APPENDIX I
Preliminary Works Information

for
Pipe Jacking: New 20” Fuel Feeder Pipe
for
Airports Company South Africa
OR Tambo International

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Rev 0C For Tender

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Index.

1 Background.

Airports Company South Africa has identified a need to replace the existing 20-inch Jet A1 fuel feeder line at O.R. Tambo International Airport. This line is used for the refuelling of aircraft at the airport and runs underground from the fuel storage depot facility to the aprons where the aircraft are refuelled.

The supply of jet fuel to the aprons is enabled by six 132kW centrifugal pumps installed at the fuel storage depot. The pumps are connected to a common suction manifold and common delivery manifold and controlled by the variable speed drives. Each pump has a delivery capacity of approximately 5 000l/min.

The delivery manifold splits into two lines feeding the aprons, an 18- and 20-inch diameter feeder lines. The split in the lines is just before the two lines penetrate the ground.

The existing 20-inch line is approximately 1.8km long and runs underground from the fuel storage depot to valve chamber VCM1. The line crosses the super-south service road at the average depth of cover of 1.7m. It further crosses the bravo service road at average depth of cover 1.8m. The crossing at Bravo taxiway is at the average depth of cover of 1.5m. Whilst the crossing at India taxiway is at 1.7m and Lima crossing is at 1m average depth of cover. The overall average depth of cover for the entire line is 1.55m.

The design pressure of the existing pipeline is 1950kPa at 50 degrees Celsius and maximum operating pressure varies from 620 - 1000kPa, excluding surge scenarios. The existing pipeline nominal thickness is 6.35mm, Schedule 10, Grade API 5L Grade A and designed to ASME B31.3 & 4 Code.

The objective is to replace the existing 20-inch line and restore jet fuel supply through the line in accordance with the airport operational requirements, end-users' requirements and other stakeholders' requirements.

Pipe jacking is required where the pipe crosses the taxiways. Elsewhere, open excavations (with shoring) will be adopted for the installation of the new 20-inch pipe.

2 List of definitions and acronyms/abbreviations.

This Works Information refers to numerous terms and acronyms, generally described with capital initials. Many of these terms refer to terms that form part of the *Employer's* procedures and general use of language. Some of the following acronyms are used in this Works Information having the meaning as stipulated:

Table 1: Table of abbreviations

ITEM	ABBREVIATION/DEFINITION
AFC	Approved for Construction
AFD	Approved for Design
AIA	Authorized Inspection Authority
ANSI	American National Standards Institute
API	American Petroleum Institute
Area	The *Employer's* Security Area
ARV	Automatic Recirculation Valve
ASME	American Society of Mechanical Engineers
BEP	Basic Engineering Package
BFD	Block Flow Diagram
BO	Beneficial Operation
BOM	Bill of Materials
CAD	Computer Aided Design
CBA	Commercial Bid Analysis
CBS	Cost Breakdown Structure
CD	Compact disc
Control Room	Operation, monitoring and supervision of the plant are performed therein with the aid of the operator interface system
DCS	Distributed Control System/the DCS provides the requisite process control
ECC	Engineering and Construction Contract
EIA	Environmental Impact Assessment
Entry Permits	*Employer's* security permits
EOJ	End of Job (Documentation)
EPC	Engineering, Procurement, and Construction
Equipment Room	Houses all the control equipment for the DCS and ESD systems and their connections to and from the field
ESD	Emergency Shutdown System/the ESD implements the required 'critical' trips and interlocks
FAT	Factory Acceptance testing
FEC	Final Estimated Cost
FTA	Field Terminal Assembly
GA	General Arrangement

ITEM	ABBREVIATION/DEFINITION
H & MB	Heat & Mass Balance
Hardcopy	Copy on paper
HAZOP	Hazard and Operability Study
HP	High Pressure
HVAC	Heating Ventilation and Air-Conditioning
IBL	Inside Battery Limit
IFD	Instrumentation Flow Diagram
ISO	Isometric Drawing
LP	Low Pressure
MFD	Mechanical Flow Diagram
MCC	Motor Control Centre
MCFD	Metallurgical and Corrosion Flow Diagram
MTO	Material Take Off
NCR	Non-Conformance Report
NDE	Non-Destructive Examination
OBL	Outside Battery Limits
OHS ACT	Occupational Health and Safety Act, Act Number 85 of 1993 as amended
OOM	Order of magnitude
P&ID	Process & Instrumentation Diagram
PDA	Potential Deviation Analysis
PFD	Process Flow Diagram
PIV	Permanent Internal Vehicle
PLC	Programmable Logic Centre
PMD	Plant Modification Diagram
PO	Purchase Order
PQR	Procedure Qualification Records
PRV	Pressure Relief Valve
PS	Pipe Support
PSV	Pressure Safety Valve
QA	Quality Assurance
QC	Quality Control
QCP	Quality Control Plan
QMS	Quality Management System (of the *Employer*)
RFC	Ready of Commissioning
RFO	Ready for Operation
RFQ	Request For Quotation
SABS	South African Bureau of Standards

ITEM	ABBREVIATION/DEFINITION
SAT	Site Acceptance Test
SD	Semi-Definitive
Security	The *Employer's* Security Department and Personnel
Softcopy	Copy on personal computer disk format
SPIR	Spare Parts and Interchange-ability Record
TBA	Technical Bid Analysis
TSV	Temperature Safety Valve
UFD	Utility Flow Diagram
UPS	Uninterruptible Power Supply
UV	Utility Vehicle
VSD	Variable Speed Drive
WPS	Welding Procedure Specification

The following terms are used in this Scope with the assigned meaning:

Table 2: Table of definitions

Term	Meaning given to the term
Area	The *Employer*'s Security Area
Client or Employer	The *Client* or *Employer*, printed in italics, is the organisation who will become the owner after completion of the *works*.
Project Manager	"Project Manager" is the *Employer's* representative and the person who is administering the project on behalf of the *Employer* with the intention of achieving the *Employer's* objectives for the completed project.
Contractor	Is a person or organization who has a contract with the *Employer* to construct or install work.
Subcontractor	Is a person or organisation who has a contract with the *Contractor* to: • construct or install a part the *works* in the *Contractor's* scope or • provide a service necessary to provide the *works* or • supply Plant and Material which were wholly or partly designed specifically for the *works.*
Principal Contractor	Principle Contractor is as defined in the construction regulations of the OHS Act (Act 85 of 1993 as amended)
works	The *works,* printed in italics, are the facilities and all associated plant and materials to be fabricated, constructed, and installed by the *Contractor.* Work that is not printed in italics cover a broader definition and include work that is not in the scope of the *Contractor.*
Works Site Information	The Site Information is information which describes the Site and its surroundings.
Works Information/Works	The Works Information describe the *works* to be performed by the *Contractor* and states any constraints on how the *Contractor* provides the *works*.

Term	Meaning given to the term
Hardcopy	Copy on paper
Master Data	Master data constitutes all deliverables to be captured into the *Employer's* integrated management system e.g. drawings, data sheets, etc.
Nonconformance report (NCR)	A non-conformance report (NCR) is deemed to be due notification of a Defect
Plant and materials	Plant and materials are items to be included in the *works*
Others	Other Contractors performing work on site for the *Employer*.
Potential deviation analysis	A potential deviation analysis is a risk evaluation technique to evaluate the risks associated with a specific set of activities and to set mitigating action to reduce the risk (probability and/or impact).
Ready for Commissioning	Ready for Commissioning is achieved when the construction work for all the equipment and facilities required for the safe commissioning of a section or unit have been completed in accordance with the AFC drawings and specifications, and all non-operational (non-hazardous) testing to ensure equipment functionality and compliance with the specifications has been successfully carried out.
Ready for Operation/Ready for Commissioning	Ready for Operation (RFO) has been achieved for a unit or section when all facilities are available to safely support start-up, commissioning activities have been completed, all agreed punch items have been corrected and the Maintenance Disciplines have given clearance for operation. Ready for Commissioning is achieved when the construction work for all the equipment and facilities required for the safe commissioning of a section or unit have been completed in accordance with the AFC drawings and specifications, and all non-operational (non-hazardous) testing to ensure equipment functionality and compliance with the specifications has been successfully carried out (See Handover and Commissioning Strategy.
Beneficial operation/Ready for Operation	Beneficial Operation is achieved when a section has produced its first sustained manufacture of saleable, on-specification products, not necessarily at design capacity. Ready for Operation (RFO) has been achieved for a unit or section when all facilities are available to safely support start-up, commissioning activities have been completed, all agreed punch items have been corrected and the Maintenance Disciplines have given clearance for operation.
Security Beneficial operation	The Employer's Security Department and Personnel, Beneficial Operation is achieved when a section has produced its first sustained manufacture of saleable, on-specification products, not necessarily at design capacity.

