, vibration, inclement weather	Noise induced hearing loss, strained body and limp appendices, damage to property	All employees to wear hearing protection, minimise exposure to noise/vibration/ergonomics; reduced ergonomic equipment Weather forecasting updates	**Possible**	**Minor**	**Medium**
19.	Excavation as and where required, and Trenching (i.e. foundation)	Inclement weather (poor visibility conditions i.e. fog, rain, blind spots); mechanical failure of machines (brakes, steering, park brake, leaks, exc.); Machines not in safe and serviceable condition;	Collisions resulting in fatality, Injuries resulting in permanent disabilities, property damage, collapsing of excavation resulting in to injuries and fatalities.	Project health and safety specification; Ensure competent, trained personnel are used. Dedicated pedestrian walk ways where practical;	**Possible**	**Major**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
		Unprotected excavations; Unsafe Access and Egress into and from excavations; Unstable excavation walls (even after inclement weather); Loose objects on the side walls of excavations; Underground services being struck/damaged;		Adequate barricading of excavations; Safe access and warnings. Inspections of excavations by competent and appointed persons to ensure compliance including checks pertaining to inclement weather; Excavators/TLB used for deep excavations; Competent and certified operators; Detection to be conducted where uncertainty exists prior to use of any mechanical excavation equipment and must			

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
				where possible have underground services isolated; Adequate supervision to stop all excavation work at the first visible sign of foreign material (e.g. electric cable sheath, PVC piping material).			
20.	Backfilling	Movement of machinery (TLB); dust emissions; noise; improper use of tools.	Injuries/fatalities, property damage, lung infections	Dust suppression methods to be implemented; Trained flagmen/spotters to be appointed; all tools to be inspected before use and to be placed on registers	**Possible**	**Minor**	**Medium**
21.	Concrete Work (Pouring)	Improper handling or working with concrete (i.e. contact with eyes or skin);	Skin and or eye irritation; Back pain; Incidents (collision) resulting in fatalities	Project health and safety specification; Medical Surveillance (Fitness for Duty Certificate);	**Rare**	**Minor**	**Low**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
		Holding of concrete weighted equipment; Incompetent concrete mix operator; Spillages of concrete		Employee Dossier; Concrete mix equipment inspection; DSTI and Toolbox Talk; Use of correct PPE (i.e. long sleeve overall, footwear, eye and hand protection etc); Spotter for concrete truck mixer; Supervision; Communication of the MDS relating to concrete/cement.			
22.	Working at elevated position (i.e. above water)	Working on unprotected edges; Poor housekeeping leading to accumulation of waste and loose materials;	Slipping and falling from height resulting in injuries, drownings leading to fatalities; property loss due to tools/equipment falling into water.	Project health and safety specification; fall protection plan to be developed and employees to be trained on it; Use fall protection and prevention	**Possible**	**Critical**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
		Incorrect methods of getting materials, equipment or tools from and to ground (i.e. throwing); Working during inclement weather conditions; medically unfit and untrained employees working at heights, Slippery surfaces due to water splashes.		equipment (i.e. guardrails, solid barricade, harnesses); formal working at heights training; rescue plan, lifejackets, valid medicals to include working at height assessments; weather conditions to be monitored and documented;			
23.	Working on water from a dredger	Incompetent operator, defective and non-compliant dredger, unsuitable dredger for the work activities to be undertaken, adverse weather conditions affecting dredger operations	Incidents and fatalities can occur (drowning), breakdowns of the dredger can result in incidents, leakages into the river of diesel causing pollution, property damage to the dredger due to the terrain it is operating in.	Adherence to Project health and safety specification; competencies of operators to be verified; maintenance records of the dredger to be inspected; handling capacity of the dredger to be aligned to the	**Possible**	**Critical**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
				scope and dredging material; weather conditions to be monitored. Operational (Harbour Master) approval for dredging activities			
24.	Designers- Ladders	Substandard material	Quality nonconformance	Designers to conform to material and testing as required by Client SANS 1200	**Rare**	**Minor**	**Low**
25.	Hot Works – Welding, Grinding, Cutting	Incompetent Operators; Substandard Electrical Tools (e.g., Portable Electrical Grinders, Drills, Welding Machines, Generators) being used; Performing hot work activities in wet weather conditions;	Injury requiring medical treatment Lost Time Injuries Fatalities, fires and explosions; Environmental issues	Project health and safety specification; Daily electrical equipment/tools inspection by a competent person; Verified competency training for any person operating electrically			

