Annexure I

Construction Management Plan

CONSTRUCTION MANAGEMENT PLAN

For: TNPA, Port of Mossel Bay

Project Name: Rehabilitation of the Ship Repair Facility

Project Number: XMB.E.0005

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Client: Port Engineer

Project Sponsor: Port Manager

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Contents

1. BACKGROUND AND CONTEXT

The Port of Mossel Bay has an approximately 85year old end haul type slipway currently installed, the original design capacity of the slipway being 500Ton (long). The existing cradle is made from wood and is supported by a 3-way system. The cradle was originally constructed as a 42m long structure but had a section cut-off around 10years ago, reducing its effective length to 35m.The timber cradle, when fully extended into the water, straddles two wooden lead-in jetties on either side of it. Both jetties are approximately 62m long and supported on wooden piles.

Figure 1: Existing slipway facility at the Port of Mossel Bay

The slipway was originally designed for accommodating side slipping, where vessels are brought to land on the main cradle and then shifted of the main cradle to either side of it. Some of the side slipping infrastructure, like the upstand concrete beams, are still present at the site. Side slipping has however not been practiced at the slipway for the last 50years at least. The Port of Mossel Bay has clarified that it intends to undertake side slipping activities in future.

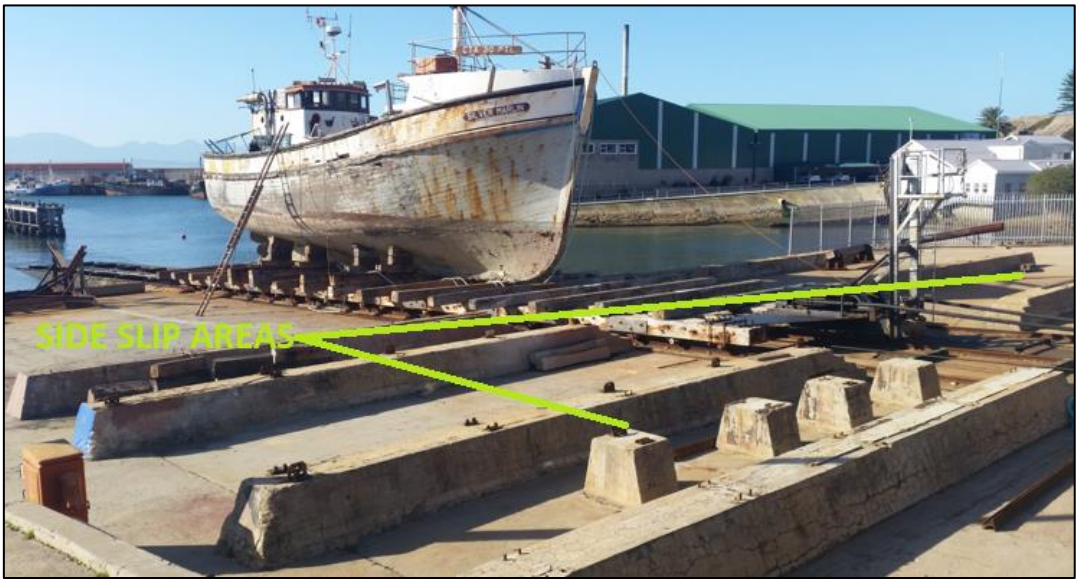


Figure 2: Side Slips either side of the main cradle

Due to poor condition of the slipway, the vessel handling capacity was downgraded to the current 200Ton. The lead-in jetties are also in a poor condition, with major deterioration of both the pile supports and superstructure. There is particular concern that any impact by vessels could result in a catastrophic structural failure of the jetties.

There is also an operations building on the site that was constructed at the same time as the slipway. The building is old, of outdated construction and does not meet the Port's future operational requirements.

Figure 3: Slipway operations building

To align with the Transnet National Port Authorities', Market Demand Strategy (MDS) and to meet the burgeoning demand from industry the TNPA initiated the project;

"UPGRADES OF EXISTING SHIP REPAIR FACILITIES AT THE PORT OF MOSSEL BAY" aimed at investigating, identifying and completing the activities required for the following:

- Remediation and improvement of the slipway facility back to original design capacity
- Construction of new lead-in jetties
- Implementation of side-slipping activities and the construction of all infrastructure required to support it
- Modernisation and retro-fit of the existing operations building
- Upgrade, expansion and modernisation of the slipway electrical reticulation network

2. INTRODUCTION

This Construction Management Plan (CMP) provides an overview of the following:

- Scope of work
- Construction methods
- Management of the construction
- Procurement
- Quality management

3. SCOPE OF WORK

The scope of works shall be broken down into the following work packages:

- M1 – Cradles and Associated Items
- C1 – Site Civil Works
- S1 – Site Structural Works

- B1 – New Operations Building (This package is for the complete building and includes all multi-disciplinary engineering requirements)
- E1 – Site Electrical

The Works include the planning, procurement, offloading, material and equipment handling, storage, fabrication, equipment refurbishment, engineering, detailing, main and sub-assemblies, tolerance machining, welding, bolting, jig fabrications, production, corrosion protection, rigging, trial fitting, marking, packing, transportation, installation, punch listing, cold and hot commissioning, trial operation, handover and project management of the following:

M1 WORK PACKAGE

- Main Cradle including sheaves, rolling element assemblies and wooden chock blocks
- Docking Arms and collapsible vessel supports complete with all sub-assemblies
- Side Slip Cradles including rolling element assemblies and wooden chock blocks
- Uphaul, Downhaul and Side slip cradle winches complete with steel wire ropes, drives, support structures, actuating mechanisms, control panels etc.
- All rails, associated fixing elements and stainless steel sole plates with rubber pads under the rails that together form the complete rail assemblies above and below water level
- Wire rope supports, complete
- All mechanical components for the stormwater management and recycling system
- Demolition of old lead-in jetties
- Corrosion Protection
- Commissioning, Testing and Handover

E1 WORK PACKAGE

- New site wide low voltage reticulation upgrades excluding equipment requirements within the new operations building

- New site wide medium voltage reticulation upgrades excluding equipment requirements within the new operations building if applicable

C1 WORK PACKAGE

- Stormwater, sewer, accesses, driveways, fencing, earthworks etc.

S1 WORK PACKAGE

- Remediation of existing structural infrastructure site wide
- Extension of slipway deck
- New construction of structural works throughout the slipway site excluding those associated with the new Operations building

B1 WORK PACKAGE

- All works comprising the complete new operations building including architectural requirements, civil/structural, electrical and mechanical works

4. LOCATION OF AND ACCESS TO THE WORKS

The slipway is located at the Mossel Bay Harbour. The Chart Datum for Mossel Bay is 0.233m below Mean Sea Level. The approximate coordinates of the slipway are S-34°10’59.05” and E22°08’45.78”.

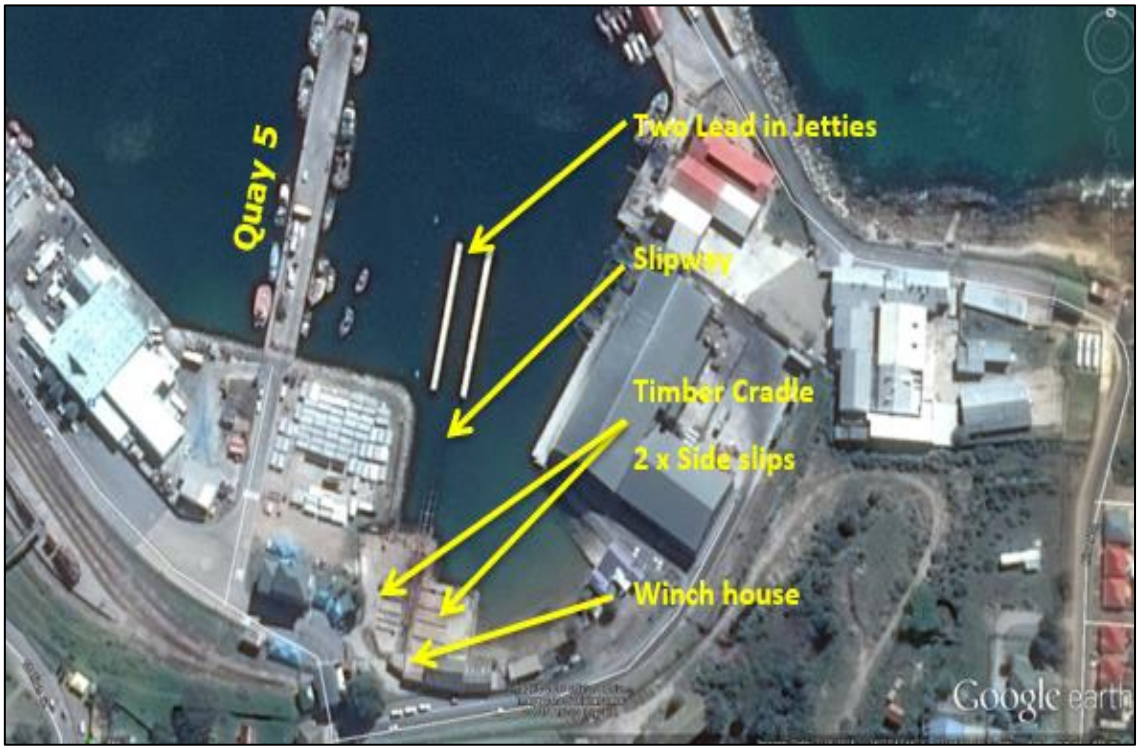


Figure 4: Location of the slipway at the Port of Mossel Bay

Access to the works is from existing public road networks and roads internal to the Port of Mossel Bay. Access will be subject to Transnet National Ports Authority security and safety requirements and regulations

Due allowance must be made for any potential delays arising from vehicular congestion due to the large number of trucks entering the Port facilities.

The Contractor, its employees and its sub-contractors shall be required to complete a full induction from TNPA before being allowed on the site.