3 Description of the *Works*

3.1 Project Summary

The "20-inch Jet Fuel Feeder Line Replacement" project will be executed under one stage, and not multiple stages. However, the pipe will be supplied and installed by the mechanical contractor, who will also undertake non-destructive testing, cold commissioning, and hot commissioning. There will be gaps between activities as various *Others* interact with the *Contractor* and *Employer.*

3.2 Work to be performed by the *Contractor:*

3.2.1 Fuel Line Replacement:

Date: Final Date TBC (Appendix C for pricing, start date 31 January 2025)
Duration: Final Date TBC (Appendix C for pricing, 18 months duration)

a) The civil contractor will excavate for trenching or open excavation. Shoring will designed, supplied and installed as temporary works under the civil contractor's scope of work. The average depth to the invert of the pipe jacking pit will be 3,5m. However, the pipe jacking *Contractor* shall confirm the dimensions and invert levels of all jacking pits for the civil contractor to design and install.

b) A specialist pipe jacking *Contractor* (**this contract**), who will be appointed by the mechanical contractor, will jack sleeves below taxi ways and roadways (if required). Excavation for the pits required by the pipe jacking *Contractor*, will be undertaken by the civil contractor.

c) The mechanical / piping contractor will provide the installation of the 20" pipe, testing and supervise the insitu NDT of the pipe.

d) The mechanical / piping contractor will provide separate QA/QC testing of the 20" pipeline in the workshop.

e) The civil contractor will supply the necessary backfill material and compact to specification, once the 20" pipe has been installed.

f) The civil contractor will reinstate the surface finish to match the existing finish – concrete, asphalt, grass etc.

3.3 Work to be performed by *Contractor*: General

a) The *Contractor* must provide his own permit recipient to sign on the permits.

b) The *Contractor* provides a clear indication of the personnel allocation.

c) The following is **excluded** from the *Contractor*'s scope of supply:

- Pipe fabrication and installation.
- Mechanical equipment other than pipe jacking equipment.
- Electrical installation and certification.
- AIA associated with mechanical or electrical contracts.
- Civil excavation, backfill and shoring.

d) The *Contractor* shall compile and transmit the End of Job (EOJ) documentation for all Work Packs.

e) The *Contractor* clears the site after the *works* are completed.

f) The Contractor must comply with all Health and Safety requirements as contained in the OHS Act 85 of 1993 and all applicable regulations.

3.4 Responsibility Matrix

Responsible Entity / Activity	Applicable	Employer	MegChem & Consultants	M&P Contractor	E&I Contractor	Pipe jacking Main contractor	Civil Main contractor	Structural Steel contractor	Insulation Contractor	Rigging Contractor	Scanning Contractor				
Design															
Process design	**Y**		X												
Mechanical design	**Y**		X												
Piping design	**Y**		X												
Electrical design	**Y**		X												
Instrumentation design	**Y**		X												
Programming and changes on HMI	**Y**				X										
Programming of DCS & ESD	**Y**				X										
Structural steel design	**Y**		X												
Structural steel shop detail drawings	**Y**							X							
Civil Design	**Y**		X												
Cathodic protection Design	**Y**		X												
Fire design	**N**														
Specialist Site Measurements and Services															

Responsible Entity / Activity	Applicable	Employer	MegChem & Consultants	M&P Contractor	E&I Contractor	Pipe jacking Main contractor	Civil Main contractor	Structural Steel contractor	Insulation Contractor	Rigging Contractor	Scanning Contractor				
3D Scanning	**N**														
GPR scanning	**Y**	X									X				
GEO Tech studies	**Y**						X								
Land Surveying	**N**	X													
(As built topographical survey)	**Y**						X								
AIA	**Y**	X	X												
NDE's (x-rays, PT/MT etc.)	**Y**			X											
Procurement															
Mechanical and process equipment (Material for Refurbishment)	**Y**	X													
Piping material (material on ISO's)	**Y**	X													
Structural steel	**Y**							X							
Valves	**Y**	X													
Instruments (flow meters, thermowell, Level gauges, flow orifice etc.)	**Y**	X													
Meter runs	**N**														
Transmitters	**Y**	X													

Responsible Entity / Activity	Applicable	Employer	MegChem & Consultants	M&P Contractor	E&I Contractor	Pipe jacking Main contractor	Civil Main contractor	Structural Steel contractor	Insulation Contractor	Rigging Contractor	Scanning Contractor				
Condensate pots for instrumentation	**N**														
Instrument stands and brackets, Tubing and fittings, Conduits, Cable racks, Cable straps, JB's	**Y**	X													
Air supply Manifolds	**N**														
Procurement of barriers for DCS/ESD panels	**Y**	X													
Instrumentation Cables - single pairs	**Y**	X													
Instrumentation Cables – multi pairs	**Y**	X													
Electrical cables	**Y**	X													
Lights /Luminaires	**N**														
Start stop hand stations	**N**														
Light brackets	**N**														
DB's	**Y**	X													
MCC Switchgear buckets	**Y**	X													
Construction															

Responsible Entity / Activity	Applicable	Employer	MegChem & Consultants	M&P Contractor	E&I Contractor	Pipe jacking Main contractor	Civil Main contractor	Structural Steel contractor	Insulation Contractor	Rigging Contractor	Scanning Contractor				
Mechanical and piping *Works*															
Safe making of equipment and piping	**Y**	X													
Decontamination of material	**Y (TBC)**		X												
Pipe fabrication	**Y**			X											
Pipe stripping out	**Y**			X											
Pipe installation	**Y**			X											
Degassing	**Y**			X											
PWHT	**N**														
Coating of Underground piping	**Y**			X											
Lining of inside of the pipe	**Y**			X											
Fireproofing	**N**														
Grouting of pipe supports	**Y**						X								
Grouting Equipment	**N**														
Grouting Instrument stands	**N**														
Installation vessel internals	**N**														

Responsible Entity / Activity	Applicable	Employer	MegChem & Consultants	M&P Contractor	E&I Contractor	Pipe jacking Main contractor	Civil Main contractor	Structural Steel contractor	Insulation Contractor	Rigging Contractor	Scanning Contractor				
Cutting and/or repairing of pressure vessel shell	**N**														
Pneumatic and/or hydraulic pressure testing	**Y**			X											
Provide N_2 for Pneumatic pressure testing	**N**														
Provide N_2 for stainless steel welding	**N**														
Provide water for pressure test	**Y**	X													
Sandblasting & Painting piping	**Y**			X											
Pickle and passivate	**N**														
Chemical cleaning of lines	**N**														
Install locking devices	**Y**			X											
Provide cranes for light rigging	**Y**			X						X					
Provide riggers for light rigging	**Y**									X					
Provide cranes for heavy rigging	**Y**									X					