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
		Oil/Fuel leaking generators		driven tools and equipment; All electrical equipment run from portable generators to be double insulated; Generators to be inspected daily; Proper earthing processes to be followed for all activities; All tools to be inspected and checked before use including use of correct cutting disk and backing plates; Grinders may only be used on solid surface; All electrically driven tools must be double insulated and must have a dead man switch fitted; Fire extinguisher and fire fighter to be	**Possible**	**Moderate**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
				available during execution. Hot work permit must be applied for before execution.			
26.	Painting	Repetitive movements Paint splashes in the eye Exposure to paint fumes Paint spillages Skin irritation Incompetent painter	Back injuries Eye injuries Inhalation/pulmonary problems Dermatitis Environmental Pollution	Frequent rest breaks and rotation of activities; All mandatory PPE to be worn with additional PPE depending on the specific activity; MDS of the various HCS to be obtained and communicated to all employees working with the substances; paint trays, drip trays and plastic sheets to be used to prevent paint spillages on the ground, only competent painter to do the job.	**Likely**	**Minor**	**Medium**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
27.	Post Construction - Operation and maintenance of N berth	Asset defects Lack of maintenance	Financial impact	Preventative maintenance schedule Structural inspection 6 monthly and thereafter once every second year by a structural engineer. Copies of records to be kept.	**Possible**	**Critical**	**High**
28.	Contractor Interface	Numerous contractors working within restricted areas; Contractors exposed to construction activities from other Contractors	Fatality, Injuries resulting in permanent disabilities, property damage.	Compliance to Project health and safety specification and Client inductions; Alignment between various contractors through frequent meetings chaired by the Client, contractors to do site specific induction and indicate in their SHE plans how will they control interface on site.	**Possible**	**Critical**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
29.	Close out of construction activities	Poor housekeeping	Injuries, falls, slips and trips, property damage	Adherence to project health and safety specification; close out checklist to be conducted before product handover to Client Site need to be in a clean condition and all redundant/waste removed.	**Possible**	**Minor**	**Medium**
30.	Driving inside the Port/Port traffic	Incompetent drivers; LV not in safe and serviceable condition; Uneven road conditions; Speeding; Fatigue; Poor visibility - dust/sun	Fatality, Injuries resulting in permanent disabilities, property damage.	Project health and safety specification; Ensure drivers are competent including random verification; Daily inspections of vehicles; Ensure selection of correct vehicle type for conditions - including tyre selection;	**Unlikely**	**Critical**	**High**

	Hazards, Associated Risks, and Ratings						
	Task Steps / Short risk name	Hazards	Associated risk event	Risk controls	Risk rating with controls		
					L	C	R
				Fatigue management plan; Signage; Emergency Preparedness Plan.			

Monitor and Review the Risk Controls
It is important to monitor risk controls and review risk assessments regularly. Review is required when there is a change in the process, relevant legal changes, and where a cause for concern has arisen. Reviews could be scheduled on an annual basis. If the risk assessment has substantially changed a new risk assessment is warranted.

4. Risk Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Critical
Almost Certain	Medium	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	High	Extreme
Possible	Low	Medium	High	High	High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Low	Low	Medium

Assessed Risk Level	Description of Risk Level	Action Required
Low	If an incident were to occur, there would be little likelihood that an injury would result	Undertake the activity with the existing controls in place
Medium	If an incident were to occur, there would be some chance that an injury requiring First Aid would result	Additional controls may be needed
High	If an incident were to occur, it will be likely that an injury requiring medical treatment would result	Controls will need to be in place before the activity is undertaken
Extreme	If an incident were to occur it, it would be likely that a permanent or death would result	Consider alternatives to doing the activity. Significant control measures will need to be implemented to ensure safety