5. SITE CONDITIONS

Site conditions are generally as follows:

- Altitude: At sea level
- Ambient temperature: 15-22 °C

- Relative humidity: Frequently 100%
- Air pollution heavily saline; industrial and locomotive fumes;
- General wind velocities: Up to 60 km/h
- Storm wind velocities: Up to 180 km/h

6. OWNERS OBJECTIVES

The Owner, TNPA, through the execution of this project aims to realise the following objectives:

- Take ownership of a slipway facility that is rated to handle a 508Ton metric capacity on the main cradle
- Incorporate side slipping activities at the facility
- Remove the existing lead-in jetties, thus freeing up space and minimising obstructions within the Port
- Extend the lifespan of existing facility infrastructure to be able to meet an operational life requirement of 20years, subject to intensive planned maintenance
- Install new equipment at the site that will give the facility a design life for new installations of at least 20years
- Build a new operations building for housing the slipway management and operations team that is ‘fit for purpose’
- Construct a water recycling system at the facility to reuse and ultimately conserve water consumption at the facility
- Install new electrical equipment into the network to improve it and expand its operational capability
- Ensure compliance of the new and existing electrical infrastructure with relevant Codes and Standards
- Increase the reliability of the facility
- Increase the utilisation of the facility
- Increase the revenue generated by the facility
- Provide a facility to TNPA customers that is modern, efficient and safe

The slipway is a multi-platform operational facility and as such, TNPA aims to achieve minimal downtime of the slipway facility over the duration of the project. Thus, the

completion of the Works shall be carefully planned and executed in order to align with the Employers aim of minimal facility downtime.

7. APPLICABLE STANDARDS

The latest editions and/or revisions of the following:

- BS: British Standards
- ISO: International Standards Organisation
- SANS: South African National Standards
- IEC: International Electro-Technical Commission

8. APPLICABLE CODES

The following codes form part of this document:

- BS 8007 – Water Retaining Structures
- SANS 1200 A – General
- SANS 1200 AH – General (Structural)
- SANS 1200 G – Concrete
- SANS 1200 H – Structural Steel
- SANS 2001-CC1 – Construction works – Part CC1: Concrete Works (Structural)
- SANS 2001-CS1 – Construction works – Part CS1: Structural Steelwork
- SANS 10100-1 – The structural use of concrete Part 1: Design
- SANS 10100-2 – The structural use of concrete Part 2: Materials and execution of work
- SANS 10144 – Detailing of steel reinforcement for concrete
- SANS 10160 – Basis of structural design and actions for buildings and industrial structures
- SANS 10162-1 – The structural use of steel Part 1: Limit-states design of hot-rolled steelwork
- SANS 10162-2 – The structural use of steel Part 2: Cold-formed steel structures
- SANS 10400 – The application of the National Building Regulations
- Lloyd's Register Rule finder 2015 – Version 9.24

- BS EN 14492-1:2006 – Power driven winches
- BS 6349-3: 2013 – Maritime works
- BS EN 15427: 2008 – Rail applications
- BS EN 13674-1 – Rail applications - Track
- BS EN 12385-1 – Steel wire ropes
- SANS 10142 -1 - Code of Practice for the wiring of premises.
- SANS IEC 60614 (1) - General requirements of conduits.
- SANS 61035 - Installation of Conduit Fittings.
- SANS IEC 61084 - Electrical Installation Ducting & Trunking Systems.
- SANS 1507 & 1574 - PVC Insulated Single Core Voltage Conductors.
- SANS 1464 and IEC 598-1 - Mounting & Positioning of Luminaries.
- SANS 10114 - Code of Practice for Artificial Interior Lighting.
- SANS 1973/61439 - Distribution Boards.
- SANS 1973-1 - Low voltage switchgear & control gear.
- SANS 10313 - Code of Practice for the Protection of Structures against Lightning.
- Occupational Health & Safety Act 85 of 1993.
- The Local Authority by-laws and any special requirements for the district concerned.
- Local Fire Regulations.
- National Building Regulations
- SANS 10142-1 Code of Practice for the wiring of premises.
- Machinery and Occupational Safety Act.
- Standard Building Regulations

9. CONSTRUCTION STRATEGY

The confines and the operational nature of the site as well as the Works to be completed justify the combination of the multidisciplinary engineering work into a single supplier appointment that shall be executed by a single Contractor. Individual work packages (M1, C1, S1, E1 and B1) shall be included and managed within the single contract. The Contractor awarded to complete the Works must have its own workshop that is fully outfitted as a heavy industrial fabrication workshop inclusive of all required metal working machinery and cranage. The bulk of the works involve metal fabrication and expertise in

metal working and installations, as such the chosen Contractor shall display its expertise in such fields.

