PART C3: SCOPE OF WORK

Document reference	Title	No of page
	This cover page	1
C3.1	*Employer's* Works Information	
C3.2	*Contractor's* Works	
	Total number of pages	

C3.1 *EMPLOYER'S* WORKS INFORMATION

Contents

SECTION 1

1 Description of the works

1.1 Executive overview

Transnet National Port Authority's Head Office have recently relocated from Parktown, Johannesburg and Kingsmead, Durban offices to Port of Ngqura's eMendi Building. The eMendi building was commissioned in April 2017, however there was some outstanding scope that couldn't be done due to budget constraints.

With the relocation of the TNPA head office to the Port of Ngqura (eMendi building), an opportunity has presented itself to maximise the occupancy potential of the building through a reconfiguration of the office space.

The project scope entails a full Structural analysis and design of the proposed expansion of the additional floors and Building alterations. The Contractor's scope shall include the design, supply, installation, and commissioning of Electrical, Civil, structural and Mechanical Engineering works as detailed under the project's scope of work and floor plans.

1.2 *Employer's* objectives

The *Employer*'s objective is to maximise the occupancy potential of the Emendi building through reconfiguration of the office space, to ensure it is fit for use and accommodates the new capacity of the Port and HQ employees.

1.3 Scope of Works

The *Contractor* shall propose deliverables to achieve the required *scope of work* for acceptance by the *Employer*. The *Contractor* shall propose the skilled staff to be formally mobilised to ensure that the deliverables of this project are met. The Building is currently fully occupied and used as offices, the *Employer* and the *Contractor* shall agree the interface particulars as and when applicable. The sequencing and phasing out of the works will be agreed with the successful *Contractor*. All *Owners'* team representatives shall be consulted prior to commencement of each task order. All relevant policies and *procedure* documents shall be made available to the *Contractor* upon request. The Scope of work for this project includes the scope for Architecture, Structures, Electrical, Civil and Mechanical Engineering.

The *Employer* shall provide concept layouts of the proposed work areas. The *Contractor* shall therefore undertake full design responsibility for the total design solution of the new recreational facilities, Electrical and Mechanical works. The main parts of the works which the *Contractor* is to undertake shall be the Detailed Design phase and Execution phase deliverables. The *Contractor* shall submit all detailed design drawings to *Employer* for acceptance prior to execution of the works. The Contractor's ECSA registered engineering designers shall approve all design drawings and documentation prior submission to the *Employer*.

1.3.1 Architecture *Scope of Work*

Read in conjunction with the latest version of the Architectural Layouts

The various work packages / work areas have been coded as per below and clearly marked on the floor plans.

1.3.1.1 BASEMENT

(REFER TO DRAWING XHOE0006-1-100-A-LA-0001-01)

Work Area B2.1 - CONVERT STOREROOM TO REGISTRY

- Design Supply & Install the required security gates and access control systems as well as the appropriate fire extinguishers.

Work Area B2.2 - CONVERT STOREROOM TO RECORDING STUDIO

- Supply & Install soundproof drywall partitions (up to slab above) with 1X 1000X1000mm view panel as indicated on the layout.
- Supply and install 6m2 drywall to box in services.
- Supply and install 12m2 acoustic cladding panels.
- Supply and install access floor (200 high) and ramp as indicated on the layout.
- Supply and install 2X 900 wide soundproof (solid) doors
- Supply and install acoustic ceiling tiles.
- Allow for skimming and painting of all walls.
- Make good screed and supply and install non-static carpet tiles with acoustic underlay throughout.
- Allow for HVAC – provide sound dampening suitable for recording studios.
- Allow for 9 network points.
- Allow for changes to lighting – allow for 8 fittings.
- Allow for a total of 5 plug points (wall boxes).
- Allow for 6 plug points (floor boxes in access floor).
- Allow for 4 plug points (wall boxes in ceiling void).
- Allow for signage to match existing.
- Allow for access control.
- Allow for appropriate fire extinguishers.

Work Area B1.1 - CONVERT OPEN MEZZANINE TO LIBRARY

- Design, Supply & Install glass partitions including 2 x 900 single glass doors, from floor to ceiling, to match existing Shopfronts in building.
- Allow for signage to doors, to match that on existing doors
- Allow for access control
- Allow for appropriate fire extinguishers
- Make good to affected floors walls and ceiling
- Allow for additional ceiling bulkhead to accommodate HVAC
- Allow for alteration to Electrical, HVAC and Fire Layouts
- Removal of all the existing balustrades in the identified work areas and storing them at a designated TNPA site.

1.3.1.2 GROUND FLOOR

(REFER TO DRAWINGS XHOE0006-1-200-A-LA-0001-01 and XHOE0006-1-200-A-LA-0002-01)

Work Area 0.1 - CONVERT ELWANDLE AUDITORIUM TO WORKSPACE

- Remove ceiling to ensure no damage to services.
- Remove divider panels with system and track.
- Blank off / disconnect all necessary building services.
- Demolish brick walls as indicated on the plans.
- Supply & install dry wall partitions as per layouts.
- Design, Supply & Install glass partitions including 900mm wide single glass doors, from floor to ceiling, to match existing Shopfronts in building.
- Allow for privacy film / decals
- Re-commission all services and install new ceiling
- Install new carpet tiles.
- Install timber screens at the kitchen area to match others in the building.
- Replace prep bowl with kitchen sink.
- Allow electrical point for Hydroboil above sink.
- Allow for alteration to Electrical, HVAC and Fire Layouts
- Allow for alteration to Access Control Systems
- Allow for signage to doors, to match that on existing doors
- Make good to affected floors walls and ceiling
- Allow for A/V fit-out in boardroom
- Allow for additional office furniture to match existing open plan furniture (as per TNPA guidelines to used).

Work Area 0.2 - CONSTRUCT OFFICES IN EAST WING EXHIBITION SPACE

(REFER TO DRAWINGS XHOE0006-1-200-A-LA-0001-01 and

XHOE0006-1-200-A-LA-0002-01)

- Supply & Install drywall partitions as indicated on the layouts.
- Design Supply & Install glazed shopfront partitions and glazed aluminium single doors
- Remove floor tiles and prepare screed for carpet tiles.
- Install new carpet tiles to match existing (40m2)
- Allow for privacy film / decals
- Allow for signage to doors, to match that on existing doors
- Make good to affected floors walls and ceiling
- Allow for alteration to Electrical, HVAC and Fire Layouts
- Allow for additional office furniture to match existing open plan furniture (as per TNPA guidelines).

Work Area 0.3 - CONVERT OPERATION CENTRE TO WORKSPACE

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- TNPA to remove all equipment before work can commence.
- Remove raised (access) floor and support structure for equipment.
- Make good other affected floors, walls, and ceilings.
- Install new carpet tiles in affected areas.
- Allow for alteration to ICT, Electrical, HVAC and Fire Layouts.
- Allow for privacy film / decals
- Allow for signage in passage and to doors, to match existing signage in the building
- Make good other affected floors, walls, and ceilings
- Allow for additional office furniture to match existing open plan furniture (as per TNPA guidelines).

Work Area 0.4- CONSTRUCT OFFICES IN CANTEEN SEATING AREA

(REFER TO DRAWINGS XHOE0006-1-200-A-LA-0001-01 and XHOE0006-1-200-A-LA-0003-01)

- Remove floor tiles and prepare floor for carpet tiles.
- Supply & Install drywall partitions as indicated on the layouts.
- Design Supply & Install glazed shopfront partitions and glazed aluminum single doors.
- Allow for privacy film / decals.
- Allow for signage to doors, to match that on existing doors.
- Make good to affected floors walls and ceiling.
- Allow for alteration to Electrical, HVAC and Fire Layouts
- Allow for additional office furniture to match existing open plan furniture (as per TNPA guidelines).

Work Area 0.5 - CONSTRUCT MEETING ROOM AND OFFICES IN CANTEEN KITCHEN AREA

(REFER TO DRAWINGS XHOE0006-1-200-A-LA-0001-01 and XHOE0006-1-200-A-LA-0003-01)

- Remove all floor and wall tiles and make good all affected walls and floors.
- Remove ceiling to decommission and remove extractors and other services.
- Blank off / disconnect all necessary building services.
- Demolish brick walls as indicated on the plans.
- Supply and install drywall partitions as per the layouts.
- Design Supply & Install glazed shopfront partitions and 900mm wide single and 1600mm wide double glazed aluminium doors.
- Install new ceiling to match existing.
- Allow for alteration to Electrical, HVAC and Fire Layouts
- Make good to affected floors walls and ceiling
- Allow for privacy film / decals
- Allow for signage to doors, to match that on existing doors
- Allow for additional office furniture to match existing open plan furniture (as per TNPA guidelines to be issued).

Work Area 0.6 – REPLACE DRYWALL WITH SHOPFRONT IN WEST WING OFFICE AREA

- Demolish existing drywall as indicated on the layout
- Design Supply & Install glazed shopfront partitions including 1500mm wide glazed aluminium double door.

Work Area 0.7 - CONVERT RECREATION AREA TO NEW CANTEEN

(REFER TO DRAWINGS XHOE0006-1-200-A-LA-0001-01 and XHOE0006-1-700-A-LA-0001-01)

- Extend the recreational facility adjacent the Admin Building.
- Masonry work: Design and construct kitchen addition (as guided by TNPA drawings to be issued)
- Design and construct concrete roof for kitchen.
- Design and construct concrete surface bed for the kitchen.
- Allow for floor drains in the kitchen.
- New kitchen walls to be tiled full height (ceramic tiles)
- Allow for design and installation of ELECTRICAL, HVAC (including extraction) and FIRE services associated with restaurant kitchens.
- Convert small room at end of walkway to toilets
- Brick up existing windows where indicated
- Allow for porcelain floor tiles
- Allow for ceramic wall tile up to 1200mm and 600mm high splashbacks
- Allow for design and installation of new services in other areas, where deemed necessary.
- Move existing manhole at proposed kitchen.
- Move existing gulley (drain) and grease trap.