Likelihood	Desciption of Likelihood		Consequence	Description of Consequence
1. Rare	Will only occur in exceptional circumstances		1. Insignificant	No treatment required
2. Unlikely	Not likely to occur within the foreseeable future, or withing the project lifecycle		2. Minor	Minor injury requiring First Aid treatment (e.g. minor cuts, bruises, bumps)
3. Possible	May occur within the foreseeable future, or within the project lifecycle		3. Moderate	Injury requiring medical treatment or lost time
4. Likely	Likely to occur within the foreseeable future, or within the project lifecycle		4. Major	Serious injury (injuries) requiring specialist medical treatment or hospitalisation
5. Almost Certain	Almost certain to occur within the foreseeavle future or within the project lifecycle		5. Critical	Loss of life, permanent disability or multiple serious injuries

Integrated Legal Register

Project Name: Deepening and Strengthening of N Berth at the Port of East London

Author: Sharifa Ahmed
Client: Transnet National Ports Authority

Project Manager: Kaelan Veerasamy

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Distribution	
Name	Title
Sharifa Ahmed	HS Manager
Kaelan Veerasamy	PM
Siyabonga Gadu	PPM
Liezl Kroukamp	HS Agent

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SIGNATORIES:

Prepared by: S.Ahmed — 10/07/2023
Sharifa Ahmed — Date
H&S Manager

Reviewed by: — 10/07/2023
Kaelan Veerasamy — Date
Project Manager

Approved by: pp — 10/07/2023
Siyabonga Gadu — Date
Principal Project Manager

Approved by: — 11/07/2023
Liezl Kroukamp — Date
Project Health and Safety Agent

Item #	Applicable legislation	General compliance requirements	Requirements in relation to the project	Mitigation measures	Cost Impact	Schedule Impact
1.1.	**Occupational Health and Safety Act (No. 85 of 1993) and associated regulations**	Transnet to comply with the relevant processes as prescribed by the provisions of the Act and put safety policies in place, in consultation with the labour stakeholders in terms of the Act and Regulations published in terms of the Act. Regulation's reference but not limited to: General Administrative, Construction, General Machinery, General Safety.	All aspects of this Act and relevant regulations apply to this Project. Compliance to Construction Work Permit as well as appointment of a PrCHSA	Ensure full compliance to the Act by Transnet and it's appointed Contractors working on this Project. Adherence is achieved through Transnet policies and procedures, which includes for suitable Health and Safety construction specification, monitoring, and audits.	Health and Safety specification and associated cost estimate caters for adherence.	Yes If approval of any documents are not adhered to.
1.2.	**National Road Traffic Act (No. 93 of 1996)**	The registration and licensing system of motor vehicles for each province shall be as prescribed. No person shall, subject to this Act, operate on a public road any motor vehicle which is not registered and licensed by virtue of this Chapter; Registration of manufacturers, builders and importers; Every manufacturer, builder or importer shall apply in the prescribed manner to the MEC concerned for	Registration and licensing of motor vehicles	Transnet to comply with the relevant processes as prescribed by the provisions of this Act and Regulations published in terms of the Act. Compliance inside the premises of the Port is catered for within the Health and Safety specification.	None	None if managed correctly

Item #	Applicable legislation	General compliance requirements	Requirements in relation to the project	Mitigation measures	Cost Impact	Schedule Impact
		registration as a manufacturer, builder or importer.				
1.3.	**Compensation for Occupational Injuries and Diseases Act 130 of 1993**	The Act applies to all employers and all casual and full-time employees who: · Become ill, or · Are injured, disabled or killed as a result of a workplace accident or workplace-related disease	Same	Valid Letter of Good Standing with WCC or similar licensed insurer. Prohibit contractors from working without valid Letter of Good Standing. Monitor reportable injuries and diseases	Specification and associated cost estimate caters for adherence	Yes If an employee who is a key resource or carries out a specialized function
1.4.	**National Health Act 61 of 2003**	The Act applies to all stakeholders as users of Health Care Services under the definition of user in the Act	Stakeholders should be conversant with the content of the Act with regards to eligibility for free health care services and the user rights when receiving treatment	Contractors to make use of registered Occupational Health/Medicine Practitioners for work related medicals and injury management	Specification and associated cost estimate caters for adherence	None