The operations building is a large facility housing both the winch drive room as well as a fabrication workshop. There is multi-disciplinary engineering works required within the building like:

- Mechanical – Wet Services, HVAC and Fire Protection
- Electrical – Small Power, Lighting
- Electronics – Access Control, Data, CCTV
- Structural
- Civil – Stormwater and Sewage, Fencing, pavements and accesses

Due to the complexity of the operations building, the chosen Contractor shall display its technical experience and expertise in the construction of large and complex buildings, with experience of building within Port confines, a notable advantage. The structural and electrical elements of the Works, though smaller in respect of scope and monetary value (compared with the metal fabrication work) is complex and as such, even if the Contractor does not have in-house resourcing to undertake these scope elements, it is deemed acceptable for the Contractor to sub-contract this work to specialists. The benefit of contracting with a single entity for the Works completion will be realised in the project and construction management of the project, where the project is expected to benefit from the single point of management contact and responsibility.

10. CONSTRUCTION PHILOSOPHY

The slipway is a multi-platform operational facility, with various stakeholders, especially individual and fleet vessel owners, constantly requiring the services of the slipway. It is thus of particular importance that the impact of the construction works on the slipway operations be minimised. In addition, the fishing season durations have to be factored into the project scheduling as the slipway is busiest in the period just following the end of the seasons. The scheduling of the project is thus expected to have two distinct phases:

- Workshop Fabrication – This is expected to last for the first 5months of the project. During this phase, the Contractor's focus must be on procurement and on metal fabrication off-site at the fabricator's workshop. Items identified as long lead, particular emphasis on cradle wheel sets and electrical components, must be placed on order as soon as possible after contract award and the Contractor must show TNPA proof of order. In the Contractor's workshop, jigs shall be fabricated for the repetitive fabrication and assembly of the cradle's individual bogeys and the bogey's individual subassemblies. The quantity of wheels, around 600off, will likely result in weekly or bi-weekly deliveries to the Contractor's workshop in order to meet timing requirements. To save time and double handling the wheel assembly stations must be precisely equipped and bogey structures must be assembled to the point that wheels can be assembled quickly onto them. The activities expected to begin in the first 5months are as follows:

    - Procurement of materials (steelwork, rails, cradle wheels, wire ropes)
    - Procurement of all winches
    - Workshop fabrication of cradles
    - Procurement of items for stormwater management and recycling system (pumps, piping, valves etc.)
    - Procurement of electrical equipment
    - Relocation of staff and equipment to the newly completed administration building
    - Demolition of the existing operations building
    - Begin construction of the new operations building
    - Begin construction of new substation
    - Structural concrete repairs that won't interfere with operations

- Site Works – During this phase the slipway shall be completely shut down, it is expected that this phase shall last for a period of 12months. During the 12 month shut period of the slipway, the following activities will be completed:

- Demolition and removal off-site of existing cradle, winch, rails and fixings above and below water level
- Repairs to existing concrete beams
- Rebuild of new slipway beams below water
- Demolition of Lead-in jetties
- Construction of new anti-tilt beams
- Construction of catchment trap wall
- Construction of new side slips
- Installation of new rail sole plates, rails and fixings
- Installation of new main and side slip cradles and sheaves
- Installation of new uphaul, side slip and downhaul winches
- Complete construction of new substation building
- Demolition and Installation of new electrical equipment
- Complete construction of new operations building
- Commissioning
- Punch list the Works
- Commissioning
- Trail operation under TNPA supervision
- Handover

11. CONSTRUCTION ORGANISATION

The Contractor's team must address the construction needs of:

- Project Management
- Planning and Scheduling
- Engineering
- Construction Management
- Quality Control
- Health and Safety

- Environmental management

Thus the Contractors management team must be comprised as a minimum, of the following individuals:

- Project manager
- Site / Construction manager
- Construction Supervisor
- Planner
- Quality controller
- Health and safety officer
- Environmental control officer

12. CONSTRUCTION METHODOLOGY

The cradles are designed as modular bogey units which to a large degree facilitates and necessitates the application of substantial prefabrication activities.