- Design and construct external seating area (as guided by TNPA drawings) complete with steel roof, planter boxes, paved floor, etc.
- Extend curved steel roof over the BBQ area.
- Close off the newly roofed area to match existing shopfronts.
- Service / Repair existing sliding doors in glazed shopfront.
- Make good to affected floors walls and ceiling.
- Decommissioning of clashing services.
- Relocation of services where necessary.
- Allow for alteration to Electrical, HVAC and Fire Layouts
- Design and construct 100m long covered walkway from Office front door to new canteen (as guided by TNPA)

Work Area 0.8 – REMOVE (DEMOLISH) MASONRY PLANTERS IN THE LOBBY TO ALLOW FOR MEETING PODS

(REFER TO DRAWING XHOE0006-1-200-A-LA-0002-01)

- Demolish existing brick walls (built-in seats) as indicated on the layout
- Make good all affected floors and prepare screed for carpet tiles.
- Install new carpet tiles to match existing

Work Area 0.9 – CHANGE FLOOR FINISH

- Remove floor tiles and prepare screed for carpet tiles.
- Install new carpet tiles to match existing (54m2)

1.3.1.3 FIRST FLOOR

(REFER TO DRAWING XHOE0006-1-300-A-LA-0001-01)

Work Area 1.1 - CREATE PASSAGE AT OPEN PLAN OFFICE OPPOSITE WEST WING KITCHEN

- Design Supply & Install glass partitions including 1,5 double glass doors, from floor to ceiling, to match existing Shopfronts in building.
- Allow for signage to door, to match that on existing doors
- Allow frosted decals on all glazed sections
- Make good to affected floors walls and ceiling
- Allow for alteration to Electrical, HVAC and Fire Layouts

Work Area 1.2 - CONVERT OPEN SPACE TO MEETING ROOM (EAST WING)

- Design Supply & Install glass and drywall partitions including 900mm wide glass door, from floor to soffit, to match existing Partitions and Shopfronts in building.
- Allow for signage to doors, to match that on existing doors
- Allow frosted decals on all glazed sections
- Allow for new carpet tiles (remove tile floor)
- Make good to affected floors walls and ceiling

- Allow for alteration to Electrical, HVAC and Fire Layouts

Work Area 1.3 - ENCLOSE EXISTING OPEN PLAN OFFICE OPPOSITE EAST WING KITCHEN

- Supply & Install drywall partitions including 900mm wide single glass door, from floor to ceiling, the door to match existing Shopfronts in building.
- Make good to affected floors walls and ceiling
- Allow for alteration to Electrical, HVAC and Fire Layouts

Work Area 1.4 – SEPARATE WORK AREAS IN WEST WING OPEN PLAN AREA

- Supply & Install drywall partitions between columns as per layout.
- Allow for alteration to Electrical, HVAC and Fire Layouts

Work Area 1.5 – SEPARATE WORK AREAS IN WEST WING OPEN PLAN AREA

- Supply & Install drywall partitions between columns as per layout.
- Allow for alteration to Electrical, HVAC and Fire Layouts.

1.3.1.4 SECOND FLOOR

(REFER TO DRAWING XHOE0006-1-400-A-LA-0001-01)

Work Area 2.1 - ENCLOSE EXISTING OPEN PLAN OFFICE (WEST WING)

- Design Supply & Install glass partitions including single glass door, from floor to ceiling, to match existing Shopfronts in building.
- Allow for signage to door, to match that on existing doors
- Allow frosted decals on all glazed sections
- Make good to affected floors walls and ceiling
- Allow for alteration to Electrical, HVAC and Fire Layouts

Work Area 2.2 - ENCLOSE EXISTING OPEN PLAN OFFICE (EAST WING)

- Design Supply & Install glass partitions including 1500mm wide double glass door, from floor to ceiling or u/s beams, to match existing Shopfronts in the building
- Allow for signage to door, to match that on existing doors
- Allow frosted decals on all glazed sections
- Make good to affected floors walls and ceiling
- Allow for alteration to Electrical, HVAC and Fire Layouts

Work Area 2.3 - ENCLOSE EXISTING OPEN PLAN OFFICE (EAST WING)

- Design Supply & Install glass partitions including 1500mm wide double glass door, from floor to ceiling, to match existing Shopfronts in building.
- Allow for signage to door, to match that on existing doors
- Allow frosted decals on all glazed sections
- Allow for new carpet tiles (remove tile floor)
- Make good to affected floors walls and ceiling
- Allow for alteration to Electrical, HVAC and Fire Layouts

Work Area 2.4 - NEW MEETING ROOMS (WEST WING)

- Design Supply & Install glass partitions including 900mm wide single glass doors, from floor to ceiling, to match existing Shopfronts in building.
- Allow for drywall partition between rooms as indicated on the plan.
- Allow for signage to door, to match that on existing doors.
- Allow frosted decals on all glazed sections.
- Allow for new carpet tiles (remove tile floor)
- Make good to affected floors walls and ceiling.
- Allow for alteration to Electrical, HVAC and Fire Layouts.

Work Area 2.5 - DEMOLISH DRYWALL AND MAKE GOOD (EAST WING)

- Demolish drywall partition between rooms as indicated on the plan.
- Make good to affected floors walls and ceiling.
- Allow for alteration to Electrical, HVAC and Fire Layouts.

1.3.1.5 THIRD FLOOR

(REFER TO DRAWING XHOE0006-1-500-A-LA-0001-01)

Work Area 3.1 – DIVIDE EXISTING OFFICE AREA INTO A SINGLE OFFICE AND A KITCHEN

- Supply and install drywall partition as indicated on the layout.
- Design Supply & Install kitchen cupboards to match those in green areas of similar size.
- Provide electrical points for Fridge, Microwave and Hydroboil.
- Allow for water connection to fixtures.
- Allow for core drilling floor and connection drainage to closest stacks.
- Allow for boxing in of pipes finished with floor tiles.
- Allow for new floor finish to match that of other kitchen areas
- Allow for new wall finishes to match that of other kitchen areas.
- Make good to affected floors walls and ceiling
- Allow for alteration to Electrical, HVAC and Fire Layouts

Work Area 3.2 - ENCLOSE EXISTING OPEN PLAN OFFICE

- Design Supply & Install glass partitions including 1500mm wide double glass door, from floor to ceiling or u/s beams and balustrade to u/s beams, to match existing Shopfronts in building.
- Allow for signage to door, to match that on existing doors
- Allow frosted decals on all glazed sections.
- Allow privacy film to the passage door leading to the gym.
- Make good to affected floors walls and ceiling
- Allow for alteration to Electrical, HVAC and Fire Layouts

1.3.1.6 FOURTH FLOOR

(REFER TO DRAWING XHOE0006-1-600-A-LA-0001-01)

Work Area 4.1 - ALTER EAST WING OFFICE AREA

- Supply & install new 900mm wide single glass door in passage to match existing Shopfronts in building.
- Make good to affected floors walls and ceiling.
- Allow for alteration to Electrical, HVAC and Fire Layouts.

Work Area 4.2 - ALTER AREA IN FRONT OF EAST WING OFFICE AREA

- Design Supply & Install glass partitions including single glass door, from floor to ceiling, to match existing Shopfronts in building.
- Allow for signage to door, to match that on existing doors
- Allow frosted decals on all glazed sections
- Allow for new carpet tiles (remove tile floor)
- Make good to affected floors walls and ceiling
- Allow for alteration to Electrical, HVAC and Fire Layouts

Work Area 4.3 - ALTER CE SECRETARY'S OFFICE TO INCLUDE BODYGUARD's CUBICLE

- Alter the glass shopfront to include an additional glass door as indicated on the layout
- Allow for mobile screen between desks
- Allow for signage to door, to match that on existing doors
- Allow frosted decals on all glazed sections
- Make good to affected floors walls and ceiling
- Allow for alteration to Access Control Systems.

Work Area 4.4 - SWITCH GEAR ROOM AND WIND LOBBY

- Supply & Install fire rated drywall and 900mm wide single fire door in the switch room
- Install new carpet tiles in the switch gear room work area
- Make good to affected floors walls and ceiling
- Allow for additional Electrical and HVAC
- Allow for alteration to Electrical, HVAC and Fire Layouts / Systems

Temporal Kitchen

The *Contractor* shall provide a Container that will be used as a temporal Kitchen/Canteen during the Construction period. The container to have the following, as minimum specifications:

- Size: 6m long
- Electrical power connection
- Deep fryers x 2
- Connection and space for the existing cooldrinks fridge
- Warmers – at least 4 (four)

- Water tank (about 50L)
- A sink
- Shelve(s) – to display snacks
- Worktop – for serving, till-point, etc.
- Weather protection (sun and rain) in front of container queuing space. Keep strong winds in mind.

1.3.2 Structural Engineering *Scope of work*

Contractor is required to contract a registered Professional Civil/ Structural Engineer or Professional Technologist for the detail design of recreational centre area and associated works including relocation of existing manholes, integration with other designs, monitoring and sign offs and close-out documentation of the civil/ structural works for the duration of the project. The engineer does not have to be full time on site but is required to ensure that, the work being executed by the *Contractor* is in line with the *Employers* scope of works and meet the *Employers* requirements.

The requirements for the structural design of the eMendi Alteration's project to be carried out by the *Contractor* shall include the following:

Design, supply and install of all structural elements required for the roof extensions and additions indicated for work area 0.7 on the architectural concept layouts.

It is to be noted that all Structural Engineering works and designs are to be signed off by registered personnel (Pr. Tech/Pr. Eng.).

1.3.3 Controls and Instrumentation(C&I) Scope of Work

The *works* to be carried out by the *Contractor* shall make provision for security systems, and ICT. These systems are to be interfaced with the Emendi building existing security and ICT systems.

The engineering scope and requirements shall be limited to the following scope:

- Provision of Access Control System
- Provision of closed-circuit television (CCTV)
- Provision of ICT local area network (LAN) points and Wi-Fi
- Provision of RFID system

The systems design requirements are indicated below:

1.3.3.1. Access Control System design

General

- Access control system portal hardware shall be selected based on TNPA physical security operational philosophies, threat level requirements and TNPA Security Building Specification.
- Provision for lockable access control door
- During power outages and emergency situations-controlled doors must unlock automatically and open. When power is restored, these shall reset back to normal operational positions.

Lockable access control door

- Entry and exit biometric readers
- Break-glass unit for exit during emergency
- Door monitors embedded Maglock to lock and monitor door status.

RFID System

- Provide the RFID System for book tracking at the library.

1.3.3.2. CCTV

General

CCTV hardware and software shall be compatible equal to the existing system used at the building.

Fixed position and fixed focus cameras shall be used in rooms that needs monitoring, and it is important that should an event occur it is viewed in real time or recorded.