Responsible Entity / Activity	Applicable	Employer	MegChem & Consultants	M&P Contractor	E&I Contractor	Pipe jacking Main contractor	Civil Main contractor	Structural Steel contractor	Insulation Contractor	Rigging Contractor	Scanning Contractor				
Provide riggers for heavy rigging	**Y**									X					
Offloading of free issued equipment	**Y**			X			X			X					
Transport of materials	**Y**			X			X								
Transport of free issued equipment from laydown area to site	**Y**			X			X								
Transport redundant material to reclamation yard	**Y**			X			X								
Provide scaffolding	**N**														
Supply and install insulation and lagging	**N**														
Fireproofing mechanical equip.	**N**														
Steam tracing	**N**														
Refractory	**N**														
Provide packers for mechanical equip / Piping shims	**Y**			X											
Pump laser alignment	**N**														
Unlock and lock spring support	**N**														
Refurbish spring supports	**N**														

Responsible Entity / Activity	Applicable	Employer	MegChem & Consultants	M&P Contractor	E&I Contractor	Pipe jacking Main contractor	Civil Main contractor	Structural Steel contractor	Insulation Contractor	Rigging Contractor	Scanning Contractor				
Installation of in-line instruments (e.g. in-line flow meter, flow control valves, etc.)	**Y**				X										
Installation of thermowells	**N**														
Instrumentation *Works*															
Strip out redundant cables and cable racks and conduits	**Y**				X										
Strip out redundant instruments	**Y**				X										
Install surface instrumentation, condensate pots, Press. & Temp. transmitters etc.	**Y**				X										
Install cables, cable racks, conduits, trunking, etc.	**Y**				X										
Cross wiring	**Y**				X										
Provide inert gas for leak testing of tubing	**Y**				X										

Responsible Entity / Activity	Applicable	Employer	MegChem & Consultants	M&P Contractor	E&I Contractor	Pipe jacking Main contractor	Civil Main contractor	Structural Steel contractor	Insulation Contractor	Rigging Contractor	Scanning Contractor				
and functional testing of control valves															
Installation of DCS/ESD	**Y**				X										
Fire/flame proofing	**N**														
Installation of IO Cards / barriers in DCS/ESD panels	**Y**				X										
Winterisation of instrument tubes	**N**														
Grouting instrumentation stands	**Y**				X		X								
Scaffolding Instrumentation	**N**														
Electrical *Works*															
Strip redundant cables, cable racks, trunking, conduits, etc.	**N**														
Strip redundant electrical equipment, lights, JB's, etc.	**N**														
Install Electrical cables, cable racks, trunking, conduits, etc.	**Y**				X										

Responsible Entity / Activity	Applicable	Employer	MegChem & Consultants	M&P Contractor	E&I Contractor	Pipe jacking Main contractor	Civil Main contractor	Structural Steel contractor	Insulation Contractor	Rigging Contractor	Scanning Contractor				
Install electrical equipment, lights, JB's, Start stop stations, etc.	**N**														
Lux readings	**N**														
Trenching for cables	**Y**				X			X							
Install and weld light brackets onto structures and platforms	**N**														
Installation of MCC Switchgear buckets	**N**														
Scaffolding Electrical	**N**														
Fire/flame proofing	**N**														
Cathodic protection	**Y**				X										
Structural Steel *Works*															
Structural steel Fabrication	**Y**							X							
Sandblasting & Painting Structural steel	**Y**							X							
Demolishing structural steel	**Y (TBC)**							X							
Structural steel Installation	**Y**							X							

Responsible Entity / Activity	Applicable	Employer	MegChem & Consultants	M&P Contractor	E&I Contractor	Pipe jacking Main contractor	Civil Main contractor	Structural Steel contractor	Insulation Contractor	Rigging Contractor	Scanning Contractor				
Transport redundant material to reclamation yard	**Y**							X							
Scaffolding Structural steel	**Y**							X							
Fireproofing Structural steel	**N**														
Civil *Works*															
Build crane pad	**N**														
Impact testing	**N**														
Earth *works*	**Y**						X								
Concrete *works*	**Y**						X	X							
Pilling	**N**														
Equipment & pipe support foundations	**Y**						X	X							
Fencing	**Y**						X	X							
Scaffolding Civil	**Y**						X								
Demarcation of site establishment areas	**Y**						X								
Sand Cement bedding	**Y**						X								
Site establishment															
Office facilities	**Y**			X											
Ablution facilities	**Y**			X											

Responsible Entity / Activity	Applicable	Employer	MegChem & Consultants	M&P Contractor	E&I Contractor	Pipe jacking Main contractor	Civil Main contractor	Structural Steel contractor	Insulation Contractor	Rigging Contractor	Scanning Contractor				
Eating facilities	**Y**			X											
Locker rooms and changing facilities	**Y**			X											
Shower facilities	**N**														
Trough for washing of hands	**Y**			X											
Drinking water	**Y (TBC)**	X													
Electrical Power for site establishment for complete site establishment	**Y (TBC)**	X													
Electrical Power for site work	**Y (TBC)**	X													
Lights for night shift	**Y**			X											
Connect electrical power for all required DB’s	**Y**	X													
Provide cables for electrical power to containers	**Y**	X													

4 Technical requirement

4.1 General

a) The *Contractor* must ensure that all the relevant *Employer's* specifications and procedures and all governing codes and legislation (e.g. Occupational Health and Safety Act and Regulations) are followed for the execution of the *works*.

b) All construction by the *Contractor* shall conform to all SANS specifications as a minimum.

c) All punching and handover shall be done in accordance with the project requirements.

d) Two independent geotechnical reports were made available, however, these are not specific to the pipe route but were investigations undertaken for the extension of the tank farm. Geotechnical investigations were conducted in 1998 and 2007, bearing in mind that these were deeper investigations for piling below the proposed tank farm bases.

e) 1998 Investigation

The following typical soil profile has been compiled from the in situ profiling of the 750mm diameter auger hole to a depth of 12,0m and the samples retrieved for depths in excess of 12,0m (up to 24m) as well as the two 400mm diameter auger holes (see photograph numbers 2, 3, 4 and 5).

0 – 3,5m	Red brown, clayey SAND (as comprehensively discussed in the initial report). TRANSPORTED MATERIAL
3,5 – 4,5m	The same as above but with fine gravel and occasional quartzite pebbles/small boulders up to 100mm diameter PEBBLE MARKER
4,5 – 9,0m	Slightly moist, red brown, dense to very dense, clayey SILT COMPLETELY WEATHERED, ANDESITIC VENTERSDORP LAVA
9,0 – 15,0m	Moist to very moist, light red/orange, firm, traces of slickensided surfaces, silty CLAY/clayey SILT COMPLETELY WEATHERED, ANDESITIC VENTERSDORP LAVA

f) 2007 Investigation (Seismic)

Site Geology.

The terrain is underlain by Transported soils and possible scattered areas with Pedogenic materials.

The soils are underlain mainly by Granite, Quartzite and Shale bedrock.

Quaternary Deposits and Pedogenic Materials.

Various soil types were observed on the site and can be grouped under the following types:

- *Transported soils.*

- *Pedogenic soils.*
- *Insitu residual soils from weathered bedrock.*

The transported materials.

The transported soils comprise mainly the following soil types:

- *Sandy to silty CLAY soils with variable amounts of transported pebbles and gravel cover the Granite underlain portion of the study area.*
- *Transported hillwash of clayey SAND to gravely clayey SAND with quartz and Quartzite fragments were observed in the Quartzite area.*
- *Clay Soils containing fragments of Shale within the upper soil strata are present in the Shale area.*

Pedogenic Soils:

Pedogenic soils are expected as the result of Ferruginisation of the insitu soils into

- *Nodular Ferricretes was observed within the transported soil profile overlying the northern Shale band and Granite bedrock. This is thought to be part of the transported soil materials covering the site as a whole.*

The Residual Decomposed and re-worked Bedrock Materials.