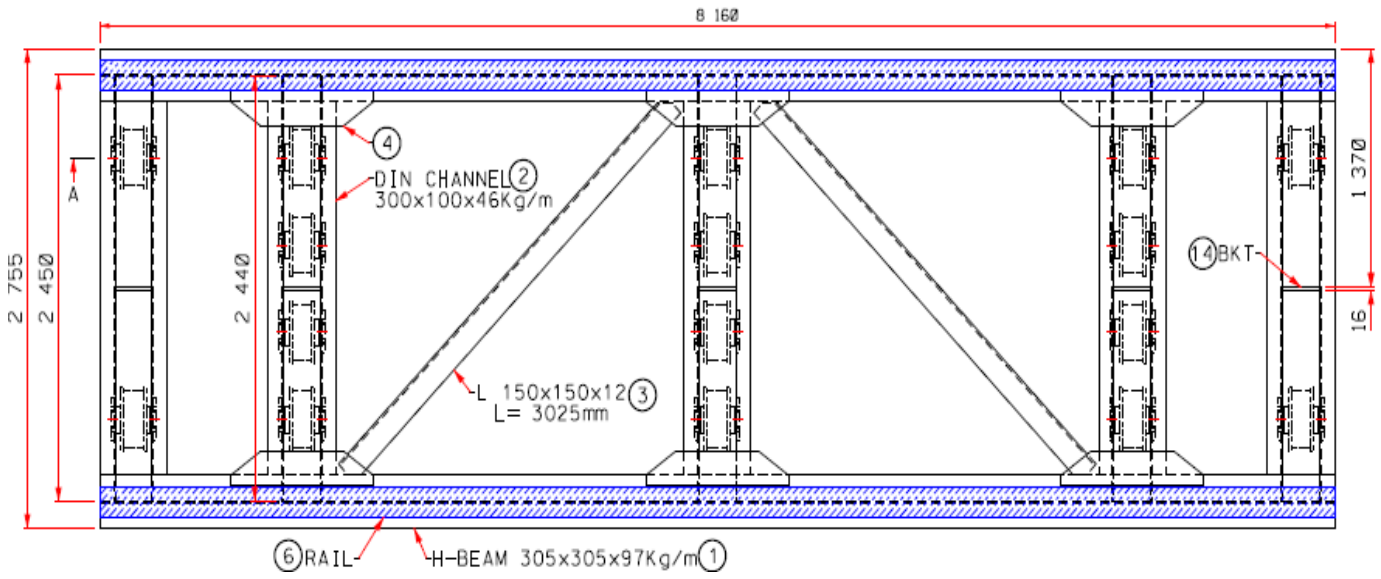
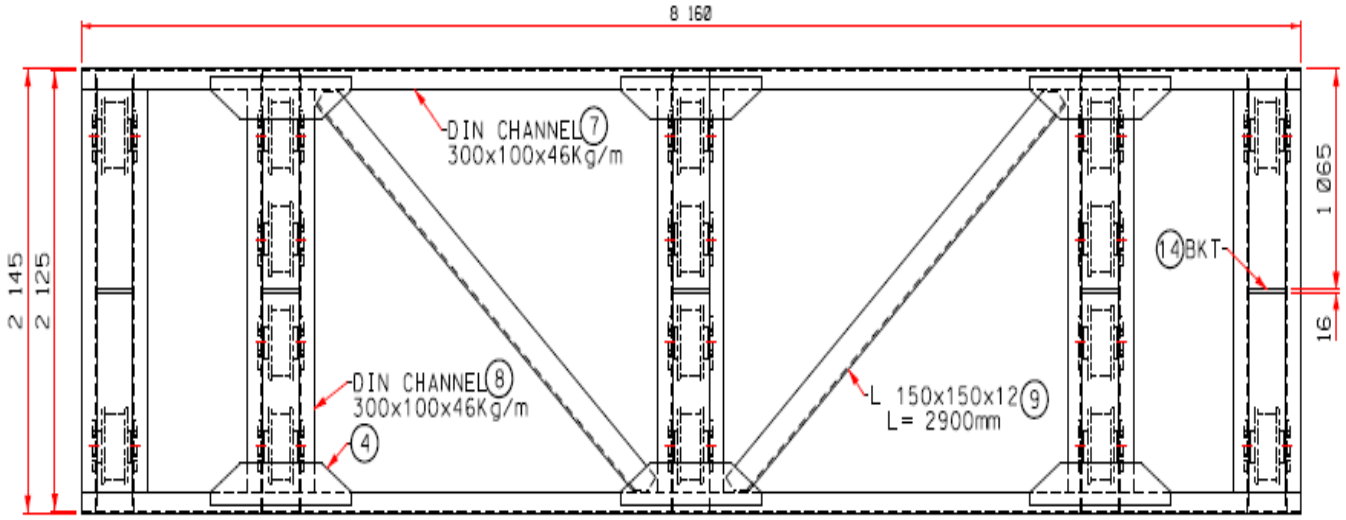


Figure 5: A-Type bogey



PLAN VIEW OF BOGEY B

Figure 6: B-Type bogey

The cradles are designed to be largely repetitive in fabrication sequence and assembly and are sectionalised to conform to road transport requirements. The individual components forming the bogeys are repetitive, this is especially the case for the plating, gussets, doublers and various stiffeners. These items can be very efficiently produced by the production technique of CNC and laser cutting. Template files for the profile cut parts will be supplied to the Contractor. The Contractor shall, via the construction of accurate jigs, be able to assemble the bogeys efficiently, accurately and with a high degree of repeatability.

Acknowledging the straddle width of the slipway and the length of the bogey sections, it is expected that at least, a 200Ton mobile crane shall be needed to lift these sections into place. The other bogey sections vary around 10Tons, requiring a 100Ton crane to lift them. Various other site works are expected to require the use of a 50Ton crane. A schedule of the crane requirements is presented below.

CRANE CAPACITY	DURATION ON SITE
1. 200Ton	5days
2. 100Ton	1month
3. 50 Ton	12months

13. INFRASTRUCTURE AND TEMPORARY SERVICES

The Contractor shall advise and supply any special plant, materials, equipment or other infrastructure that it requires to successfully execute the project. These shall include site office accommodation for the Client's Representative.

14. SITE PROJECT CONTROLS AND REPORTING

The Contractor's site management team, described in section 11, shall be responsible for the implementation of all project controls and reporting as stipulated by the NEC form contract. These may include:

- Cash-flow projections
- Construction schedule updates
- Progress reports
- Risk register management
- The Contractor`s various discipline leads shall report individually to TNPA.