The equipment selection shall conform to Transnet ICT Equipment Standardization Specification.

Surveillance

The indoor dome CCTV cameras shall produce sharp, detailed, and stable images on the monitor in sufficient detail to provide positive identification of individuals within the storage room under all conditions of light. The new indoor dome CCTV cameras shall be integrated to the existing security system.

Indoor dome CCTV cameras shall be monitored and controlled from an existing central control room.

1.3.3.3. ICT design requirements

General

- The ICT system shall facilitate, Where applicable, office automation (networked printing).
- The ICT data network shall connect to Transnet National Port Authority (TNPA) corporate network.
- Multi-functional devices (MFD) shall be cabled to the ICT infrastructure network. The MFD shall have 2 data connections.

- The ICT equipment shall be protected from physical and environmental threats in accordance with Transnet ICT Physical and Environmental Security Standard.
- The design and deployment of hosts on the Transnet network shall conform to the Transnet Network Security Standard.

Wired Network

- Network wiring shall comply with EIA/TIA-568.
- Separation from electrical wiring and pathways shall be according to EIA/TIA-569
- Ethernet Cable (RJ 45) shall be connected to an existing Hub Ethernet Port.

Wireless Network

- The Wi-Fi Access Points shall be installed where required
- The Wi-Fi Access Points shall be powered through power over ethernet (PoE)

Video and Teleconferencing

- To provide for Digital Signage system where required.

1.3.3.4. Acronyms and abbreviations

C&I acronyms and abbreviations a are summarised in the following table:

Abbreviation	Description
ACS	Access Control System
PoE	Power over Ethernet
ICT	Information and Communications Technology
C&I	Control and Instrumentation
CCTV	Closed Circuit Television
TNPA	Transnet National Port Authority
LAN	Local Area Network
MFD	Multi-Function Device

1.3.4 Civil Engineering scope of work

- *Contractor* is required to contract a registered Professional Civil/ Structural Engineer or Professional Technologist for the detail design of recreational centre area and associated works including relocation of existing manholes, integration with other designs, monitoring and sign offs and close-out documentation of the civil/ structural works for the duration of the project. The engineer does not have to be full time on site but is required to ensure that, the work being executed by the *Contractor* is in line with the *Employer's* scope of works and meet the *Employers* requirements. The works to be carried out by the *Contractor* shall include:

(REFER TO DRAWINGS XHOE0006-1-200-C-LA-0001-01)

The Civil *scope of works* focuses on the proposed extension of the Recreation centre building and all associated civil services in the basement floors as indicated on the conceptual Architectural layouts. The comprehensive scope shall include the design and construction of Civil services, as listed below:

- Decommissioning of services clashing with building footprint (extension side):
    - Septic tank.
    - Communications and electrical manholes.
    - Grease traps.
    - Sewer Rodding Eyes.
- Relocation of services and adjusting manhole covers:
    - Communications and Electrical manholes.
- Design of new services, where deemed necessary:
    - Consolidated stormwater management system.
    - Sewer lines and manhole to accommodate proposed ablution block, tying into existing system.
    - New rodding eye and gullies where necessary.
- Detection of existing services.
- Allow for new service markers to match existing.
- Verify if the existing services can carry increase capacity.
- Water reticulation network to tie into existing.
- Earthworks:

- Making shortfall in material through provision of engineered layer works.
- Saw cutting, removal, and reinstatement of existing pavement structure (Asphalt) in sections of the parking lot where necessary to allow for installation of new services.

- Updating as-built information
- Demolition, removal/blocking and covering up of all floor drains located in basement as instructed by the *Employer's Agent* and/or as indicated in drawings.

It is to be noted that all Civil Engineering works and designs are to be signed off by registered personnel (Pr. Tech/Pr. Eng.).

1.3.4.1 Standard of Work, Equipment, and Materials

All equipment and material 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 Employer at all reasonable times.

Adapt facilities (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.*

1.3.4.2 Specifications

The design shall be undertaken using the latest revision of applicable SANS and other relevant standard specifications. The Contractor shall employ a registered Professional Engineer to review and sign off all design documents and drawings submitted to the Employer for approvals. The design shall be such that it is built by others to satisfy the functional and serviceability requirements and be cost-effective and safe. Sound Engineering judgment shall be exercised in applying

these criteria to the system and its components. The *Contractor* shall communicate with the *Employer* to coordinate all designs.

The following publications and specifications (latest edition) shall apply:

SANS 10400	The Application of the National Building Regulations
SANS 2001-DP4	Sewers
SANS 2001-DP7	Sewers for buildings
SANS 2001-CC2	Concrete Works (Minor works)
SANS 1850	The design and manufacture of commercial kitchen extraction/ventilation systems
SANS 2001-CM1	Masonry Walling
SANS 2001-DP1	Earthworks for Buried Pipelines and Prefabricated Culverts
SANS 2001-DP2	Medium Pressure Pipelines
SANS 2001-DP3	Cable Ducts
SANS 2001-DP5	Stormwater Drainage
SANS 1200-M	Road (general)
SANS 1200-MH	Asphalt Base and Surfacing
SANS 1200-MJ	Segmented Paving
SANS 1200-MK	Kerbing and channeling
SANS 1200-MM	Ancillary roadworks

1.3.5 Mechanical Engineering *Scope of work*

1.3.5.1. *Employer's* Design

The *Employer* makes available the drawings and specifications needed to successfully complete the Works.

- Conceptual HVAC designs for the addition work to accompany the current HVAC system for ground, first, second, third, fourth and fifth floor of the main administration building, as well as for the additional outside canteen building and surrounding structures, associated with the works.
- Conceptual water reticulation design for additional water supply points for outside canteen building and surrounding structures, associated with the works.
- Conceptual fire protection & detection systems design, for outside canteen building and surrounding structures, associated with the works; and
- The technical specification of all mechanical plant associated with the works for the above mentioned.

1.3.5.2. The *works* to be carried out by the *Contractor*:

- *Contractor* is required to contract a registered Professional Mechanical Engineer or Professional Technologist for the design, integration with other designs, monitoring, commissioning, and close-out documentation of the mechanical works for the duration of the project. The engineer does not have to be full time on site but is required to ensure that, the work being executed by the *Contractor* is in line with the *Employers* scope of works and meet the *Employers* requirements. The works to be carried out by the *Contractor* shall include:

    - ○ Design, supply, and install, test and commission of addition ducting, and/or modification of current ducting, as per The Employers concept design for all current and addition HVAC equipment and the works associated with such equipment and designs. The *Contractor* shall complete modifications as per the architects and mechanical drawings. Any partitioning done in the Architects drawings, which do not include any mechanical concept drawings, shall be accommodated in the design, supply, install, testing and commissioning of new and modified HVAC system. Where possible the Contractor shall reposition and reuse, refurbish, and test and commission the current equipment to fit the new partitioning.

- The design, supply, installation, testing and commission of the ventilation system, including but not limited to, ducting, air filters, dampers, return and supply air diffusers/grilles, and all other supporting air terminals, as per The Employers concept design. Any partitioning done in the Architects drawings, which do not include any mechanical concept drawings, shall be included in the above design, supply, installation, testing, and commissioning for all current and addition systems. Ventilation shall be designed as per SANS ventilation standards. The Contractor shall verify whether current supply and extract air fans can accommodate additional volumetric flow rate and pressure added to the system, design, supply, installation, testing and commission of upgraded ventilation fans shall be carried out by The *Contractor*, if required and all associated work.
- The Contractor shall evaluate the current canteen extraction system and hood. They shall where possible reuse said system in the installation of the new canteen which will be outside of the main administration building. The Contractor shall provide all recommendation and evaluations to the Employers Engineers for confirmation. If deemed reusable, the Contractor shall refurbish, install, test and commission the extraction system and hood into the newly constructed canteen kitchen. If deemed unusable the contractor shall design, supply, install, test and commission and new kitchen extraction system for the newly constructed canteen.
- The design, supply, installation, testing and commission of the pipe network for the refrigeration lines and all associated work of the air conditioning system. The *Contractor* is to ensure all addition equipment install is of the same OEM as the current system installed in the building, as to avoid compatibility issues within the BMS currently installed in the building
- The design, supply, installation, testing and commission of all air conditioning equipment, as depicted on The Employers concept design, including but not limited to additional 4-way cassette unit, concealed

ceiling air conditioning units, heat recovery units and outdoor air condition units. The *Contractor* is to ensure the correct heating and cooling is determined and for each addition area, as per The Employers conceptual designs. The *Contractor* shall assess whether there is addition capacity on the current system to accommodate addition heating and cooling load of new equipment, if not, the *Contractor* shall make provision as per The Employers concept design and install addition heat recovery units as well as addition outdoor units. The *Contractor* is to ensure all addition equipment install is of the same OEM as the current system installed in the building, as to avoid compatibility issues within the BMS currently. Any partitioning done in the Architects drawings, which do not include any mechanical concept drawings, shall be included in the above design, supply, installation, testing, and commissioning for the air conditioning system.

- The *Contractor* shall ensure that all new air-conditioning equipment and ventilation equipment being installed, be integrated into the existing BMS system.
- The Contractor shall, design, supply, install, test, and commission an independent acoustic sensitive ventilation and cooling system for the work area B2.2 as depicted on the Employers drawings. This system shall not exceed the 25 decibels sound level as described in 2007 AHSHRAE Handbook – HVAC Applications – Chapter 47 – Table 42: Design Guidelines for HVAC – Related to Background Sound in Rooms, for Drama theatres, concert hall and recital halls. The Contractor shall ensure that on completion the entire room with all systems on does not exceed the sound level mentioned above.
- The *Contractor* shall evaluate, design, supply, install, test and commission of the current fire detection system, provision is to be made for any new, including but not limited to, smoke detectors, heat detectors, manual call points, sirens, which are required due to the additional partitioning, and shall connect any addition equipment to the current addressable fire panel. The *Contractor* shall ensure that the new Canteen on the outside of the main

building and all its equipment be connected to the main buildings fire panel, with its own zoning, and all associated works.