These soils comprise mainly:

- *Clayey SILT to silty CLAY from decomposed Granite.*
- *Sandy to silty CLAY from decomposed Shale.*
- *Silty Sand with variable amounts of Quartzite fragments to a silty SAND in the Quartzite areas.*

It was also noted that results from DPSH tests indicated areas with a higher DPSH count, overlying areas with a lower DPSH count. The water table was encountered at a depth of 10m during the 1998 investigation. Dewatering will not be required. Management and disposal of stormwater collection during the summer months is the responsibility of the civil contractor.

The civil contractor shall be responsible for the removal of excavated material removed from adjacent, but not inside the jacking pit. The interface responsibility point is that the pipe jacking *Contractor* will remove the soil from the jacking pit to above ground, near the jacking pit, such that it does not affect his method of pipe jacking installation and operations. The civil contractor will load the soil adjacent the pit and remove it from site.

4.2 Discipline Specific requirements: Pipe Jacking

a) The pipe jacking *Contractor* is considered a specialist construction service with proprietary equipment purchased specifically for the task of pipe jacking. The method of pipe jacking may vary between projects, depending on the jacking equipment purchased and soil conditions encountered. As such, the pipe jacking *Contractor* is expected to show experience

in having completed similar successful projects of preferably jacking below taxi runways, or below other highly sensitive structures. Jacking of a similar length or greater than this project, would be advantageous.

b) The pipe jacking *Contractor* will employ a professionally registered Geotechnical Engineer (ECSA accredited) to advise, inspect and sign off on the final installation of the pipe sleeve.

c) The Geotechnical Engineer must, on completion of the project, prepare a short report (3-4 pages) on the conditions encountered during the pipe jacking process. The objective is to electronically file the report to assist ACSA with future work to be undertaken at the facility.

d) Any loose voids around the pipe must be pressure grouted, or filled as directed by the *Contractor's* Geotechnical Engineer, to avoid potential soft spots causing settlement at the runway surface.

e) It is anticipated that the professional pipe jacking *Contractor* will make use equipment appropriate to the task e.g. pipe jacking set up, air compressors, hydraulic jacks, spacer blocks, thrust rings, jacking shield, guide rails, excavators, generators, wheeled bogeys etc.

f) The jacking sleeve should be externally lubricated using the *Contractors* proprietary system.

g) Where layerworks are encountered below taxi ways: The pipe jacking *Contractor*, in consultation with the Geotechnical Engineer, shall determine how the layerworks shall be replaced if disturbed during the pipe jacking procedure. The objective is to locate the jacking pit away from the taxiway layerworks. The pit and sleeve must be deep enough to avoid the jacking sleeve interfering with the load bearing capacity of the layerworks.

h) The current depth and composition of layerworks is below taxiways is unknown but is being investigated. The plan extent is unknown until the civil contractor is established on site. It is anticipated that it will extend at least 1m each side of the taxiway paving. The civil contractor will hand excavate to locate layerworks prior to excavating for the jacking pit.

i) Additional hand excavation under welding points will be required in the jacking pit.

j) The civil contractor shall supply adequate access to the invert of the jacking pit for the safe passage of employees.

k) The *Contractor* must note that GPR (ground penetrating radar) might not detect all services such as water and sewer pipes, electrical cables, fibre optic cables etc. However, this is unlikely to affect the pipe jacking *Contractor*, other than the position of the pipe jacking pit on plan.

l) No 'free issue' materials will be made available to the Contractor.

m) The Contractor must acquaint themselves with the following ACSA terminology:

Landside refers to:

• Areas of the airport before the security points; and

• The restricted area beyond the security points but, within the perimeter of gatehouses, passenger terminals and cargo buildings.

Airside refers to:

• The Apron / manoeuvring areas; and

• Areas within the airside boundary/perimeter fence, excluding the internal areas of the passenger terminals, perimeter gatehouses and cargo buildings.

• Fuel Farm Area

5 Working with the *Employer*, *Contractor,* and *Others*

5.1 Working with *Others*

a) The *Employer* has other Contractors that are also performing other work on site (*Others*). The *Contractor* must manage his/her interfacing with the *Employer* and the *Others (*Contractors*)* such that there is no standing time for either Party.
b) Co-ordination is required with ACSA as the area may be congested by *Others* as well as *Employers* operations or maintenance personnel. It is however required that the *Contractor* manage his/her interfacing with *Others*.

5.2 Compliance with Codes and Standards

The *Contractor's* Temporary *works* design shall comply with the (latest edition) SANS codes and international standards stated below, and/or in the Scope and Good Engineering and Construction Practices. To the extent not stated, the Designs comply with internationally recognised codes and standards which are accepted by the Employer. In case of conflict between national, international codes, standards or guidelines and/or the requirements specified in this Scope, and unless otherwise instructed by the *Employer*, the more onerous one takes precedence; provided always that the *works* comply as a minimum and in any event, with applicable law and mandatory South African national codes, standards and guidelines.

The minimum ACSA requirements for all disciplines are:

c) the requirements of the Occupational Health and Safety Act No. 85 of 1993 and Construction Regulations 2014.
d) Legislation By-Laws and Regulations applicable to the area within which the project falls.
e) the code of practice for the Application of the National Buildings Regulations, (SANS 10400).
f) JIG Guidelines for Aviation Fuel Quality Control and Operating Procedures.
g) the ATEX directives; (The Regulations apply to al/ equipment intended for use in explosive atmospheres, whether electrical or mechanical, and to protective systems)
h) the requirements of the IEC 61508 and IEC 6151 1 standards for functional safety of electrical/electronic/programmable electronic safety-related systems; (SIL3 Certification) the recommendations API / El Aviation Fuel Handling Equipment Standards and Recommended Practices (15xx) and all standards referenced or contained in their Annexures; (unless there are more onerous requirements stated elsewhere)
i) the recommendations of OIML.
j) the requirements of SANS 10089 parts 1 and 2.
k) the requirements of SANS 347.
l) the requirements of API and ASME standards for valves, flanges, gaskets, tanks, vessels, welding,
m) pumps, piping and other appurtenances, e.g. API 6D, 6FA, 610, 2000, 650, 651, 652, 653, etc. and

n) ASME B16.xx, Vil, 831 .3, 831 .4, etc.
o) the requirements and recommendations of the NFPA standards and codes for fire protection and fire
p) safety, e.g. NFPA 10, 1 1, 13, 15, 16, 20, 22, 24, 30, etc.
q) the requirements of the COLTO Standards, SANS 1921 and SANS 2001 for roads and civil engineering.
r) the recommendations of the UK Health and Safety Executive (HSE) Control of Major Hazardous
s) Installations Regulations (COMAH Regulations).
t) The recommendations of the UK Environmental Agency in their Pollution Prevention Guidelines (PPG).

The recommendations contained within or made by international and national standards are viewed as the benchmark for Good Engineering and Construction Practices and shall be complied with, unless it can be demonstrated that it is not practicable.

Good Engineering and Construction Practices are the relevant practices, standards, recommendations, methods, procedures and acts used internationally by skilled contractors engaged in the design, engineering, construction, testing and commissioning of work similar in nature and extent to the *works* that, at a particular time, with the exercise of reasonable judgment, care, attention in light of the facts known or that reasonably should have been known to the party making a decision at the time a decision is or should be made, would be expected to accomplish the desired result in a manner consistent with Laws, reliability, safety, environmental protection, economy and expedition.

With respect to the plant and the *works*, Good Engineering and Construction Practices include taking reasonable steps to ensure that:

- Adequate materials, resources and supplies are available to undertake the *works* under normal conditions.

- Sufficient engineering, design, construction and safety personnel are available and are adequately experienced and trained to design, construct and test the *work*s properly, efficiently and within applicable Laws, manufacturer's guidelines and specifications and API and El standards and recommendations.

- Appropriate monitoring and testing are done during the design, manufacturing, erection and commissioning to ensure that the *works* are constructed to the required standards, tolerances and specifications and that equipment is functioning as designed and to provide assurance that it will function properly under normal conditions.