15. COMMUNICATIONS

All contractual communications from the Contactor shall be documented especially those that require decisions or outcomes. The communications must always have the TNPA Project Manager in copy.

16. QUALITY

16.1. Definitions

TERM, ABBREVIATION	MEANING
Data	All drawings/documents/information required to be supplied under the Contract
Data Pack (DP)	A compilation of manufacturing data, certification, inspection and testing records prepared by the Supplier/Contractor to verify compliance with the Contractual requirements.
Employer	For the purposes of this document, the term Employer has the same meaning as applied to the term Client.
Field Inspection Test (FIT)	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 Supplier/Contractor by the Employer advising release of the Materials for shipment. This does not relieve the Supplier/Contractor of its obligations in accordance with the Terms and Conditions of the Contract.
Inspection Waiver Report (IWR)	A document issued to the Supplier/Contractor by Employer advising that the Employer has waived final inspection for the materials listed in this document. The issue of this Report does not preclude further inspection by Employer, is issued without prejudice and does not relieve the Supplier/ Contractor from the guarantees and obligations included in the Contract
Project Quality Plan (PQP)	A document that outlines the Supplier/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 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 (TQ)	This refers to a document used by the Supplier/Contractor to formally clarify a Technical Query related to the scope of supply. This should not be used where a non-conformance has already been initiated.

16.2. Applicable Documents

16.2.1 General

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

16.2.2 Statutory Regulations

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

16.3. Quality System

16.3.1 General

The Supplier/Contractor shall be 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 Work in accordance with the requirements of this Specification, and the Supplier/Contractor's PQP and QCP's once reviewed and approved by the Employer.

The Supplier/Contractor shall ensure that all Sub-Suppliers/Sub-Contractors also conform with the requirements of this Specification.

16.3.2 Supplier/Contractor Quality System Requirements

The Supplier/Contractor shall have, maintain and demonstrate its use to the Employer, it's documented Quality Management System. The Supplier/Contractors Quality Management System should be in accordance with the International Standard ISO 9001. The Supplier/Contractor shall submit its Quality System documentation to the Employer at the time of tender and at Contract Phases as detailed below:

- Project Quality Plan

- Quality Policy
- Index of Procedures to be used
- Programme of internal and external audits

16.3.3 Supplier/Contractor Documentation Requirements

The Supplier/Contractor shall develop and maintain a comprehensive register of documents that will be generated throughout the project, and shall include all quality related documents. The register shall be submitted to TNPA for review.

The Employer, TNPA, shall indicate those documents required to be submitted for information/review and/or acceptance and this shall be indicated in the Supplier/Contractors' Document Register. The register shall indicate the dates of issue of the documents taking into account sufficient time to allow TNPA review/acceptance cycle prior to the document being required for use.

16.4. Quality Assurance

16.4.1 Project Quality Plan

Where specified, the Supplier/Contractor shall submit a PQP to TNPA within 28 days after the Contract start date. The PQP shall detail how the Supplier/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 Supplier/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 Supplier/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 / coordination of QA / QC activities

- Include a listing of all Quality Control Plans (QCP's), and associated Field Inspection Checklists (FIC's), as applicable

- Identify in the Project Quality Plan any Sub-Supplier/Sub-Contractor work. Sub-Supplier/Sub-Contractor plans shall be approved by the Supplier/Contractor, and a copy forwarded to the TNPA

- Include the proposed Authorised Inspection Authority (where applicable - for pressurised equipment and systems)

- Include a schedule of 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 Supplier/Contractor is required to provide a PQP, no work shall commence until the PQP is approved by the Employer, TNPA.

16.4.2 Procedures

The Supplier/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 Supplier/Contractor shall submit copies of Quality Procedures for review. In addition, the Supplier/Contractor shall ensure that copies of all Procedures relevant to the Scope of Work are available for reference by TNPA at each work location. These will include the following:

<u>Document Control</u>

The Supplier/Contractor's Project Quality Plan shall provide a description of how Supplier/Contractor and Sub-Supplier/Sub-Contractor documents 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.

Design Control

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

Procurement

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

Supplier/Contractor Audits

The Supplier/Contractor shall:

- Carry out audits in accordance with its Quality System at its own and Sub-Supplier/Sub- Contractor's facilities to ensure project quality requirements are being achieved
- Include a QA Audit Schedule in the Supplier/Contractor PQP submitted to TPT prior to commencement of the Scope of Work. The Audit Schedule shall include all audits to be implemented by the Supplier/Contractor and Sub-Supplier/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 shall be submitted to TNPA at the completion of each Audit. Where unsatisfactory performance is evident, additional audits shall be performed by the Supplier/Contractor as directed by TNPA

16.4.3 Inspection and Testing

The Employer, TNPA, may, at its discretion perform surveillance inspection at the Supplier/Contractor's premises, Sub Supplier/Sub-Contractor's premises or at the location of the Scope of Work. Dependent on the nature of the Scope of Work and the frequency of inspections, TNPA may elect to have inspection personnel resident at the place of manufacture, fabrication, or assembly.