The Contractor shall evaluate, design, supply, install, test, and commission the current smoke extraction system for the main admin building, and that of the new proposed canteen area, as per The Employers conceptual drawings, which is located outside of the main building and all associated works. The *Contractor* shall evaluate, design, supply, install, test, and commission of the sprinkler pipe network within the main building due to all partitioning withing Architect's drawings. The *Contractor* is to ensure that current sprinkler system complies with ASIB, and that if meets the requirements of all partitioning within the building associated with The Employers conceptual designs. The *Contractor* shall evaluate where it is possible to expand the main buildings sprinkler system, to the newly proposed canteen on the outside of the building, if viable, The *Contractor* shall design, supply, install, test and commission the additional sprinkler system into the newly proposed canteen, and all associated works.

- The new HVAC system must be connected to the fire detection system and the two systems must be integrated into the existing BMS system.
- The Contractor shall design, supply, install, test and commission any additional water reticulation system and all associated works required for such system, in requirement of SANS, to suit the designs by the Employees architect.

1.3.5.1. South African National Standards

Standard No.	Description
NFPA 13	Standard for the Installation of Sprinkler Systems
SANS 10252	Water supply and drainage for buildings Part 1 and Part 2
SANS 10400-T	The application of the National Building Regulations Part T: Fire protection
SANS 10400-O	The application of the National Building Regulations Part O: Lighting and ventilation
SANS 10139	Fire detection and alarm systems for buildings - System design, installation, and servicing
SANS 1200HC	Corrosion Protection of Structural Steelwork

SANS 1200 L	Medium Pressure Pipeline
SANS 10400	The Application of the National Building Regulations
SANS 659:2007	Cold water - Copper
SANS 1545	Safety rules for the construction and installation of lifts
SANS 4344	Steel wire ropes for lifts – minimum requirements
SANS 347: 2012	Categorization and conformity assessment criteria for all pressure equipment
SANS 32/SANS121	Hot Dip Zinc (galvanised) Coatings
SANS 10254: 2017	The Installation, maintenance, replacement, and repair of fixed electric storage water heating systems
SANS 10139: 2012	Fire detection and alarm systems for buildings
SANS 10064	The preparation of steel surfaces for coating
SANS 763	Hot-dip (galvanised) zinc coatings
SANS 1091	National colour standards for paint
SANS 5493	Code of practice for protective coating of iron and steel structures against corrosion
SANS 10400 XA	Energy usage in buildings
SANS 1910	Portable refillable fire extinguishers
SANS 543	Fire hose reels
SANS 10400W	The application of the National Building Regulations Part W: Fire installation
SANS 1200 LB	Bedding (pipes)
SANS 10142	Code of Practice for the Wiring of Premises.
SANS 10147	Code of Practice for Refrigeration and air-conditioning installations
SANS 10173	Code of Practice for the installation, testing and balancing of air conditioning duct work
SANS 1387:2009	galvanized mild steel, medium weight
SANS 62	Pipes suitable for threading and of nominal size not exceeding 150 mm
SANS 1186	Standard signs and general requirements

SANS 1128-1:2010	Components of underground and above-ground hydrant systems
SANS 1461	Major hazard installation - Risk assessments

Other Specifications

Specification No.	Description
Government Notice	Pressure Equipment Regulations, 2009
	The General Electrical Specification for the Provincial Administration of the Republic of South Africa Part 2E
	The Municipal Fire Regulations.
	The Municipal by laws and any special requirements of the Supply Activities of the area or district concerned.
	The Occupational Health and Safety Act No 85 of 1993

1.3.5.2. Testing and Commissioning

The *Contractor* shall provide a detailed testing and commissioning plan which shall be approved by the Project Manager prior to the start of any testing and commissioning activities. This includes the factory and site acceptance testing.

- The Commissioning of each system is done in accordance with the following high-level procedure:
- All work is inspected by The *Contractor* to ensure all defects are identified and rectified. The *Contractor* informs the Employer of all defects identified and the remedial action taken.
- Once the defects identified by The *Contractor* have been rectified, The *Contractor* and the Supervisor shall jointly inspect the Works. Any further defects shall be recorded and categorised according to the following:
- Defects that are urgent and require immediate attention to enable testing and commissioning to be completed
- Defects that can be rectified after Commissioning
- Items that are out of scope and require approval to be implemented
- The *Contractor* and the Supervisor shall jointly inspect once all identified defects have been rectified
- The Project Manager notifies The *Contractor* that commissioning may proceed.
- A safety review is held with the *Contractor*, Supervisor, Project Manager, and necessary experts for the system being commissioned.

- Each system and item of major equipment is thoroughly checked using an accepted pre-commissioning check list.
- Functionality is checked for all items under no load conditions.
- Once all checks are complete and functionality confirmed, the system is started under test conditions and then put into operation
- *Contractor* rectifies all further defects identified during the commissioning process and previously identified defects including approved compensation events.
- The Contractor and the Supervisor shall jointly inspect once all identified defects have been rectified.
- The *Contractor* shall invite the Employers Engineer for all testing and commissioning activities at least 2 weeks prior to the start of the activities. the employers engineer must be present for all testing and commissioning activities

1.3.5.3. Mechanical Engineering Scope:

The *Contractor* shall ensure that the scope is read in conjunction with the conceptual drawings provided by The Employer.

- The *Contractor* shall design, supply, deliver, install, test and commission and handover the upgrade of the automated and manual firefighting system and signage that will include, but is not limited to, the addition of new fire extinguishers, piping, valves, fire equipment signage, emergency and safety signage and all emergency evacuation plans, as required due to SANS and local legislation in accordance with The Employers drawings.
- The *Contractor* shall perform an analysis to determine the possibility of the extension of the fire sprinkler system from main building to that of the new outside building, if deemed viable, The *Contractor* shall design, supply, deliver, install, test and commission and handover the extension of the fire sprinkler system and all associated works. The *Contractor* shall ensure that the extension of said sprinkler system is ASIB approved.
- The *Contractor* shall design, supply, deliver, install, test and commission and handover cold water reticulation system that will supply water to all additional taps, sinks, washbasins, wash troughs, toilets and urinals, and hot water kitchen storage systems as depicted on the employer's drawings. The *Contractor* shall design, supply, install, test and commission and handover all supporting infrastructure required for all mechanical works. Including but not limited to all structural supports

for the fire and potable water reticulation systems regarding, thrust blocks, and anchoring down supports for the pipeline or bridges, plant bases or plinths, plant supports and fixings for all equipment. This is to be informed by water hammer analysis and thrust block restraint design

- The *Contractor* shall conduct flow and pressure analysis on all existing water tie in points to ensure sufficient flow and pressure requirements are met to comply to SANS and local regulations. This shall include the flow and pressure on both the potable water lines as well as the manual and automatic fire suppression systems
- The *Contractor* shall supply, install, test and commission and handover all control and actuation systems; MCC panels and Electrical Distribution Boards required for the mechanical Plant; and Electrical work including connection to power isolators, wiring between switchboards, unit mounted sensors, control devices, etc. and wiring between controllers and remote sensors, remote set point adjusters, etc.
- The *Contractor* shall supply, install, test and commission and handover all painting and corrosion protection of Plant.
- The *Contractor* shall, supply, deliver, install, test and commission and handover HVAC system, to meet SANS, ASHRAE and local Legislation, in accordance with the Employers drawings submitted. Which include, all ducting, fans, filters, and air terminals for the fresh air supply to the building, and all auxiliary works which are associated. This shall include all air-conditioning equipment for the temperature control of the building, comprising of, but not limited to, 4-way cassettes, outdoor units, high static air handling units (concealed ceiling units), as well as fresh are units, heat recovery units and all controllers, and all the auxiliary works associated with the installation.
- The *Contractor* shall provide all detailed workshop and fabrication drawings, including pipe schedules, HVAC equipment and duct routing, services clashes, and weld maps for acceptance prior to the commencement of fabrication.
- The *Contractor* shall provide all as-built drawing of the current existing mechanical HVAC, Fire suppression and Detection Systems as well as the potable water systems. Following completion of the new works installed, updated as-built drawings shall be provided which indicate the newly installed equipment along with any old equipment which functions as part of the system.
- The *Contractor* shall provide a decommissioning and removal plan for current HVAC system equipment within the building which is requires removal/replacement, these

plans to be confirmed with the Employers Engineers. All old equipment, ducting, refrigerant piping, or air-conditioning units which are to be used in the new system shall be as per The Employers conceptual drawings, for areas where no conceptual drawings are provided, the Contractor shall provide conceptual drawings for The Employers Engineers to confirm.

- The *Contractor* shall ensure all drawings mentioned in the Works Information, be supplied to the Employer, in a native DWG format for use on AutoCAD software.
- Assessment and Certificate of Conformance, of existing fire sprinkler system to be completed by ASIB. The *Contractor* is to ensure that this takes place before construction, to ensure that the sprinkler system meets accepted regulatory standards. If not, it shall be brought up to acceptance by The *Contractor*. The *Contractor* shall ensure that due to addition and/or new partitioning within the current building, that the sprinkler nozzles are situated within new partitioned areas, as per ASIB/SANS requirements.
- The *Contractor* shall provide a detailed testing and commissioning plan including all FAT, SAT and Commissioning tests and activities prior to the commencement of any testing activities.
- The *Contractor* shall test and commission the systems in line with the guidelines as per the Works Information as well as the manufacturer's requirements and industry best practices.
- The *Contractor* shall provide Operation and Maintenance manuals that will include, but is not limited to, quality certificates and tests conducted during fabrication and installation, all FAT and SAT tests conducted, all commissioning documentation, detailed as built drawings and technical specifications of all plant and systems, operation methodologies and information, maintenance methodologies and information and details of spares and replacement components.
- The *Contractor* shall guarantee all installations and equipment for twelve (12) months after "practical completion" date of the completed installation, or sections thereof. This is the date confirmed in writing by the Project Manager.

1.3.5.4. General

The *Contractor* shall inform themselves with local site conditions such as safety requirements, access area available on site, type of ground, space available for on-site fabrication, storage, transport, loading and unloading facilities, scaffolding,

tackles, and tools needed, as no claims by the *Contractor*, which may arise from ignorance of the site conditions, shall be considered.