Item #	Applicable legislation	General compliance requirements	Requirements in relation to the project	Mitigation measures	Cost Impact	Schedule Impact
1.5.	**Hazardous Substances Act 15 of 1973**	It provides for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature and for the control of certain electronic products	Where equipment might be used or installed that contains a source of ionizing radiation / radio-active isotopes (e.g. Troxler)	All contractor's method statements, safe work procedures and risk assessments to be approved before work starts.	Health and Safety specification and associated cost estimate caters for adherence.	Yes Allowance made before commencement of any work on site
1.6.	**National code of practice for the training providers of lifting machine operators 2015**	The code of practice makes provision for the accreditation of training service providers by an accredited authorized body tasked by SAQA Act to do so.	All lifting machine operators to be trained and declared competent by such an accredited service provider only.	Verification and approval of contractor's H&S documentation in this regard.	Health and Safety Specification adherence	**Yes** Allowance made before commencement of any work on site
1.7.	**National Building Regulations and Building Standards Act 103 of 1977**	The Act and Regulations shall be complied with in the areas of jurisdiction of local authorities in relation to the erection of buildings as defined in the Act.	Some of the aspects of the structures of this project fall under the definition of a 'building'. All designers/engineers shall comply with the regulations and standards which impact on the design under headings such as structural design, public safety, site operations, foundations and fire	Design criteria to take Health and Safety requirements into consideration.	Specification and associated cost estimate caters for adherence	**Yes** Allowance made before commencement of any work on site.

Item #	Applicable legislation	General compliance requirements	Requirements in relation to the project	Mitigation measures	Cost Impact	Schedule Impact
			Protection to mention a few.			
1.8.	**Basic Conditions of Employment Act 75 of 1997**	Applies to any employer. It gives effect to and regulates the right to fair labour practices.	All stakeholders but especially contractors who will be employing persons from the local communities.	Monitoring of contractors / addressing deviations to avoid industrial action. Monitor complaints. Employee representatives / committees.	Low cost impact	None if managed correctly
1.9.	**Employment Equity Act 55 of 1998**	Applies to any employer. It provides for equity in the workplace, equal opportunities and fair treatment.	All contractors.	Transnet policies & procedures regarding community liaison.	Low cost impact	None if managed correctly
1.10.	**Labour Relations Act 66 of 1995**	All stakeholders are included in the application of this Act and shall comply with the provisions of the Act accordingly	The Act applies to all stakeholders on the project such as to fair labour practices, employee participation, labour disputes etc.	Contractors are required to comply with the legislation as a minimum.	Low cost impact	None if managed correctly

Item #	Applicable legislation	General compliance requirements	Requirements in relation to the project	Mitigation measures	Cost Impact	Schedule Impact
1.11.	**Unemployment Insurance Act (No. 4 of 2002)**	Employer and every employee to whom this Act applies must contribute to the Unemployment Insurance Fund. Contributions must be paid over to the Commissioner by the employer.	Section 5 (Duty to contribute to Fund).	Contributions to the UIF.	None Standard practice therefore no additional impact.	None Standard practice therefore no additional impact.
1.12.	**Skills Development Act (No. 9 of 1999)**	The obligations of an employer in terms of this Act relates to the following— Learner ships; Learner ship Agreements; contract of employment with learner; disputes about learner ships; skills programmes; and disputes.	Sections 16-21 (Learner ships).	Employer has to encourage employees to study to empower themselves and develop their skills	None Standard practice therefore no additional impact.	None Standard practice therefore no additional impact.
1.13.	**Private Security Industry Regulatory Authority Act 56 of 2001**	The Act applies to the private security industry and the security service providers.	The appointed security service(s) shall comply with the relevant provisions of the Act.	Suitable qualified / registered service provider. Non-compliant service provider will be removed from site.	High cost impact	Yes If material and equipment are stolen