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

The Supplier/Contractor shall provide TNPA with all necessary tools, calibrated measuring equipment, safety equipment and workspace to verify or witness tests in progress.

While TNPA is at the Supplier/Contractor's premises, the Supplier/Contractor shall provide, free of charge, reasonable facilities including office facilities and reasonable access to a telephone, facsimile machine and computer connection point. The Supplier/Contractor shall provide notice in writing in within a time frame as agreed upon, to allow the attendance of TNPA and other representatives at nominated witness and hold points.

16.4.4 Special Processes

It is the Supplier/Contractor's responsibility to ensure that all processes which require prequalified procedures and/or work methods are tested and qualified before work begins. This typically covers such activities as welding, non-destructive testing, special fabrication techniques and painting. Unless specified such procedures are the Supplier/Contractor's responsibility and do not require submission to TNPA before work begins. When such procedures are requested, no work shall commence until procedures are approved by TNPA.

It is the Supplier/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 Supplier/Contractor and made available to TNPA when requested.

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

Welding Procedures

Where the Supplier/Contractor's Scope of Work includes fabricated weldments, Welding Procedure Specifications (WPS) defining the method, preparation and sequences to be adopted to achieve satisfactory welded joint shall be provided for all weld types required in the execution of the Supplier/Contractor's Scope of Work. The procedure shall only be submitted to TNPA when requested in the Contract.

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

When requested in the Contract a suitably marked "weld map" shall be completed by the Supplier/Contractor for all items to be fabricated. A summary of WPS shall be prepared and when used, shall be identified on the weld map. Where TNPA approval is required, fabrication shall not commence until written approval of WPS and Welding Procedure

Qualification Records (WPQR) is received by the Supplier/Contractor. No welding fabrication will be accepted that is not covered by a TNPA approved WPS/WPQR.

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When requested in the Contract a suitably marked "weld map" shall be completed by the Supplier/Contractor for all items to be fabricated. A summary of WPS shall be prepared and when used, shall be identified on the weld map. Where TNPA approval is required, fabrication shall not commence until written approval of WPS and Welding Procedure Qualification Records (WPQR) is received by the Supplier/Contractor. No welding fabrication will be accepted that is not covered by a TNPA approved WPS/WPQR.

Welding Procedure Qualification (WPQ) tests may be witnessed by TPT and/or an independent inspection authority. Testing of the specimens prepared during the WPQ Tests shall be carried out by an independent approved testing laboratory independent of the Supplier/Contractor. In certain instances, a certificate to EN 10204 3.1 B may be required. Where actual weld deposit analysis and weld metal physical properties are required for procedure qualification, the information shall be taken from the procedure qualification tests. Data listed in the catalogues of the manufacturer of welding consumables is not acceptable.
Welders/welding operators shall be qualified in accordance with the relevant welding code prior to commencing production fabrication. Specific Welder Qualifications (WQ's) records will be reviewed by TNPA in the Supplier/Contractor's works. A register of welders qualified to work shall be maintained by the Supplier/Contractor.

16.5. 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.

16.6. Non-Conforming Products

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

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

- If the Supplier/Contractor discovers material or product which is not in accordance with the requirements of the Contract, i.e. a non-conformance (NCR), the Supplier/Contractor shall promptly initiate the non-conformance procedure in terms of the Supplier/Contractor's Quality Management System, advise TNPA promptly, and provide a copy of the NCR to TNPA

- If TNPA or its agent identifies a non-conformance an NCR may be raised

- Originals of all closed out NCR's shall be included in the DP

<u>Corrective and Preventative Action</u>

If the Supplier/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 TNPA whose decision on the proposal shall be obtained in writing before the nonconforming 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 Supplier/Contractor following discussion and agreement with TNPA.

Technical Queries

For clarification of technical issues (only), Supplier/Contractor may submit a Technical Query (TQ) to TNPA in accordance with the Contract.
The TQ shall clearly identify all elements of the query, and all supporting documentation and/or drawings shall be attached where appropriate.
Completed original TQN's shall be included in the DP.

16.7. Quality Records

Supplier/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 Supplier/Contractor during the project, and be provided to TNPA at the times, and in the quantities specified in the Contract. The Supplier/Contractor shall collate all quality records in the DP and submit the DP to TNPA 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 Supplier/Contractor's DP including the quality records from Sub-Supplier/Sub-Contractors have been reviewed and accepted by TNPA. The DP shall be compiled progressively during the execution of the Scope of Work and shall be made available for review by TNPA as required.