1.3.5.5. Materials and Workmanship

- The *Contractor* shall ensure all materials shall be of the quality specified and The *Contractor* shall, furnish proof that the materials are of the specified quality. The Engineer is not responsible for Quality Assurance on behalf of The *Contractor* but shall be entitled to condemn unsatisfactory work.
- The *Contractor* shall ensure all materials and equipment used for the installations shall be new and undamaged. The *Contractor* shall, if requested by the Project Manager, provide samples of material and Plant for approval. If judged necessary by the Project Manager, such samples may only be returned after the completion of the installation, to ensure that the quality of the installed product is the same as that of the approved sample
- Material for which a SABS specification exists, shall be in accordance with such a specification, and shall bear the SABS mark.
- All fire protection Plant used shall originate from suppliers which have been certified in accordance with SABS ISO 9001 (ISO 9001) or SABS ISO 9002 (ISO 9002) for Quality assurance. Copies of certificates of approval shall be provided by the tenderers with their tenders. Plant designed to BS 5446, Fire systems for residential premises, or similar other standards, are not acceptable.

1.3.5.6. Design and Drawings

- The *Contractor* shall ensure all Plant is positioned and installed in such a way as to ensure proper access for service and maintenance.
- The *Contractor* shall ensure That all control panels, wiring and components of the electrical installation comply with all application safety codes standards and regulations. All electrical works associated with the mechanical plant shall comply with the requirements of electrical works detailed in this document.
- The *Contractor* shall ensure the designs must be cost effective and energy efficient.
- The *Contractor* shall furnish details of any Plant that is other than, or different to, that specified by the Employer's Engineers, to the Supervisor for Approval by the Employer's Engineers. The *Contractor* is prohibited from installing said without the required prior authorization from the Employer's Engineers. The approval shall only apply to the selection of the type of Plant and in doing so,

the Employer's Engineers assume no responsibility or accountability for the proper functionality of Plant or associated systems designed by The *Contractor* in any way whatsoever.

- The *Contractor* shall ensure All design calculations and simulations shall be submitted to the Project Manager for acceptance by the Employer's Engineer together with the workshop Drawings. The drawings shall be submitted in PDF as well as DWG formats for all submissions. The *Contractor* shall price in the works for the submission of the calculations and drawings as well as schedule the time for acceptance of all designs and approval of plant type (should there be any deviation from the specifications).

1.3.5.7. Plant Supports, Bases and Foundations

- The *Contractor* shall design all foundations required for mechanical Plant as per the recommendations of the Plant suppliers and to comply with the requirements of the Works Information and Technical Specifications.
- The *Contractor* shall design supports, stands, hangers, and suspended platforms for equipment, tanks or other Plant as required.
- The *Contractor* shall design bases and plinths for all items of plant to comply with the requirements as specified in this document.
- The *Contractor* shall ensure that all designs of foundations, bases and plinths are compatible with the type of floor designed by the Structural Engineers and be able to tie into the floor to provide a continuous surface.

1.3.5.8. Workshop Drawings

The *Contractor* shall ensure Preparation of complete workshop drawings is the responsibility of the *Contractor*. The workshop drawings must be prepared based on:

- The *Contractor* shall ensure the latest Architect's, Structural Engineer's, Civil Engineer's and Electrical Engineer's drawings regarding co-ordination, layout, and design.
- The *Contractor* shall make use of the actual Plant offered in the Tender and Approved by the Project Manager. No work may be put in hand before the relevant workshop drawings have been reviewed by the Project Manager for

acceptance. The Employer's responsibility in this regard is limited to checking conformance with the works information and co-ordination with other disciplines where necessary This does not absolve The *Contractor* of any responsibility in terms of the contract or for errors or omissions in the shop drawings. Comments, amendments, or corrections of shop drawings are not intended to cause any variation in the cost of the work, and

- The *Contractor* shall include time in the schedule for acceptance of workshop drawings and Approval of Plant by the Employer. All workshop drawings submitted shall be signed by an ECSA registered Professional Engineer.
- The workshop drawings shall include but not be limited to the following:
- P&ID showing the entire system layout and plant details.
- Detailed drawings of all plant.
- Plant Specifications, including fixing details and materials.
- Piping schedules.
- Detailed piping drawings, including joint details and positions.
- Welding schedules and weld maps (if applicable).
- Foundation, Plinth and Base details of all plant.
- Corrosion protection specifications for all plant and materials.
- Cable schedules; and
- General arrangement drawings and component lists for electrical and controls works associated with the mechanical plant.

1.3.5.9. Builders Work Drawings

Openings

- The Contractor shall show all openings and other finishes on layout drawings in such a way as to constitute a clear instruction to others.

Plant Foundations, Bases and Plinths

- The *Contractor* shall be responsible for providing detailed Builder's Work drawings for all foundations, plinths, and plant bases as per the manufacturer's recommendations for the Plant selected.

Noise and Attenuation

- In respect of noise control and attenuation The *Contractor* shall be responsible for the selection, supply and installation of all sound attenuators, spring mounts, mass bases, flexible connections, spring hangers, etc. as

required by the *Contractor's* detailed design to comply with all relevant SANS standards and the OHS Act.

- The *Contractor* shall ensure that where ducts and pipes pass through concrete, brick or other structural members and finishes. This is achieved without transmission of noise and vibration.

1.3.5.10. Responsibilities of the *Contractor*

- Ordering of Plant and Materials
- The *Contractor* shall be responsible to ensure that the project programme is adhered to and that no delays are caused by late deliveries of Plant and materials. All other activities which must proceed placing of orders must be considered when The *Contractor* schedules his activities.

1.3.5.11. Storage of Materials and Plant

The Contractor shall be responsible for the proper storage of all materials and Plant on site to ensure protection against the elements, damage by impact, dirt, builder's rubble dust theft etc.

1.3.5.12. Protection of the Works

The Contractor shall programme his work to avoid damage by other Trades and shall be responsible for protection of the works against such damage until handover to the Client.

1.3.5.13. Accessibility

- *The Contractor shall* plan suitable accessibility for thermometers, gauges, controls, dampers, and other devices which require reading adjustment, inspection, repair removal or replacement.

1.3.5.14. *The Contractor shall* design all systems and plant positioning to enable ease of maintenance or repair and provide sufficient space for removal or replacement of plant if required. **Weather Proofing**

- All outdoor Plant shall be weatherproof and corrosion resistant including minor items such as screws fixers, brackets, etc.
- The IP rating for waterproofing of all Plant must be accepted by the Project Manager.
- In addition to the above mentioned, The *Contractor* may comment on aspects of the Employer's design with a view to improvement or cost saving but must draw to the attention of the Engineer any aspect of the design which in his view is not appropriate. The final decision and responsibility rests with the Engineer.

1.3.5.15. Alternatives and Main Offer

- The main tender price must include for the equipment specified herein, under the heading of Allowed in Tender. This does not necessarily indicate a general preference for the specified equipment but serves the purpose of ensuring that all Tenderers include for the same major equipment in their Tender Price. Generally, the specified equipment will be of the quality and in the price range, deemed appropriate for the project. All tenders, including alternatives which comply with the specification, will be considered, but not only based on price. Factors such as Client preference, track record, service facilities, and spares back-up will be considered. Where alternatives do not comply with the specification or specified equipment in full, all deviations must be listed in detail. Incidental extra costs or savings associated with alternative proposals must be shown separately to give the full cost implications of any alternative offered. If tenders are within budget, this will not exclude lower priced alternatives from favourable consideration and vice-versa.
- Any alternatives to the specifications must be highlighted by The *Contractor* and shall be submitted to the Project Manager for acceptance by the Employer's Engineer. The submission must include the detailed specification for the alternative plant and The *Contractor* shall specify if the alternative does not meet any of the minimum specified criteria in the technical specifications and drawings.

1.3.5.16. Service Conditions

- The Plant and Material shall be designed and rated for continuous operation under the following conditions.
- Ambient/Environment Conditions:
- All Plant and Material offered shall be rated for continuous operation under the following conditions:

External Conditions

Summer ambient	: 40 °C DB Maximum
Winter ambient	: -3 °C Minimum
Humidity	: as high as 86%
Altitude	: 0-1800m above sea level

Lightning conditions	Severe, with a maximum lightning ground flash density of 2.0 lashes per km2 per annum
Atmosphere	Atmosphere will be of a highly saline and dust-laden nature

Internal Conditions (air-conditioned areas)

Summer	: 22.5 °C Dry bulb – 55 % Relative Humidity
Winter	: 22.5 °C Dry bulb – 55 % Relative Humidity

1.3.5.17. Noise levels

Maximum noise levels caused by the operation of items of Plant shall comply with the OHS Act 85 of 1993 and all other regulations.

1.3.5.18. Normative References

The following publications and specifications (latest edition) shall apply where contextually correct:

In addition to the specifications, the project shall comply with the following relevant Acts and Regulations as listed below:

- Occupational Health and Safety Act 85 of 1993.
- The S.A. National Building Regulations and Building Standards Act. (Act 103 of 1977).
- South African National Standards and Codes of Practice.
- IEC Standards and Recommendations.
- International Standards and Codes – ISO, DIN, BS, ASME, ASCE, ANSI, ASTM, EU, NFPA.
- The local, provincial or S.A. Government laws in force at the time.
- Construction Regulations 2014; and
- National Heritage Resource Act (Act 25 of 1999)

The SI ("Le Systeme International d' Unites") – Metric System of Units shall apply. Refer to SANS – M33A: The International Metric System: Guide to the use of the SI in South Africa.

The *Contractor* shall additionally read the Engineering Works Information for the mechanical works in conjunction to this with the Specifications provided separately in the annexures.

1.3.6 Electrical engineering *scope* of work

The *works* that the *Contractor* is to perform includes the following:

- *Contractor* is required to contract a registered Professional Electrical Engineer or Professional Technologist for the design, integration with other designs, monitoring, commissioning, and close-out documentation of the Electrical works for the duration of the project. The engineer does not have to be full time on site but is required to ensure that, the work being executed by the *Contractor* is in line with the *Employers* scope of works and meet the *Employers* requirements. The works to be carried out by the *Contractor* shall include:

  - Design, supply and install interior Lighting.
  - Design, supply, and installation of small power.
  - Design, supply, and installation of low voltage cabling and cable way systems.
  - Design, supply and install Earthing and Lightning protection.
  - Modifications to existing Distribution boards.
  - Building Management System integration of additional equipment.
  - Testing and commissioning of the installation.
  - Supply, installation of 3 phase and single-phase power skating.

1.3.6.1. Standard of Work, Equipment and Materials

The electrical installation shall conform to the requirements of the latest edition and amendments of SANS 10142-1 Code of Practice for the Wiring of Premises Low- voltage installation and any additional requirements thereto, described in this specification.