Item #	Applicable legislation	General compliance requirements	Requirements in relation to the project	Mitigation measures	Cost Impact	Schedule Impact
1.14.	**Criminal Procedure Act 51 of 1977**	Applies to prosecuting authorities. It makes provision for procedures and related matters in criminal proceedings	Any stakeholders where a crime has been committed.	Policies, management systems and procedures where legal compliance is regarded as minimum. Pre-approval of contractors and tender evaluation process.	None	None
1.15.	**Construction Industry Development Board Act 38 of 2000**	The Act is applicable to all construction projects. The purpose is to provide the basis for a best practice project assessment scheme to promote the performance of public and private sector clients in the development of the construction industry	Every client who engages in the best practice project assessment scheme must pay to the Board a prescribed percentage of the contract sum as determined at the time of the awarding of the contract	Policies, management systems and procedures where legal compliance is regarded as minimum. Pre-approval of contractors and tender evaluation process.	None	None
1.16.	**Constitution of the Republic of South Africa Act 108 of 1996**	Chapter 2 – Bill of Rights	Chapter 2 – Bill of Rights; Section 24 [Work] Environment	Other legislation including Health and Safety related legislation is written to give effect to Section 24.	Specification and associated cost estimate caters for adherence	**Yes** Allowance made before commencement of any work on site.

Item #	Applicable legislation	General compliance requirements	Requirements in relation to the project	Mitigation measures	Cost Impact	Schedule Impact
1.17.	**Engineering Profession Act 46 of 2000**	The Act applies to the Engineering Council of South Africa (ECSA) and the registration of professionals, candidates and specified categories in the engineering profession.	All engineers may only practice in the categories they are registered in. Construction drawings signed off by registered professionals only.	Name of professional and ECSA registration number shown on title block of construction drawings. Document control set up to not release any construction drawings not signed accordingly	None. Drawings will comply before being issued	None To be specified at tender documentation
1.18.	**Income Tax Act 58 of 1962 as amended**	All stakeholders are included in the application of this Act and shall comply with the provisions of the Act and regulations accordingly	All stakeholders shall comply to the relevant provisions of the Act	Tax clearance certificate required from contractors during tender evaluation process.	none	None. Resolved at tender evaluation stage.
1.19.	**Promotion of Access to Information Act 2 of 2000**	The Act and Regulations apply to records of a public body or records of private body as defined in the Act.	The Act shall be complied with when the need arises for any relevant records	All record keeping shall be in accordance with the relevant legislation which requires it to be kept.	None	None Compliance to the act.

Item #	Applicable legislation	General compliance requirements	Requirements in relation to the project	Mitigation measures	Cost Impact	Schedule Impact
1.20.	**Protected Disclosures Act 26 of 2000**	The Act makes provision for the protection of an employee being subjected to an occupational detriment on account of having made a protected disclosure, to provide remedies in connection with occupational detriments and to provide procedures in terms of which an *employee* can disclose information regarding *improprieties* by his or her *employer.*	The Act is potentially applicable during construction phase and shall be complied with when the circumstance arises and the Act is applicable.	This supports conditions in the OHS Act and should be covered during H&S induction training	None	None Resolved prior approval of H&S files
1.21.	**Public Finance Management Act (PFMA)**	The Act is to secure transparency, accountability, and sound management of the revenue, expenditure, assets and liabilities of the institutions to which this Act applies.	Transnet is listed as such an institution in Schedule 2 of the Act and has to comply with the relevant provisions of the Act.	Good governance practices.	Low cost impact	Yes All payments certificates and CEs to be assessed and approved according to DOA.
1.22.	**Quantity Surveying Profession Act, Act No 49 of 2000**	The Act applies to all Quantity Surveyors (QS) to provide for the registration of professionals, candidates and specified categories in the quantity surveying profession.	All quantity surveyors may only practice in the categories they are registered in.	QS Principal to be a registered professional with South African Council for Quantity Surveyors. The QS to have a certified quality management system that applies to all projects. QS's to be registered	None	None To be specified at tender documentation