16.8. Quality Control Plan

The QCP shall be approved by the Engineer and shall conform to the requirements of ISO 9001 (2000) and shall incorporate the following as a minimum:

16.8.1 A detailed organisation chart;

16.8.2 A list of Subcontractors;

16.8.3 A list of the applicable quality assurance procedures;

16.8.4 A list of applicable Codes and Standards for design, construction, inspection and tests;

16.8.5 The Contractor's inspection plans;

16.8.6 Any Subcontractor's inspection plans;

16.8.7 Provisional programmes for expediting Works to be executed by Subcontractors;

16.8.8 Procedures to manage the non-conformance of Plant and Materials

16.8.9 An audit schedule for Contractor/Subcontractor activities.

The QCP shall indicate Hold Points and Witness Points proposed by the Contractor. The Engineer will determine, in consultation with the Contractor and the Employer, and notify the Contractor, the Hold Points and Witness Points to be witnessed by the Engineer and/or the Employer.

The Taking-Over Certificate shall not be issued to the Contractor until all the Hold Points on the QCP have been witnessed and approved by the Engineer and/or Employer as required.

The Contractor shall be responsible for updating the QCP regularly throughout the Contract. The QCP shall be required to demonstrate compliance with the requirements of the Contract.

The Engineer shall be entitled to audit any aspect of the QCP and details of all procedures and compliance documents shall be submitted to the Engineer for information, before each design and execution stage is commenced. When any document of a technical nature is issued to the Engineer, evidence of the prior approval by the Contractor itself shall be apparent on the document itself.

The Contractor shall maintain the Contractor's Data Book for the Works at all times, and the Contractor's Data Book for the Works shall be made available to the Employer at all times during the Contract for review and approval by a Third Party Inspector.

17. HEALTH, SAFETY AND ENVIRONMENT

The Contractor shall comply with all applicable health, safety and environmental regulations and requirements for all persons entitled to be on the Site.

The Contractor shall be responsible for the precautions and measures to ensure the health and safety of all individuals on the Site and temporary areas (if applicable) outside of the Site, but utilised by the Contractor, with the prior approval of the Employer.

This shall also include any areas that may adjoin those areas or otherwise be affected or potentially endangered by the Works. The Contractor shall be responsible for the adequacy, stability and safety of all Site and Temporary Areas operations, methods of construction, all Contractor's Equipment, Temporary Works and structures.

The Contractor shall provide and/or install for all necessary safety protection equipment (e.g. rotating parts guards, hot surface insulation/guards, railings) and necessary Contractor's Personnel, in accordance with the applicable legislation in South Africa, including the Occupational Health and Safety Act (1993) of South Africa. The Contractor shall take special note of the requirements of the Construction Regulations, 2003.

The Contractor shall comply with the Employer's Environmental Management Plan Requirements.

The Plant's noise level shall be less than 85 dBA when measured at any point further than three metres from the source(s) of the noise.

The Contractor performs the Works and all construction activities within the Site and Working Areas in accordance with the provisions of the specification Standard Environmental Specification (SES), Project Environmental Specifications (PES) and specification Construction Environmental Management Plan (CEMP)

The Contractor ensures that its SubContractors comply with the requirements of the CEMP.
The CSHEO submits daily, weekly and monthly checklists as required by the CEMP to the ProjEM.

The CEMP is:

a. Contractor's Declaration of Understanding.
b. Environmental method statements for construction operations.
c. Materials handling, use and storage.
d. Re-vegetation and rehabilitation.
e. Environmental closure certificate.
f. Environmental inspections and audits.
g. Environmental alignment meetings.

The roles and responsibilities of the various personnel acting on behalf of the Project Manager and who communicate directly with the Contractor and his key persons with respect to the CEMP and environmental issues are:

a. The Construction Manager (CM) is responsible for environmental management on the Site and Working Areas and reports to the Project Manager with specific tasks to.
b. Implementing the Employer's CEMP.
c. Monitor *Contractor*'s compliance to the CEMP.

The Project Environmental Manager (ProjEM) is responsible for ensuring that the *Contractor* complies with the CEMP and acts on behalf of the Project Manager.

The Project Environmental Officer (ProjEO) reports to the PSSM and ProjEM, conducts the day-to-day tasks to ensure that the *Contractor* complies with the CEMP and acts on behalf of the Project Manager.

18. COMMISSIONING AND HANDOVER

Definitions

"Commissioning" is performed by the Contractor in presence of the Engineer to demonstrate successful installations, Works and functionality

"TESTING" is performed by the Contractor on its own to satisfy himself and to establish the "readiness" for commissioning.

"Test Runs" are performed by the Employers operational team in the presence of the Contractor were all functions shall be vigorously tested.

"Performance Test" is a fixed duration of continuous operation in which the Plant / Equipment shall perform without malfunction. This test is performed by the Employers operational team, - with or without the presence of the Contractor. The Equipment / Plant shall be tested to its Design Capacity.

"Endurance Test" a variant of the Performance test, - normally done at a lower rate than the Design Capacity but with extended Duration (up to 72 to 100hrs continually) were the equipment must perform without fault and malfunctions.

"Hand Over" a formal certificate issued for the continuous use in operation of plant and equipment at the successful passing of the Performance Test.

The Contractor is responsible for completing all testing associated with and required for the successful commissioning and handover of the works. The TNPA shall witness and approve of such testing should the testing meet the predefined acceptance and performance criteria. The Contractor shall supply all necessary tools, plant, equipment and materials required to fully complete all commissioning activities.