- Appropriate protective devices and design features are provided to ensure that safe, reliable, long-term operation of the plant can be achieved, if operated and maintained in accordance with the Operation and Maintenance Manual.

6 Access dates, Take over, Key dates, Completion.

6.1 Access dates

Define the access to site to perform work.

Access site	• Site walks and to do inspections. • Do measurements. • Only work that do not require permit conditions will be allowed.
Site establishment	• Starting with site establishment on site.
Construction starts (receive permit)	• All the equipment the *Contractor* will work on is offline and safe. The *Employer* will issue a permit to start with the work.

6.2 Key dates

This section defines the conditions of the work to be completed to achieve the key date. The key date is stated in the contract data part one.

Start Date	See Appendix C
Access Date	See Appendix C
Completion of Cold commissioning	See Appendix C
Completion of Hot commissioning	See Appendix C
Completion of all the *works*	See Appendix C

6.3 Completion

Completion is achieved when:

a) The work has been completed according to the requirements in the Works Information.
b) All surplus materials have been removed from site.
c) The *Contractor* has completed cleaning and the removal of debris from the Site.
d) All outstanding punch and exception items have been complete and signed off.
e) The EOJ documentation is received and accepted by the *Employer*.
f) Red-lined drawings indicating as-built dimensions were received by the *Employer.*
g) All "end of job" documents, to be supplied by the *Contractor*, has been accepted by the *Contractor* and *Project Manager* and handed over.
h) Upon satisfaction of the above the *Project Manager* issues a completion certificate.
i) Site Establishment has been cleared off-site.

7 General constraints and requirements on how the *Contractor* provide the *Works.*

7.1 Access

a) No access is allowed when the *Employer* commences to shut down the plant and during the safe making of the plant.
b) No work is allowed in the plant area during the commissioning of the plant. The commissioning will take 7 days after signing of RFC.
c) NDT windows will be during lunch times and shift hand over. If x-rays are being taken at the site, the *Contractor* can be affected and may be temporarily removed from the area until it is safe to return.

7.2 Working Hours

a) To be advised, but working hours are subject to a permit to work being issued to the *Contractor*.

7.3 General

a) If applicable: The required cover of suitable flameproof material for cocooning needs to be provided by the *Contractors* for the safe closure of scaffolding during welding, grinding and cutting work.
b) If applicable: All electrical equipment needs to be inspected prior to use by the *Employer's* electrical department.
c) Permits must be obtained for the *works* prior to starting the *works.*
d) The *Contractors* is responsible for providing his own communication on site. Note that there are limitations on cell phones and two-way radios. See **7.11.3**

7.4 Special PPE requirements

a) The *Contractors* is to supply and provide *Contractor*'s employees with the required PPE. Standard civil construction PPE is required to perform the work, unless stipulated otherwise on the work permit.

7.5 Shipment of *Contractor's* supplied Equipment, Plant and Materials.

a) The *Contractor* arranges all shipments of Plant, Materials and Equipment to the Site and consigns all such shipments to himself as consignee at the project shipping address, freight fully prepaid. The *Contractor* makes demurrage agreements and settlements with carriers for his shipments.
b) The *Subcontractor* advises the *Contractor* in advance of all major shipments of Plant, Materials and Equipment and co-ordinates with the *Contractor* the arrival, unloading and release of such. The *Contractor* promptly unloads its shipments and promptly releases the carrier's equipment.
c) The *Subcontractor* notifies the *Contractor* of being unable to promptly unload any shipment not less than 10 (ten) days prior to arrival. The *Contractor*, at his discretion, unloads or makes arrangement for *Others*

to unload such shipments for the account and risk of the *Subcontractors*. The *Subcontractors* promptly pays the *Contractor* for costs incurred in respect of unloading.

7.6 Protection and control of Plant, Materials and Equipment

a) At all times provides protection for all Plant, Materials and Equipment from damage or loss due to weather, fire, theft, unexplained disappearance or other similar casualty.
b) At all times, protects from damage due to the *Contractor*'s Provision of the *works*, all Plant, Materials and Equipment, paving, structures and all items on the Site that is the property of the *Contractor* or *Others*.

7.7 Temporary installations

a) The *Contractor* supplies, installs, maintains and removes all temporary construction facilities and utilities necessary to provide the *works*.
b) The *Contractor* takes note and submit the following details of the type of facilities the *Contractor* intends to bring to site, the commencement and completion dates and the locations within the site to the *Project Manager* for acceptance:

- Standard temporary buildings including offices, warehouses, change rooms, reinforcing fabrication facilities, concrete mixing facilities, form work storage facilities.
- Establishment and maintenance of the Site.
- Arrangements for accommodation and feeding of the *Contractor*'s personnel.
- Communications facilities.
- First aid facilities and firefighting equipment.
- Sanitary facilities including janitorial services.
- Securing the entire *Contractor*'s equipment inside *Employer's* secondary security area.
- Parking facilities on-site.
- Temporary lighting.
- Fuels and lubricants.
- Temporary expendable or consumable construction items and supplies.
- Temporary electrical power and reticulation (permanent power supply cannot be guaranteed).
- Dewatering equipment.
- Test equipment required for testing and sampling.
- Construction and potable water at points near the job site as designated by the *Employer*.
- Connections to and disconnection from water supply are to be supplied by the *Contractor*.

- Transport facilities on and off site.
- Water draw-off and drain valves and all fittings for disposal of test water.
- Electrical construction panel and distribution wiring; Connections to, and connections from, the power source will be by the *Contractor*.
- Lab equipment.
- Maintenance of the *Contractor*'s lay-down, storage and work areas and roads within such areas.
- All non-destructive testing equipment; and,
- All small tools and equipment required to perform the work.

c) The locations and layout on Site are subject to and in accordance with the review and acceptance by the *Project Manager*. No changes to the layout are allowed without prior approval from the *Project Manager*.
d) The *Contractor* provides adequate sanitary facilities and janitorial services within the Site for his/her employees conforming to the minimum requirements as stipulated in the OHS Act. The *Contractor* maintains the facilities in a sanitary and safe condition. The *Employer's* and *Contractor's* safety officers may inspect the site and facilities for compliance with these requirements at any time.
e) The *Contractor* provides and maintains first aid facilities within the Site.
f) The *Contractor* maintains the site and ensures proper housekeeping is always executed from the date of site establishment to demobilization. The *Contractor* is to ensure all access roads are kept in a safe and workable condition.

7.8 Site services procedures

7.8.1 Existing Services

a) The *Employer* has specific Site services and procedures. The *Contractors* shall ensure that all *Contractors*' employees, *Contractor*'s suppliers comply with these procedures.
b) All *Contractors* staff entering the ACSA site attend a one-day induction training.
c) All requests for excavation permit (e.g. for cable clearance requests or pipe exposures) are made one week in advance.
d) The *Contractor* identifies and protects all existing services. The existing services are marked on site with markers and chevron danger tape as applicable. Any damage to existing services is reported to the *Employer* immediately and is repaired by the *Contractor*. Where the *Contractor* cannot do this work, the *Employer* repairs the damage on behalf of the *Contractor*. The *Contractor* remains responsible for the costs associated with the damage repairs.

7.8.2 Equipment, Plant and Materials

a) The *Contractor* inventories all equipment, plant and materials entering the Working Area on the prescribed forms obtainable from the *Employer's* security. The original inventory is retained by security and the *Contractors* retains a duplicate copy of the inventory. The *Contractor* updates the inventories as required by the *Employer*.
b) All equipment brought into the site by the *Contractor* is clearly marked and is not removed from the working area unless the *Contractor* identifies it as his/her property and the *Project Manager* has accepted the removal.

c) All equipment, plant and material brought into the site are to be clearly consigned to the *Contractor*. The *Project Manager* first accepts the removal of any excess plant and materials and waste.