Item #	Applicable legislation	General compliance requirements	Requirements in relation to the project	Mitigation measures	Cost Impact	Schedule Impact
				with the Association of South African Quantity Surveyors.		
1.23.	**Project and Construction Management Professional Act 48 of 2000**	The purpose of the Act is to provide for the registration of professionals, candidates and specified categories within the project and construction management professions	All project and construction managers may only practice in the categories they are registered in as stated in section 18 of the Act	Ensure compliance through adherence to the requirements by reviewing CV's and qualifications of appointed persons	Health and Safety specification and associated cost estimate caters for adherence.	Yes If not specified at tender stage. Could affect execution if a registered key resource exits the project and a replacement is required.
1.24.	**Standards Act 8 of 2008**	The purpose of the Act is to provide a legal framework for the development, promotion and maintenance of South African National Standards in the Republic and the rendering of conformity assessment services and related activities	All applicable standards related to the design has been identified and listed in this register	The design took all the necessary national standards into consideration and has been included in the individual design criteria reports.	Cost impact if relevant standards are not identified and incorporated into design criteria	**Yes** If relevant standards are not identified and incorporated into design criteria. This can cause delays to the schedule if re-

Item #	Applicable legislation	General compliance requirements	Requirements in relation to the project	Mitigation measures	Cost Impact	Schedule Impact
						design has to be done.
1.25.	**Municipal By-Laws covering all specific work areas**	The specific by-laws shall be complied with in the areas of jurisdiction of local authorities in relation to any activity which triggers it.	All relevant section of the Municipal By-laws which may be triggered through project activities	Ensure full compliance to applicable by-laws by Transnet and it's appointed Contractors working on this Project. Adherence is achieved through familiarisation of the requirements of the area of jurisdiction.	Specification and associated cost estimate caters for adherence	**Yes** Allowance made before commencement of any work on site
1.26.	**National Key Points Act (No. 102 of 1980)**	Port Security requirements must be implemented to ensure that the requirements of the act are met.	Sets requirements for security related to national key point areas including harbours	Existing security measures that are in place at the Port of East London complies with the requirements of the Act. The project will not breach any of the existing security measures and will adhere to the security requirements when work is undertaken within secured port areas. The requirements are included in the construction security specifications.	None	**Yes** Allowance made before commencement of any work on site

Item #	Applicable legislation	General compliance requirements	Requirements in relation to the project	Mitigation measures	Cost Impact	Schedule Impact
1.27.	**National Ports Act No.12 of 2005**	Port Access Control and use of the Port	Section 6,9 and 11 (Port use, access and safety)	Ensure compliance to the Transnet Act and it's appointed Contractors working on this Project.	Adherence is achieved through Transnet policies and procedures, which includes for suitable Health and Safety construction specification, monitoring and audits. Also with reference to Security specifications and procedures	**Yes** Allowance made before commencement of any work on site
1.28.	**Marine Occupational Health and Safety Act 2010**	Maritime Occupation Health and Safety	Marine Occupational Health and Safety Act 2010	Ensure compliance to the Transnet Act and it's appointed Contractors working on this Project.	Adherence is achieved through Harbor Master instruction, policies, and procedures, which includes for suitable Health and Safety construction specification, monitoring and audits.	**Yes** Allowance made before commencement of any work on site

Item #	Applicable legislation	General compliance requirements	Requirements in relation to the project	Mitigation measures	Cost Impact	Schedule Impact
1.29.	**National Environmental Management Act (No. 107 of 1998)**	No Environmental Authorization required but other sections remain relevant	Section 28 – Duty of Care Section 30 – Reporting in event of pollution spill	Implement CEMP, SES to ensure compliance to relevant sections of NEMA	None	None
1.30.	**National Environmental Management: Waste Act (No. 59 of 2008)**	Waste License not required Registration of area for Storage of waste only required if long term storage area is necessary, but not envisaged – TBD Norms and Standards	Category C Norms and Standards	Implement CEMP, SES and PES	TBD only if required, but not long-term storage not envisaged	TBD only if required, but not long-term storage not envisaged
1.31.	**National Environmental Management: Integrated Coastal Management Act (No 24 of 2008)**	Determination of the coastal zone in South Africa; Provision for co-ordinated and integrated management of the coastal zone; Preservation, protection, extension and enhancement of coastal public property; Equitable access to coastal public property; and Giving effect to South Africa's obligations under	off-shore disposal of dredge material is relevant to the project. Off-shore disposal permit	Water and Sediment Quality monitoring. Dredged amount to be confirmed, offshore	EMS for water and sediment quality, EMS for dredging activities. CEMP and SES compliance.	Yes Delay impact.