Where the local supply authority requirements differ from those specified herein, the Transnet National Ports Authority (TNPA) electrical engineer shall be approached for a decision.

All equipment and material 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.

All equipment and material shall comply with the relevant National or International standard specifications. Where equipment does not comply, it shall be submitted to the TNPA electrical engineer for approval prior to installation.

All installation, testing and termination must be approved by the TNPA Engineer prior to commissioning.

1.3.6.2. Service Conditions

The equipment shall be designed and rated for continuous operation under the following conditions:

Altitude	0 – 1800 above sea level
Ambient temperature	-3°C to +40 °C
Relativity humidity	As high as 86%
Lightning conditions	Severe, with a maximum lightning ground flash density of 2.0 lashes per km^2 per annum
Atmosphere	Atmosphere will be of a highly saline and dust-laden nature

1.3.6.3. Electrical Conditions:

The voltage may vary within the range of 95% to 105% of the nominal and all equipment installed shall be suitably rated.

The low voltage system of supply will be three phase 400 V, 4 wire, and 50 Hz alternating current.

1.3.6.4. Lightning conditions

following conditions:

Current: The peak lightning current and its rate of rise shall be regarded as severe when Imax =200kA.

Voltage: The highest cloud potential shall be assumed to be more that 100MV, where; Q = CV, where Q is assumed at 100C and C to be 10^-7 F

1.3.6.5. Specifications.

The following publications and specifications (latest edition) shall apply:

CODES OF PRACTICE

SANS 10142-1	Code of Practice for the Wiring of Premises
SANS 10114-1	Interior lighting Part 1: Artificial lighting of interiors
SANS 10114-2	Interior lighting Part 2: Emergency lighting
SANS 10389-1	Exterior lighting Part 1: Artificial lighting of exterior areas for work and safety
SANS 10389-2	Exterior lighting Part 2: Exterior security lighting
SANS 10389-3	Exterior lighting Part 3: Guide on the limitation of the effects of obtrusive light from outdoor lighting installations
SANS 10400	The Application of the National Building Regulations
SANS 62305-1	Protection against lightning Part 1: General principles
SANS 62305-2	Protection against lightning Part 2: Risk management
SANS 62305-3	Protection against lightning Part 3: Physical damage to structures and life hazard
SANS 62305-4	Protection against lightning Part 4: Electrical and electronic systems within structures
SANS 10313	Protection against lightning - Physical damage to structures and life hazard
SANS 1063	Earth rods, couplers, and connections
SANS 10198-8	The selection, handling, and installation of electric power cables of rating not exceeding 33 kV Part 8: Cable laying and installation

SANS 10199	The design and installation of earth electrodes

1.3.6.6. Transnet Specifications

The following publications and specifications (latest edition) shall apply:

TPD-001-EL&PSPEC	Technical specification for the supply and installation of electrical lighting and power in buildings other than dwelling houses.
TPD-002-DBSPEC	Technical specification for the design and manufacturing of low voltage distribution boards.
TPD-003-CABLESPEC	Technical specification for the installation of medium and low voltage cables.
TPD-004-EARTHINGSPEC	Technical specification for the design, supply and installation of lightning protection and earthing for buildings and structures.

1.3.6.7. Electrical Engineering Scope:

a) Lighting

The *Contractor* shall supply, deliver, offload, and install recessed and surface mounted luminaires
for all the rooms with ceiling. The recessed luminaires shall be connected through individual 5A single socket outlets to isolate luminaires during maintenance.

The *Contractor* shall design, supply, deliver, and install 16A one lever light switches and light switch dimmers, similar or equal approved to Legrand Arteor. The light switches shall be installed on 4x2 PVC boxes.

The *Contractor* shall design, supply and install light fitting that are compatible with the BMS used in the TNPA Building. *Contractor* shall integrate all new installation into the BMS system used in the building.
The *Contractor* shall design, supply, deliver, and install similar or equal approved to Schneider occupancy sensors. The sensor shall be recessed into the ceiling using a

ceiling mounted adapter plate to secure the sensor. The time delay DIP switch setting on the occupancy sensor shall be set at ten (10) minutes.

The *Contractor* shall design, supply, deliver and install SABS approved, 20mm outer diameter, PVC conduit flush mounted in the wall. The PVC conduit shall be used as wireways, linking all flush mounted PVC boxes to the distribution board and luminaires. All necessary accessories such as fasteners, bends, junction boxes, adaptors, etc. shall be included to ensure a safe neat link for the conduit system.

The *Contractor* shall design, supply, deliver, offload, and install SABS approved PVC insulated house wire for all lighting circuits. The PVC insulated wire shall comply with Transnet specification TPD-003-CABLESPEC. The wire shall be installed inside the Uni-strut system and conduit.

Where new conduits are installed in masonry walls, the Contractor shall do the necessary chasing and all these areas will be made good after installation.

b) Switched Socket Outlets

The *Contractor* shall also design, supply, deliver, offload, install 2-tier power skirting, one compartment shall be dedicated to Electrical and the other two Data/communications. The size of both the compartments shall be 70mm^2. The power skirting shall be supplied with all fastening accessories such as screws, and end covers.

The *Contractor* shall design, supply, deliver, and install 16A single, dedicated, and non-dedicated switched socket outlets.

The *Contractor* shall also design, supply, deliver, and install 16A double, flush mount, switched socket outlets. The socket outlets shall be installed 300mm and 1350mm above the floor.

The *Contractor* shall design, supply, deliver and install SABS approved, 20mm outer diameter, PVC conduits flush mounted in the wall. The PVC conduit shall be used as

a wireway, linking all socket outlets to the distribution board. All necessary accessories such as fasteners, bends, junction boxes, adaptors, etc. shall be included to ensure a safe neat link for the conduit system.

The *Contractor* shall design, supply, deliver, offload, and install appropriately length of SABS approved, 32mm outer diameter, PVC conduit. The conduit shall be used as a wire way system to provide a path for data wires to connect from the power skirting to the data swing frame panel. The conduit wire way system shall be flush mount in the wall. All necessary accessories such as fasteners, bends, junction boxes, adaptors, etc. shall be included to ensure a safe neat link for the conduit system.

The *Contractor* shall design, supply, deliver, offload, and install SABS approved PVC insulated house wire for all socket outlet circuits. The PVC insulated wire shall comply with Transnet specification TPD-003-CABLESPEC. The PVC insulated house wire shall be installed in conduit and trunking.

c) Switched Isolators

The *Contractor* shall design, supply, deliver, offload, and install 20A flush mount, double pole, single phase switched disconnector (isolator). The isolators shall be installed at various heights to accommodate the equipment being supplied. Location of isolator should comply with SANS 10142-1 reequipments.

The *Contractor* shall also design, supply, deliver, offload, and install surface mounted weatherproof, single phase and three phase switched disconnectors (isolators), for all areas disposed to water.

The *Contractor* shall design, supply, deliver and install SABS approved, 20mm outer diameter and 32mm outer diameter, PVC conduits flush mounted in the wall. The PVC conduit shall be used as a wireway, linking all isolators to the distribution board. All necessary accessories such as fasteners, bends, junction boxes, adaptors, etc. shall be included to ensure a safe neat link for the conduit system.

The *Contractor* shall design, supply, deliver, offload, and install SABS approved PVC insulated house wire for all isolator circuits. The PVC insulated wire shall comply with Transnet specification TPD-003-CABLESPEC. The PVC insulated house wire shall be installed in conduit.

d) Distribution Boards

The *Contractor* shall modify existing Low Voltage Distribution Boards, install circuits breakers and cables to the existing board.
The contractor shall test and re-commission the DB boards once completed.
The Distribution Board shall contain the following signage.

- Name of the Distribution Board.
  ("**TNPA Distribution Board DB"**).
- The rated Voltage level of the Distribution Board
- The rated Short Circuit Current for distribution board
- The rated current rating for the distribution board
- Description of circuits fed by the associated circuit breaker.
- Full description of the type of cable (Copper PVC insulated ECC, SWA), the size in mm^2 of the cable terminated in the associated circuit breaker and the cable run length to the load.
- Danger sign for electrical power exposure

e) Cable and Cable Way System

The *Contractor* shall supply, deliver, offload, install and terminate 4-core low voltage 600/1000V, SWA, ECC, PVC insulated copper cable between the distribution boards. The PVC insulated, ECC, SWA, 4 core LV cables shall be terminated, and glanded neatly and appropriately using suitable sized Cable Corrosion Glands

The cables shall also be also installed on a cable ladder system. The OEM bending radii requirements of the cable shall be adhered to. The cable ladder system shall be used to sufficiently support the weight of PVC insulated, ECC, SWA, 4 core LV cables. The cable ladder and all associated mechanical supports such as anchor fixings bolts to the wall, suspending rods, supporting channel, etc. shall be made of

stainless steel (grade 3CR12) and shall be powder coated grey. The cable ladder system shall be suitably bonded and connected to the nearest building earth bar with an appropriately sized protective earth conductor in compliance to SANS 10142-1 and TPD-004-EARTHINGSPEC. The *Contractor* shall submit, to the Employer's Engineer, all design aspects of the cable ladder system prior to any procurement of materials for acceptance.

f) Earthing and Lightning Protection

The Contractor shall design, supply, and install earthing and lightning protection for and in accordance with specification No. TPD: 004-EARTHINGSPEC. The earthing and lightning protection design shall be submitted to TNPA electrical engineer for acceptance before any installation commences.

Design and installation of earthing and lightning protection system shall be in strict accordance with the latest SANS Codes of practice 10313, 10199, and 1063 in conjunction with SANS 62305 1-4.

g) Building Management System

The Building Management System (BMS) shall use industry standard protocols; TCP/IP, Bacnet, Modbus, and OPC network interfaces. The software shall reside on a dedicated computer terminal with a GUI to represent the key equipment in the building. The energy management system shall record data collected from various items of equipment. It shall also allow the user to configure the requirements for the operation settings, time of use, etc.

It shall be able to operate in customisable modes of operation such as night mode, day mode, summer mode, winter mode, and any combination of these as required by the user. A database application residing on this dedicated terminal shall record data and event histories from the BMS. This database will be accessible by authorised users through their user account configurations over an internet connection and will enable them to manipulate the BMS to different security and permission settings.

The BMS shall be equipped to collect energy use data from the different systems such as lighting, power, HVAC, hot water systems etc.

The BMS shall be enabled to effect energy saving concepts such as daylight harvesting, grey water use data, and potable water use data.