7.9 Security Requirements

7.9.1 General

d) ACSA security maintains discipline on roads within the area. The *Contractor* to ensure adherence to the road traffic offences within the ACSA premises.

e) The *Contractor* does not permit personnel who are under the influence of drugs or alcohol to enter the working area. The Security may, at their own discretion, have a person tested. The *Contractor* bears the costs for positive testing. The tariffs for these tests are obtained from the *Employer's* medical station.

f) Further information regarding security requirements is available from the following person:

Name	:	Mr Jacob Ramathe
Telephone	:	TBA
e-mail	:	Jacob.Ramathe@airports.co.za

7.9.2 Entry

a) The *Contractor* obtains entry permits that are issued free of charge by security upon submission of the employee's valid identity documents, subject to *Employer's* applicable rules.

b) The *Contractor* undertakes always to be in possession of an entry permit, worn so that identification can be made immediately. The *Contractor* consents the *Employer's* security searching and inspecting property entering or remaining within the area.

c) The *Employer* requires a security clearance of all persons entering the area. The *Contractor* applies for the security clearance of its personnel timeously. Detailed requirements for security clearances and procedures for the issue of permits are available from the offices. Temporary permits are only issued by security in cases of emergency break stops.

d) When a *contractor's* employee is no longer required on the site, or in cases where an employee leaves the employment of the *Contractor*, the *Contractor* is responsible for the recovery and delivery of the entry permits to the *Employer's* Security department for immediate cancellation prior to any employee leaving the site. The cancellation receipts are issued upon the return of the permits.

e) If the Completion Date is extended, the *Contractor* arranges with the *Employer* for an extension of the entry permits and updating of records.

7.9.3 Vehicles

f) Access into the working area by the *Contractor*" vehicles is controlled by security.

g) *Contractor* to provide transportation for his employees to different site locations in the ACSA security area.

h) The *Contractor* compiles, in consultation with the *Employer's* official responsible for the *works*, a vehicle registration list that reflects the type, make and registration particulars of the vehicle and submits the form to security for acceptance and registration, prior to the date of commencement of the *works*.

i) The *Employer's* security personnel have authority to stop and search vehicles and personnel at their discretion. The *Contractor* advises all his/her employees and S*ubcontractors* accordingly.

j) The *Contractor's* supplier's drivers identify themselves by means of a valid identity document and produce a delivery note addressed to the *Contractor*. The responsible *Employer's* official signs in the supplier's

vehicle and its occupants, escorts them to the working areas, escorts them out after the delivery, and signs out the supplier's vehicle and its occupants.

k) Security searches and inspects all vehicles and their contents entering and leaving the area.

7.10 Subcontracting

a) *Contractor* at all times only utilizes approved ACSA vendors for the execution of the *works.* The *Contractor* submits all proposed *Subcontractors* to the *Employer* for acceptance. *Contractor* submits and complies with the following:

- A list of the proposed *Subcontractors*
- A statement of any *works* that should not be subcontracted.
- A statement of any *works* that is required to be subcontracted.
- Details of any restrictions applicable in the use of labour, or preference for utilization of Small, Medium and Macro Enterprises, Black Economic Empowered Enterprises, Black Woman Owned Enterprises, etc.

b) It is important to take any preplanned shutdown dates of the *Employer's* works into consideration.

c) All *Contractors* are appointed on a back-to-back basis in accordance with the NEC Engineering and Construction Subcontract or the NEC Professional Services Contract.

7.11 Permits

7.11.1 Permits

a) The *Contractor*'s responsible person appointed in terms of the OHS Act receives permit training, from the *Employer*, before the *Contractors* starts any work.

b) The *Contractor* shall familiarize himself with ACSA's safety and security requirements relating to permits to prevent any unnecessary work delay.

c) The *Contractor* shall have no claim against ACSA in the event that a permit request is refused.

Permit	Required by/for	Department
AVOP – Airside Vehicle Operator permit	All drivers of vehicles on airside	ACSA Safety
Airside Vehicle Permit	All vehicles that enter airside	ACSA Safety
Basement Parking Permit	All vehicles allowed to enter the delivery basement	ACSA Parking
Personal Permit	All persons employed on the airport	ACSA Security
Cell Phone Permit	All persons taking cell phones to airside	ACSA Security
Tools & Laptop Permit	All persons taking tools and laptop to airside	ACSA Security
Camera Permit	All persons taking camera equipment to airside	ACSA Security
Hot Works Permit	All welding and/metal cutting work on the airside	ACSA Safety
Airside Projects/Works Permit	For all projects on the airside	ACSA Airport Operations / Safety
Low/Medium Voltage Permit to Work	For all work on substations, distribution boards and cables	ACSA Electrical Maintenance

7.11.2 Excavation permits (if applicable)

a) The *Contractor* arranges for excavation permits for each excavation in a specific area with the *Employer.*
b) The *Contractor* does not commence any excavation without the necessary permits and the prior acceptance by the *Employer*.

7.11.3 Other Requirements

c) Proof of having attended the Airside Induction Training course is required for all personal permit applications.
d) Fees are levied for these courses. Fees are further levied for all permit renewals and refresher courses where applicable.
e) The use of cell phones is not permitted unless the user is in possession of an appropriate Airport permit for the device.
f) Cell phone permit issuing authority lies with the ACSA Security department.
g) The *Contractor* will not be allowed to use two-way radios at the Airport unless these radios are of the type, model and frequency range as approved by the ACSA IT department.
h) Approved radios may be arranged via ACSA IT department – payment will be for the account of the *Contractor.*

8 Health and Safety

8.1 Safety, Risk Management

a) THE *EMPLOYER* AND *CONTRACTOR* MAINTAINS A HIGH STANDARD IN SAFETY, HEALTH AND ENVIRONEMENT, AND THE *CONTRACTORS* UNDERTAKES NOT TO JEOPARDISE THESE STANDARDS.
b) The *Contractor* shall comply with the required *Employers* and *Contractor's* specification relating to Safety, construction regulations as well as the applicable OHS Act and all its regulations.

8.2 *Employer* Safety, Health and Environment Requirement

a) The *Contractor* compiles a project specific SHE management plan in accordance with the requirements and stipulations of *Employer* Procedure for Service Provider Safety Management and submits it to the *Employer* for acceptance as per the accepted program. The *Contractors* SHE management plan reflects the process and timing of SHE related issues and how they will be handled in respect to actions required to provide the *works*.
b) The *Contractor* complies with all legal requirements, the *Employer's* SHE specifications as well as the operations site-specific policies, standards, codes, procedures, health and safety rules, whilst working on the Site.
c) The *Contractor* complies with all requirements as stated in this Works Information and attachments hereto.
d) The *Contractor* performs the *works* safely as per the requirements of the Works Information.
e) Prior to commencing the construction work, the *Contractors* submits the plans for Equipment maintenance, security and dust control at the site to the *Contractor* for acceptance and complies with such plans as accepted by *Contractor.*

8.3 Legal appointments

a) This agreement will serve to exclude the presumption in terms of the OHS Act Section 37(1) and will serve to meet the requirements of Section 37(2) of the Act.
b) The *Contractor* warrants that his people all have the professional and technical expertise, the qualifications, and legal appointment, competencies and skills and the appropriate equipment, tools, resources, facilities, licenses and permits to perform its obligations.
c) The *Contractor* to ensure that the Construction Health and Safety Officer are registered with the South Africa Construction and Project Management Professions (SACPCMP), and he/she has the necessary competencies. They must be allocated to site full time.

8.4 Application for a construction work permit / notification of construction work

a) The *Contractor* participates with the *Project Manager* in the provision of the necessary documentation in compliances with the requirement for application for a permit to do construction work and or notification of construction work when applicable.