Item #	Applicable legislation	General compliance requirements	Requirements in relation to the project	Mitigation measures	Cost Impact	Schedule Impact
		international coastal and marine law.				

Tender Health and Safety Cost Breakdown

Tenderer (Company)	Responsible Person	Designation	Date
Project/Tender Title	**Project/Tender No.**	**Project Location / Description**	

#	Cost element	Unit Cost (R)	# of Units	Total Cost (R)
1.	Human Resources			
2.	Systems Documentation			
3.	Meetings & Administration			
4.	H&S Training			
5.	PPE & Safety Equipment			
6.	Signage & Barricading			
7.	Workplace Facilities			
8.	Emergency & Rescue Measures			
9.	Hygiene Surveys & Monitoring			
10.	Medical Surveillance			
11.	Safe Transport of Workers			
12.	HazMat Management (e.g. asbestos /silica)			
13.	Substance Abuse Testing			
14.	H&S Reward & Recognition			
15.	Incident Management			

Total Health and Safety Cost (R)	
Total Tender Value (R)	
H&S Cost as % of Tender value	**%**

Contractor Safety Questionnaire

1.	Safe Work Performance				
1A	Injury Experience / Historical Performance				
	Use the previous three years injury and illness records to complete the following:				
	Year				
	Number of first aid cases				
	Number of medical treatment cases				
	Number of lost time injury cases				
	Number of fatal injuries				
	Total recordable frequency				
	Lost time injury frequency				
	Number of worker manhours				
	Action taken to prevent re-occurrence				
	1	Medical Treatment Case	Any occupational injury or illness requiring treatment provided by a physician or treatment provided under the direction of a physician		
	2	Restricted Workday Case	Any occupational injury or illness that prevents a worker from performing any of his/her craft jurisdiction duties		
	3	Lost Time injury Cases	Any occupational injury that prevents the worker from performing any work for at least one day		
	4	Total Recordable Frequency	Total number of Medical Treatment, Restricted Work and Lost Time Injury cases multiplied by 200,000 then divided by total manhours		
	5	Lost Time Injury Frequency	Total number of Lost Time Injury cases multiplied by 200,000 then divide by total manhours		
1B	Workers' Compensation Experience				
	Use the previous three years injury and illness records to complete the following (if applicable):				
	Industry Code:		Industry Classification:		
	Year				
	Industry Rate				
	Contractor Rate				
	% Discount or Surcharge				
	Is your Workers' Compensation account in good standing? (Please provide letter of confirmation)		Yes		No

Contractor Safety Questionnaire

2.	**Citations**				
2A	Has your company been cited, charged or prosecuted under Health, Safety and/or Environmental Legislation in the last 5 years? If yes, provide details:	Yes		No	
2B	Has your company been cited, charged or prosecuted under the above Legislation in another Country, Region or State? If yes, provide details:	Yes		No	

3.	**Citations**				
	Does your company have a Certificate of Recognition?	Yes		No	
	If yes, what is the Certificate No:		Issue Date:		

4.	**Safety Program**					
4A	Submit your company written health and safety plan? Submit for provide a copy for review					
4C	Health and safety plan should contain the following elements					
		Yes	No		Yes	No
	Health and Safety Policy			Competence, Training and Awareness		
	Incident Management, reporting and Investigation			Emergency Preparedness/Response		
	Recordkeeping & Statistics			Hazard Assessment and Risk Management and training		
	Reference to Legislation			Permit to Work		
	Site Establishment and Rehabilitation			Safe Work Procedures and Safe operating procedures		
	Roles and Responsibilities			Workplace Inspections		
	Alcohol, Drugs and Other Intoxicating Substances			Occupational Hygiene and Covid19		
	Personal Protective Equipment			Measuring and Monitoring		
	Waste Management			Communication, Participation and Consultation		
	Work Program or look ahead plan			Signs and Notices		
4C	Submit your company pocket safety booklet for field distribution?					