1.3.6.8. Testing and Commissioning the Entire Installation

The *Contractor* shall conduct a Factory Acceptance Test (FAT) for all *Plant's* to be installed as part of the *Works* to be executed in this *Contract* prior to delivery to site. The FAT shall be conducted in the presence of the *Employer's Engineer*. The legal transfer of ownership from the *Plant's* supplier to the *Contractor* shall be held by the *Contractor* until the *Plant* is fully installed, tested commissioned on the *Employer's* designated site.

The *Contractor* shall conduct a Site Acceptance Test (SAT) for all *Plant's* supplied, offloaded, and delivered to the designated *Employer's* site. The SAT shall be conducted in the presence of the *Employer's Engineer*. The legal transfer of ownership from the *Plant's* supplier to the *Contractor* shall be held by the *Contractor* until the *Plant* is fully installed, tested commissioned on the *Employer's* designated site.

The *Contractor* shall test the entire installation, including but not limited to the MV installation, LV installation and the lighting installation as per SANS 10142-1 and hand over all relevant test certificates to the *Employers Project Manager* for acceptance. The *Contractor* shall hand over both MV and LV certificate of compliance as per the OHS Act of 85 and SANS 10142-1 and SANS1042-2 for the installations.

The *Contractor* shall test and commission the entire Earthing and Lightning protection system as per Transnet Specification TPD-004-EARTHINGSPEC and SANS 10142-1 in the presence of the *Employer's Engineer*. The *Contractor* shall handover all test certificates to the *Employer's Project Manager* for acceptance by the *Employer's Engineer.*

1.4 Interpretation and terminology

The following abbreviations are used in this Works Information:

Abbreviation	**Meaning given to the abbreviation**
CDR	Contractor Documentation Register
CDS	Contractor Documentation Schedule

Abbreviation	**Meaning given to the abbreviation**
CIRP	Contractor's Industrial Relations Practitioner
CSHEO	Contractor's Safety, Health, and Environmental Officer
CM	Construction Manager
DTI	Department of Trade and Industry
DWG	Drawings
EO	Environmental Officer
Native	Original electronic file format of documentation
NRS	National Regulatory Standard
NEC3 ECC	NEC3 Engineering and Construction Contract
QA	Quality Assurance
QC	Quality Control
R&D	Research and Development
SANS	South African National Standards
SAPS	South African Police Services
SASRIA	South African Special Risks Insurance Association
SAT	Site acceptance tests
SES	Standard Environmental Specification
SHE	Safety, Health, and Environment
SHEC	Safety, Health, and Environment Co-ordinator
SIP	Site Induction Programme
SMP	Safety Management Plan
SSA	State Security Agency
SSRC	Site Safety Review Committee
TNPA	Transnet National Ports Authority
AFC	Approved For Construction
DGN	Design
DWG	Drawings

Abbreviation	Meaning given to the abbreviation
EPCM	Engineering, Procurement & Construction Management
FEL	Front End Loading
NEC 3	New Engineering Contracts
PEP	Project Execution Plan
SANS	South African National Standards
SHE	Safety, Health and Environmental
TNPA	Transnet National Ports Authority
URS	User Requirement Specification
ECSA	Engineering Council of South Africa

2 Engineering and the *Contractor's* design

2.1 Parts of the *works* which the *Contractor* is to design

2.2.1 The *Contractor* is to design the following parts of the *Work:*

The *Contractor* is to design parts of the *works* as described in each Engineering discipline's *Scope of work.*

2.2 Procedure for submission and acceptance of *Contractor's* design

The *Contractor* submits designs as the 'Works Information' required to the *Project Manager* for review and acceptance.

The *Contractor's* documentation shall be issued to the *Project Manager* under cover of the Contractor's Transmittal Note indicating all Contract references (i.e., Project No, Contract No, etc.) as well as the *Contractor's* Project Document Number, Revision Number, Title, and chronological listing of transmitted documentation.

Formats of *Contractor* data submitted is dependent on the project procedure and shall be specified by the *Project Manager*, upon the notified request of the *Contractor*.

The *Contractor* shall deliver both hard copies and electronic media copies (CD Rom) to the *Project Manager* at the address stated within the Contract Data.

All electronic documentation shall be submitted by the *Contractor* in Adobe Acrobat (.PDF) and Native file format.

Acceptance of documentation by the *Project Manager* will in no way relieve the *Contractor* of his responsibility for the correctness of information, or conformance with his obligation to provide the Works. This obligation rests solely with the *Contractor.*

After review, a copy of the original reviewed/marked-up drawing/document, with the *Project Manager's* consolidated comments and document status marked on the *Contractor* Review Label, is scanned and the hard copy shall be returned to the *Contractor* under cover of the project's Transmittal Note for revision or re-submittal as instructed.

The *Contractor* shall allow the *Project Manager* 2 (two) weeks to review and respond to the *Contractor's* submission of their documentation, i.e., from time of receipt by the *Project Manager* to the time of despatch.

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*.

On receipt of the reviewed documentation the *Contractor* shall make any modifications requested/marked-up and resubmit the revised documentation to the *Project Manager* within 2 (two) weeks. 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 returned to the *Contractor* to be corrected. The *Contractor* shall re-issue the revised documentation incorporating all comments and other specified details not included in the previous issue within 2 (two) working days of receipt of the marked-up document. No cost arising from any revisions which are a result of the *Contractor*'s omission of critical details and any costs incurred by the *Contractor* in completing such designs and drawings, may be claimed from the *Employer*.

2.3 Use of *Contractor's* design

The *Contractor* grants the *Employer* a licence to use the copyright in all design data presented to the *Employer* in relation to the *works* for any purpose in connection with the construction, re-construction, refurbishment, repair, maintenance, and extension of the *works* with such licence being capable of transfer to any third party without the consent of the *Contractor*.

2.4 As-built drawings, operating manuals, and maintenance schedules

The *Contractor* provides the following:

As built drawings (2 (two) x hard copy plus editable Pdf and native file).

3 Construction

The following considerations shall be made in the construction phase:

- A Method Statement and construction Schedule shall be submitted to the *Employer* timeously for approval prior to execution.
- The *Contractor* shall minimize disruptions of business operations in and around the eMendi Admin precinct.
- The *Contractor* shall ensure that a quality assurance plan is in place and shall appoint a *Site Agent* who shall report to the *Employer* during the execution phase.
- Contractor shall, upon completion, furnish the *Employer* with As-built data in native format.

3.1 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*.
- 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 at time intervals stipulated by the *Employer* in digital format (PDF format) conveyed by email.

3.1.1 *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.*

3.1.2 Plant and/ or Equipment provided by the *Employer.*

None.

3.1.3 The *Employer* provides the following facilities for the *Contractor*:

- Access permit to the Port
- The employer will endeavour 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.

3.2 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.

3.2.1 As-built drawings and data packs

The Contractor ensures that the Project Manager has a full and accurate dossier of built documents that represent the status of the completed works to present to the Employer.

3.2.2 Pre-Commissioning Tests and Commissioning

The Contractor shall arrange for Factory Acceptance Testing of selected Electrical and Mechanical Plant as required by the Employer's Engineers at the Supplier's Premises before any Plant is despatched to site.

The Factory Acceptance Testing shall be witnessed by the *Employers* Engineers, but in doing so; the *Employers* Engineers assume no responsibility

or accountability for the proper functionality of the Plant in any way whatsoever.

The *Contractor* shall arrange Site Acceptance Testing for the selected Plant when it arrives on Site.

The Site Acceptance Testing shall be witnessed by the Employers Engineers, but in doing so; the Employers Engineers assume no responsibility or accountability for the proper functionality of the Plant in any way whatsoever.

The cost of the FATs and SATs, including travel, accommodation, and daily stipend for the Employer's Engineers, is part of this contract, and shall be included in the Contractor's Price. The anticipated number of persons to be catered for in this regard is 3 (three) per FAT.

The *Contractor* shall appoint an independent ECSA registered commissioning engineer to conduct and coordinate the commissioning activities. The Curriculum Vitae of the commissioning engineer shall be submitted to the *Project Manager* and *Employer's* Engineers for acceptance before his appointment.

The *Employer's* Engineers and/or the *Project Manager* reserves the right to reject the proposed commissioning engineer if he is deemed unsuitable to carry out the commissioning activities as required by the *Employer* and the *Employer's* Engineers.

The installation shall be comprehensively tested and commissioned as individual and integrated systems as may be required by the configuration, after the Works are substantially complete.

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.

3.2.2.1.1 The commissioning programme shall include, but is not limited to:

- A schedule of equipment to be commissioned, the proposed tests to be conducted and the testing methods and the range of acceptable results,
- Commissioning check sheets,
- Commissioning programme dates and duration.

The *Contractor* shall supply all relevant test equipment, monitoring devices, network analysers, protocol testers/analysers etc. required to test and commission the complete Works.

An accurate record of all commissioning and testing is to be taken and included in the handover documentation as a permanent record.

The *Contractor* shall perform all tests as required by any Sections or Clauses of the Works Information and all tests required by the Employers Specifications annexed thereto, and all tests required by any applicable SANS Standard, or other Standard, and/or as directed by the *Employer's* Engineers and the *Project Manager*.

Testing and commissioning is considered part of the Works and is to be done before completion.

3.2.3 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.

4 Plant and Materials Standards and Workmanship

4.1 Investigation, Survey and Site Clearance

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

4.2 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.

XHOE0006-1-100-A-LA-0001-01 - Basement Layout

XHOE0006-1-200-A-LA-0001-01 - Ground Floor Layout

XHOE0006-1-200-A-LA-0002-01 - Ground Floor Layout - East Wing

XHOE0006-1-200-A-LA-0003-01 - Ground Floor Layout - West Wing

XHOE0006-1-300-A-LA-0001-01 - First Floor Layout

XHOE0006-1-400-A-LA-0001-01 - Second Floor layout

XHOE0006-1-500-A-LA-0001-01 - Third Floor Layout

XHOE0006-1-600-A-LA-0001-01 - Fourth Floor Layout

XHOE0006-1-700-A-LA-0001-01 - Recreation Building Alterations

XHOE0006-1-900-A-LA-0001-01 - Office Furniture (open plan) Cabinet Design

XHOE0006-1-200-C-LA-0001-01- Recreational Facility Layout

SECTION *2*

5 Management and start up

5.1 Management meetings

The *Contract* will be managed through the New Engineering Contract, NEC 3 Engineering Construction, Option A: Priced Contract with Activity Schedule. 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 (Gqeberha or virtual) to suit the Parties, the nature, and the progress of the study. The person arranging the meeting within five (5) 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, Risk Reduction and SHE Meetings. All meetings shall be recorded using minutes or a register prepared and circulated by the person who convened the meeting. Project Manager to circulate all meeting minutes within a period of 3days from the day of the meeting and adopted by way of signature by the Contractor. The *Contractor* 's key personnel are expected to attend meetings with the objective to resolve problems/challenges including making available to either party, any data, including data that may be viewed as confidential, that which 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 Gqeberha or virtual depending on the applicability. At these meetings the *Contractor* shall presents all relevant data including safety, health and environmental issues, progress reports, quality plans, sub-Contracto*r* management reports, as may be required.