8.5 Construction pre-qualifications

a) The *Contractor* may conduct a pre-qualification assessment of its *Subcontractors* to be appointed on existing SHE performance and overall, SHE management effectiveness.
b) The *Contractor,* with reference to the *works* to be performed, verifies the *Subcontractor's* resource capacity, employee qualifications and competence required to provide the *works*.
c) Prior to commencing the construction work, the *Contractor*, and each of his/her *Subcontractors* who qualify as a Principal Contractor as defined by the OHSAct, submits its relevant Construction SHE plans with minimum requirements as per MegChem SHE requirements and *Employer* SHE requirements.

8.6 Risk Management

a) The *Employer* project specific base line risk assessment is provided.
b) The *Contractor* does not perform / service / work before undertaking a risk assessment of the site and work / service to be performed and obtaining a permit to work from the *Employer*. The risk assessment and control measures to be taken by the Principal *Contractor* or *Subcontractors* are to be reviewed by the *Project Manager* and an agreement must be reached on communication and co-operation requirements.
c) The *Contractor* submits to the *Project Manager* a project specific baseline constructability review / risk assessment and risk mitigation plan for the *works*.
d) The *Contractor* has his/her own employee(s) trained to sign-on and sign-off of permits to work (permit recipient).

8.7 Reporting of incidents

a) The *Contractor* immediately contacts the *Employer* to report the following incidents mentioned below:
    - Near misses.
    - Any incident/accident or injury that may have a significant impact on the project or adjacent plants.
    - Any occupational injuries and illnesses on Site (fatal cases, lost workday cases, restricted work cases, medical treatment cases, first-aid cases and section 24 incidents).
    - All visits from Department of Labor, any condition that may endanger the adjacent and surrounding plants and any condition that may endanger the construction activities.
    - All reportable incidents as required by legislation (flying or falling objects, machinery out of control, failure of safety or alarm systems, dangerous substance spilled or uncontrolled release of substance under pressure).
    - Any occupational health or hygiene incidents other than illnesses; and
    - Any damage caused to the property or environment.
b) The *Contractor* complies with the *Employer's* requirements with regards to incident management. The requirements are set out in the incident management toolkit and will be issued to the Principal Contractor after contract award.
c) Only injuries which are classified as project related is accepted and recorded for statistical purposes.

8.8 Behavioural Based Safety (BBS)

a) The *Contractor* ensure that a behaviour-based safety system is implemented on all project in line with the specified principles.

b) The *Contractor* understands the consequences of deviating from expected SHE behaviours. Deviations from expected SHE behaviours are managed according to the disciplinary codes with due consideration for distinguishing between mistakes and violations.
c) The *Contractor* participates and ensures leadership is enabled to enhance safety engagement and climate through the behaviour transformation interventions from the *Contractor*, in order to achieve and sustain zero harm.

9 Programme and Reporting

9.1 Project programme

9.1.1 First programme for acceptance

a) The *Contractor* will compile a basis of schedule that will serve as the input document for the program. The *Contractor* must provide input into the basis of schedule and must make sure that all the critical activities are listed, and all interfaces are addressed.

b) The *Contractor* will compile a level 3 programme. The *Contractor* must provide input into the program and must make sure that all the critical activities are listed, and all interfaces are addressed. On accepting the program, the program will become the program of the *Contractor*.

c) This programme will show all contractual dates, major activities per phase and other milestone dates. The programme will contain the information as stipulated in NEC 3 clause 31.2.

9.1.2 Requirements of Programme

a) The *Contractor* will compile the revised programme. The *Contractor* must provide input into the program and must provide the progress.

a) The first revised program will be at least a level 4 programme and is the basis for project control and progress measurement by overall histograms and progress curves. On accepting the program, the program will become the program of the *Contractor*.

b) If the Basis of Program change in the revised program, then the updated Basis of Program narrative document must be submitted with the revised program.

c) The programme must contain the information as stipulated in clause 31.2 of the contract.

d) Resources are uploaded on the level 4 schedule. In the process of resource loading technical constraints, availability of resources in the region, quality of resources and performance factor of resources needs to be considered.

e) The level 4 programme includes, but not be limited to, the detail of activities for completion of procurement, construction, pre-commissioning and testing and hand-over.

9.2 Daily Reports (Site work only)

a) Daily diaries must indicate the daily activities, the resources utilized on site, activity duration, deviations (if any) and signed off by the *Contractor*'s representative.
b) Daily diaries to be submitted to the *Contractor* daily before 11H00.
c) The daily dairy must contain the following as a minimum.

- Planned activities for the previous period.
- Previous planned activities not met.
- Daily look ahead at all activities planned for the week.
- Areas of concern
- Safety status
- Labour report indicating the *Contractor*’s available manpower to meet the program for provision of the *works.*
- Any slippages to the agreed baseline and recovery plans to pull back the progress to the agreed baseline.

10 Management of the *works*

10.1 Project Management

a) The *Contractor* must ensure that proper contract management is performed as required by the contract. All documentation and notification are issued in a timely manner within the time intervals as required in the contract.
b) The *Contractor* ensures that all risks are managed to enable the successful execution of the project.
c) Any risk that occurs or develops during any phase of the project is brought to the *Contractor’s* attention in writing.
d) A general risk analyses is performed prior to starting with the construction work.

10.2 Construction management.

a) The *Contractor* manages his access to the Site.
b) The *Contractor* manages his activities on Site to ensure that no interference takes place between his work and that of the *Employer* and *Others*.
c) The *Contractor* maintains and promotes labour harmony on the Site and the working environment in general.
d) The *Contractor* immediately reports any potential labour disharmony to the *Project Manager*.
e) The *Contractor* does not recruit or employ any personnel from the *Employer*, *Contractors* and *Others*, without prior acceptance of the *Project Manager*.
f) The *Contractor* attends the Constructability Review sessions.
g) The *Contractor* attends the Construction Readiness Review sessions.

11 Financial

a) The *Contractor* must submit a proforma invoice to the *Project Manager* for acceptance after the assessment date.
b) The *Project Manager* will return the signed proforma with comments, if any, to the *Contractor*.
c) The *Contractor* must incorporate the comments on the accepted proforma invoice and send the tax invoice, either electronically or a hard copy, before the first of the month to:

Annamarie Bothma:
Cell: **084 514 0670**
Work: **017 620 2259**
Email: **annamarie.bothma@megchem.com**

Deviations to this will result in late payment.

d) Any queries regarding payments can also be addressed to the above contact.
e) The *Contractor*’s invoice must as a minimum contain the following:
f) The registered name of the company
g) The VAT registration number of the company
h) The *Contractor*’s contract number
i) The invoice sequence number
j) The amount paid to date.
k) The value of the invoice amount split as per the activity or milestone schedule.
l) Any retention monies to be deducted from the invoice.