5.	**Training Program**					
5A	Attach orientation program for new hire employees? include a course outline. Does it include any of the following:					
		Yes	No		Yes	No
	General Rules & Regulations			Confined Space Entry		
	Emergency Reporting			Trenching & Excavation		

Contractor Safety Questionnaire

	Injury Reporting			Signs & Barricades		
	Legislation			Dangerous Holes & Openings		
	Right to Refuse Work			Rigging & Cranes		
	Personal Protective Equipment			Mobile Vehicles		
	Emergency Procedures			Preventative Maintenance		
	Project Safety Committee			Hand & Power Tools		
	Housekeeping			Fire Prevention & Protection		
	Ladders & Scaffolds			Electrical Safety		
	Fall Arrest Standards			Compressed Gas Cylinders		
	Aerial Work Platforms			Weather Extremes		
5B	Submit a program for training newly hired or promoted supervisors? Tenderer must submit an outline for evaluation which include instruction on the following:					
		Yes	No		Yes	No
	Employer Responsibilities			Safety Communication		
	Employee Responsibilities			First Aid/Medical Procedures		
	Due Diligence			New Worker Training		
	Safety Leadership			Environmental Requirements		
	Work Refusals			Hazard Assessment		
	Inspection Processes			Pre-Job Safety Instruction		
	Emergency Procedures			Drug & Alcohol Policy		
	Incident Investigation			Progressive Disciplinary Policy		
	Safe Work Procedures			Safe Work Practices		
	Safety Meetings			Notification Requirements		

6.	**Safety Activities**					
6A	Do you conduct safety inspections?	Yes	No	Weekly	Monthly	Quarterly
	Describe your safety inspection process (include participation, documentation requirements, follow-up, report distribution)					
	Who follows up on inspection action items?					
6B	Do you hold site safety meetings for field employees? If Yes, how often?	Yes	No	Daily	Weekly	Biweekly
6C	Do you hold site meetings where safety is addressed	Yes	No	Weekly	Biweekly	Monthly

Contractor Safety Questionnaire

	with management and field supervisors?					
6D	Is pre-job safety instruction provided before to each new task?			Yes		No
	Is the process documented?			Yes		No
	Who leads the discussion?					
6E	Do you have a hazard assessment process?			Yes		No
	Are hazard assessments documented?			Yes		No
	If yes, how are hazard assessments communicated and implemented on each project?					
	Who is responsible for leading the hazard assessment process?					
6F	Submit your company policies and procedures for environmental protection, spill clean-up, reporting, waste disposal, and recycling as part of the Health & Safety Program?					
6G	How does your company measure its H&S success? Attach separate sheet to explain					
7.	**Safety Stewardship**					
7A	Are incident reports and report summaries sent to the following and how often?	Yes	No	Monthly	Quarterly	Annually
	Project/Site Manager					
	Vice President/Managing Director					
	Safety Director/Manager					
	President/Chief Executive Officer					
7B	How are incident records and summaries kept? How often are they reported internally?	Yes	No	Monthly	Quarterly	Annually
	Incidents totalled for the entire company					
	Incidents totaled by project					
	Subtotaled by superintendent					
	Subtotaled by foreman					
7C	How are the costs of individual incidents kept? How often are they reported internally?	Yes	No	Monthly	Quarterly	Annually
	Costs totaled for the entire company					
	Costs totaled by project					
	Subtotaled by superintendent					
	Subtotaled by foreman/general foreman					
7D	Does your company track non-injury incidents?	Yes	No	Monthly	Quarterly	Annually
	Near Miss					
	Property Damage					
	Fire					
	Security					
	Environmental					
8.	**Personnel**					
List key health and safety officers planned for this project. Attach resume (CV and qualification).						

Name	Position / Title	Designation	
		Category	SACPCMP Number

Contractor Safety Questionnaire

9. References

List the last three company's your form has worked for that could verify the quality and management commitment to your occupational Health & Safety program

Name and Company	Address	Telephone Number