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.	Monthly on a day and time mutually to be agreed.	Port of Ngqura or Virtual	*Employer*, *Contractor*, *Supervisor* and *Project Manager.*
Contract risk register and Compensation Events.	Monthly on a day and time mutually to be agreed.	Port of Ngqura or Virtual	*Employer*, *Contractor*, *Supervisor* and *Project Manager.*
Site Inspections.	Ad hoc.	Port of Ngqura	*Employer*, *Contractor*, *Supervisor* and *Project Manager.*
Contractor Safety Meetings.	Held Monthly with *Contractors*. Day and time to be agreed.	Port of Ngqura or Virtual	*TNPA Safety Advisors; Contractor Safety Officers and Contractor management / supervision and Project Manager.*
Safety Pre-Mobilisation Meeting.	Once off at the kick-off meeting.	Port of Ngqura	*Employer*, *Contractor* (appropriate key persons), *Supervisor* (as necessary and appropriate delegates), and *Project Manager* (and appropriate delegates).
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 Ngqura	*Contractor* (appropriate key persons), *Contractor Supervisor* (as necessary and appropriate delegates), *Foreman* and G*eneral Workforce*.

One (1) x Site investigation– Project site investigation will be an opportunity where the *Contractor* will meet with local authority to discuss design requirements, highlighting current issues and coordinate with the proposed scope of work.

5.2 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.

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) All drawings supplied shall comply with the CAD Standards, i.e., ENG-STD-0001.

j) 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.

k) 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.

l) 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.

m) 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.

n) The *Contractor* shall apply "wet signatures" to the original Documentation before scanning the signed original and prior to formal submission.

o) 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.

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

5.3 Health and Safety management

The Principal Contractor complies with the following Health and Safety requirements, but not limited to:

- Transnet Health and Safety Project Specification
- Occupational Health and Safety Act (Act 85 of 1993) and Regulations.
- Transnet health and safety policies and procedures.
- National Road Traffic Act.

The Principal Contractor ensures that its Contractors comply with the above-mentioned requirements.

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 HAS specification, are contained within (Health and Safety Project Specification).

The Principal Contractor shall appoint a full time CHSO 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 Officer(s) 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 CM is responsible, within the context of the HAS 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

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 employees 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).

Trainings as stipulated in the HS project specification will 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. A health and safety file to be submitted by the Principal Contractor and all Contractors for acceptance by the Employer or Employers representative before site access can be granted. In addition, sufficient time to be allowed for health and safety file to be approved by TNPA HS Department.

5.4 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.

A Construction Environmental Management Programme (CEMPr) has been compiled for the Port of Ngqura which is applicable to this project and is included under Annexure B (Environmental Management Programme).

The CEMPr provides 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 CEMPr is the minimum acceptable standard for the Project that shall be complied with at all times. The CEMPr requirements shall be applicable to the main Contractor and all its service providers.

The Contractor must sign the declaration of understanding as a commitment to abide with the Project CEMPr and Transnet Environmental Governance Framework. Sufficient environmental budget must be allocated to meet all the project environmental requirements for the duration of the contract.

The Contractor shall perform the Works and all construction activities within the Site and Working Areas having due regard for the environment and environmental management practices as more particularly described within the CEMPr.

The Contractor must appoint a suitably qualified SHE Officer with a relevant environmental qualification and a minimum of 5 years relevant construction environmental management experience. Note that the SHE Officer will conduct a dual role for Health and Safety and Environmental Officer. The roles and responsibilities of the Contractor's EO are clearly outlined in the CEMPr.

The Contractor will be required to submit an environmental file to TNPA 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 overarching obligations of the Contractor in terms of the CEMPr before construction activities commence on the Site and/or Working Areas is to provide environmental method statements for all construction operations at the Site and/or Working Area and were requested by the Construction Manager. The Contractor shall comply with the following:

- The Contractor shall identify the kinds of environmental impacts that will occur as a result of their 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 the CEMPr are achieved.

- Environmental method statements will be prepared in accordance with the requirements set out in the CEMPr. These method statements shall form part of the environmental file.

- The Contractor shall ensure that his management, foremen and the general workforce, as well as all suppliers and visitors to Site have attended the Environmental Induction Programme prior to commencing any work on Site.

- If new personnel commence work on the Site during construction, the Contractor shall ensure that these personnel undergo the Environmental Induction Programme and are made aware of the environmental specifications on Site.

The Contractor must appoint a waste removal Service Providers as per the TNPA list of waste removal Service Providers (to be provided after contract award).

During the construction period, the Contractor shall comply with the following:

- Upon award the Contractor will receive all the environmental file templates and copies of the project's EA, permits and licences and CEMPr.

- A copy of the project's EA permits and licences where relevant, CEMPr and method statements shall be available on Site, and the Contractor shall ensure that all the personnel on Site (including subcontractors and their staff) as well as suppliers are familiar with and understand the specifications contained in these documents.

- The Contractor must sign a Declaration of understanding (T2.2.38) as part of a returnable acknowledging understanding of the environmental requirements for the Project. Furthermore, sufficient environmental budget must be allocated for the implementation of environmental management requirements.

- Method statements that are required during construction must be submitted to the Project Manager for approval at least 10 days prior to the proposed commencement

of the activity. Emergency construction activity method statements may also be required. The activities requiring method statements cannot commence if the method statements have not been approved by the Project Manager. The scope of the required method statements for completion by the Contractor shall, as a minimum, include all such items as are listed within the CEMPr.

- Where applicable, the Contractor shall provide job-specific training on an ad hoc basis when workers are engaged in activities, which require method statements.

The Contractor shall ensure that anyone making deliveries to Site is properly informed of all procedures and restrictions, e.g., which access roads to use, no go areas, speed limits, noise, and the like, as required by the relevant project Authorisations and the CEMPr, before they arrive at Site.

5.5 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* shall have, maintain, and demonstrate to the *Employer* the documented Quality Management System to be used in the performance of the scope. The *Contractor* shall institute a quality management system, instruments and equipment required including providing adequate quality supervision and control for always works.

The *Contractor's* Quality Management System shall conform to International Standard ISO 9001:2015.

The *Contractor* submits his Quality Management System 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 ISO 9001:2015 (Quality Understanding and Implementation Certificate) 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.

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.

The Quality Plan 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* shall nominate a suitably experienced quality representative 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 the Project Manager's review and approval.

The *Contractor* shall also ensure that all sub-Contractors 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.

5.6 Programming constraints

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

The *Contractor* submits his Level 3 programme to the *Employer* for acceptance in the period stated in the Contract Data.

The *Contractor* uses the latest version of Primavera or Microsoft Project his programme submissions.

The *Contractor* shows on his programme submitted for Acceptance and all subsequently revised programmes schedules showing the critical path or paths and all necessary logic diagrams demonstrating the order and timing of the operations, which the *Contractor* plans to do to provide the Services.

The *Contractor*'s programme shows duration of operations in working days.

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

a) 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.

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.

5.7 Contractor's management, supervision, and key people

The *Contractor* employs a CSHEO 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 Site 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 Officer, and Quality Manager 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.

5.8 Insurance provided by the *Employer*

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

5.9 Contracts change management

No additional requirements apply to ECC Clause 60 series.

5.10 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.

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

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

- Records of design employee's location of work (if appropriate).

- Records of Equipment used, and people employed outside the Working Areas (if applicable).

5.12 *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 eMendi Administration Building

Port of Ngqura,

N2, Neptune Road,

Off Klub Road,

Gqeberha

For the attention of

The invoice is presented as an original.

5.13 CONTRACTOR LIABILITY

The *Contractor* warrants that it will be liable to Transnet 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 Transnet 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 Transnet's 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.

5.14 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 Transnet for any costs Transnet 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 Transnet, 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 Transnet 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.

5.15 Plant, Equipment and Materials

The *Contractor* provides Plant, Equipment 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, Equipment and/or Materials are new, unless the use of old or refurbished Plant, Equipment 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, Equipment 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.

SECTION 3

ANNEXURES

Annexure A: *Contractor* Documentation Submittal Requirements standard DOC-STD-0001

Annexure B: Construction Environmental Management Programme for the Port of Ngqura

Annexure C: Declaration of Understanding (T2.2.38)

Annexure D: Transnet Technical Specifications (Electrical)

Annexure E: List of Architectural Drawings:

- XHOE0006-1-100-A-LA-0001-01 - Basement Layout
- XHOE0006-1-200-A-LA-0001-01 - Ground Floor Layout
- XHOE0006-1-200-A-LA-0002-01 - Ground Floor Layout - East Wing
- XHOE0006-1-200-A-LA-0003-01 - Ground Floor Layout - West Wing
- XHOE0006-1-300-A-LA-0001-01 - First Floor Layout
- XHOE0006-1-400-A-LA-0001-01 - Second Floor layout
- XHOE0006-1-500-A-LA-0001-01 - Third Floor Layout
- XHOE0006-1-600-A-LA-0001-01 - Fourth Floor Layout
- XHOE0006-1-700-A-LA-0001-01 - Recreation Building Alterations
- XHOE0006-1-800-A-LA-0001-01 – Covered Walkway
- XHOE0006-1-900-A-LA-0001-01 - Office Furniture (open plan) Cabinet Design

Annexure F: XHOE006-ENG-A-SP-0001 Rev 00 - Office Furniture Specification

Annexure G: Health and Safety Specification

Annexure H Health and Safety Cost Breakdown

Annexure I: Health and Safety Contractor's questionnaire

Annexure J: Quality standard QAL-STD-0001