12 List of Attachments

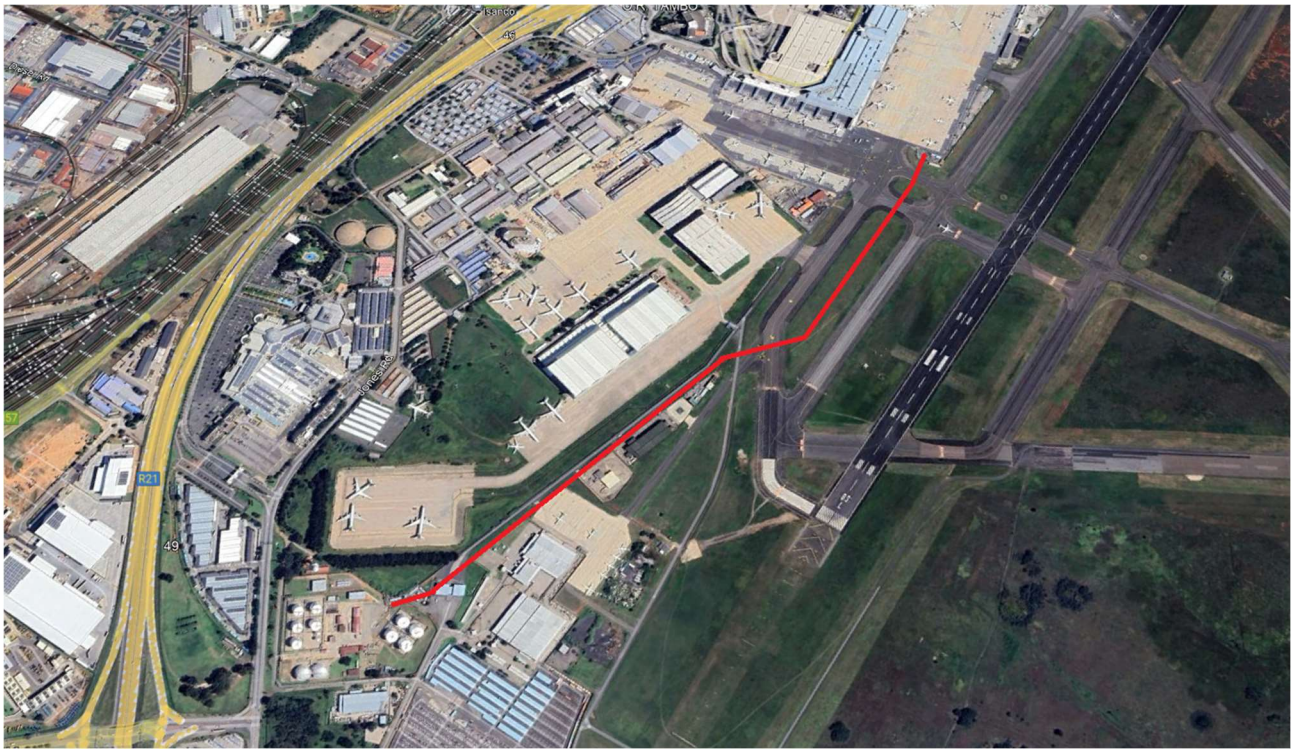
12.1 Appendix A: Enlarged Google Earth Images showing intended route, not to scale.

12.2 Appendix B: BoQ

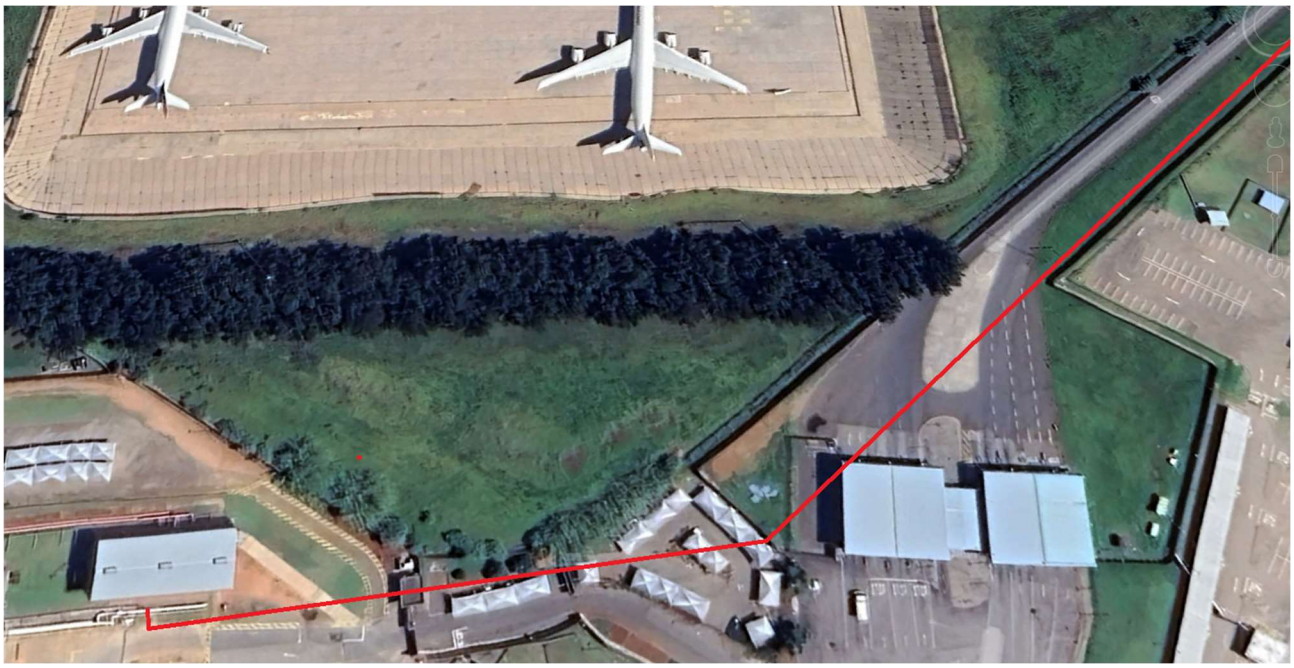
12.3 Appendix C: Programme

12.4 Appendix D: Drawing

12.1 Appendix A: Enlarged Google Earth Images showing intended route, not to scale.



Overall Route



Commencement of Route

12.2 Appendix B: BoQ

L23638 - ACSA OR Tambo 20-inch Jet A1 fuel Feeder Line **Revision: 0B**
Preliminary Bill of Quantities Pipe Jacking
Demolition
Doc no.: L23638 - 023

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
		SCHEDULE:2				
2		**PIPE JACKING**				
		Note the position of buried services is unknown.				
		Area 1 - Bravo Taxiway +-150m pipe jacking				
		Set up all equipment inside jacking pit at edge of taxi way	Sum	1		R -
		Install and jack forward Class 100D 1117mm internal diameter, Rocla jacking pipes or equivalent, length of pipe is 2440mm. Top of pipe minimum 1500mm below ground level. Rate all inclusive to advance pipe sleeves, including lubrication, compressors, temp works etc	No	63		R -
		Remove excavate soil from pipe during jacking and stockpile at ground level for the civil contractor to remove off site	m³	150		R -
		Supply and install high pressure grout around perimeter of jacked pipe	Sum	1		R -
		Remove all jacking equipment (complete) from jacking pit	Sum	1		R -
		Attendance by the Pr Geotechnical Engineer during the jacking process	hours	72		R -
		Stability certificate and report on jacking process by Pr Geotech Eng	Sum	1		R -
		Standing time for all mechanical equipment associated with pipe jacking	hours	24		Rate only
		Standing time for all labour associated with pipe jacking	hours	24		Rate only
		Clean up the construction area to the satisfaction of ACSA	Sum	1		R -
		Area 2 - India and Lima Taxiway +-200m pipe jacking				
		Set up all equipment inside jacking pit at edge of taxi way	Sum	1		R -
		Install and jack forward Class 100D 1117mm internal diameter, Rocla jacking pipes or equivalent, length of pipe is 2440mm. Top of pipe minimum 1500mm below ground level. Rate all inclusive to advance pipe sleeves, including lubrication, compressors, temp works etc	No	82		R -
		Remove excavate soil from pipe during jacking and stockpile at ground level for the civil contractor to remove off site	m³	200		R -
		Supply and install high pressure grout around perimeter of jacked pipe	Sum	1		R -
		Remove all jacking equipment (complete) from jacking pit	Sum	1		R -
		Attendance by the Pr Geotechnical Engineer during the jacking process	hours	72		R -
		Stability certificate and report on jacking process by Pr Geotech Eng	Sum	1		R -
		Standing time for all mechanical equipment associated with pipe jacking	hours	24		Rate only
		Standing time for all labour associated with pipe jacking	hours	24		Rate only
		Clean up the construction area to the satisfaction of ACSA	Sum	1		R -
					Sub-total carried forward	R0.00
					Sub-total brought forward	R0.00
		SCHEDULE:2				
		PIPE JACKING				
		Total Carried Forward to Summary of Schedules			***Total***	***R*** -

12.3 Appendix C: Programme

12.4 Appendix D: Drawing