

CONTRACT DATA

**A contract between
SENTECH, Sender Technology Park, Radiokop, Octave Road, Honeydew,
and**

**Appointment of Service Provider/s for the Planning, supply, installation, and
commissioning of masts for Sentech**

Bid Number: SENT-054-2023-24

Contents

Part C1: Agreements and contract data

Form of Offer and Acceptance

Contract Data provided by the Sentech

Contract Data provided by the Supplier

Part C2: Pricing Data

Part C3: Scope of Work

Conditions of Contract (available separately)

PART C1: AGREEMENTS AND CONTRACT DATA –

Form of Offer and Acceptance Offer

Sentech, identified in the acceptance signature block, has solicited offers to enter into a contract for the **provisioning of 15m Mast structures**.

The Bidder, identified in the offer signature block, has examined the documents listed in the Tender Data and addenda thereto as listed in the Bid schedules, and by submitting this offer has accepted the conditions of the Bid.

By the representative of the Bidder, deemed to be duly authorized, signing this part of this form of offer and acceptance, the Bidder offers to perform all of the obligations and liabilities of the Bidder under the Contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the conditions of contract identified in the Contract Data.

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF APPLICABLE TAXES; (in the Bids applicable currency).

_____ (amount in words);

_____ (amount in figures)

NB: A combined cost for the number of Masts installed on locations as per Table A in PART C2: PRICING DATA. All prices must be for Masts delivered and installed with all duties paid. The price must be carried over from the price breakdown / schedule of rates provided in the Bid document.

This offer may be accepted by Sentech by signing the acceptance part of this form of offer and acceptance and returning one copy of this document to the Bidder before the end of the period of validity stated in the Tender Data, whereupon the Bidder becomes the party named as the Bidder in the conditions of contract identified in the Contract Data.

Bidder's Signature(s) _____

Signed by the Bidder at _____ **on this the** _____ **day of** _____ **20** _____

Name(s) _____

Capacity _____

Address (Domicillium)

Acceptance

By signing this part of this form of offer and acceptance, Sentech accepts the Bidder's offer. In consideration thereof, Sentech shall pay the Bidder the amount due in accordance with the conditions of contract identified in the Contract Data. Acceptance of the Bidder's offer by the signature by Sentech shall form an agreement between Sentech and the Bidder upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract, are contained in:

Part C1 Agreements and contract data, (which includes this agreement)

Part C2 Pricing data

Part C3 Scope of work.

and drawings and documents or parts thereof, which may be incorporated by reference into Parts C1 to C3 above.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto as listed in the Bid schedules as well as any changes to the terms of the offer agreed by the Bidder and the employer during this process of offer and acceptance, are contained in the schedule of deviations attached to and forming part of this agreement. No amendments to or deviations from the said documents are valid unless contained in this schedule of deviations.

Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Sentech's Signature(s) _____

Signed by Sentech at _____ **on this the** _____ **day of** _____ **20** _____

Name(s) _____

Designation _____

SENTECH SOC LIMITED,

Sender Technology Park

Octave Road, Radiokop

Honeydew

Johannesburg

Date _____

Upon acceptance by Sentech of the Bidder's offer, a contract will come into existence.

SCHEDULE OF DEVIATIONS

Notes:

- 1 The extent of deviations from the Bid documents issued by the Sentech before the Bid closing date is limited to those permitted in terms of the conditions of Bid.
- 2 A Bidder's covering letter shall not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid, become the subject of agreements reached during the process of offer and acceptance, the outcome of such agreement shall be recorded here.
- 3 Any other matter arises from the process of offer and acceptance either as a confirmation, clarification or change to the Bid documents and which it is agreed by the Parties becomes an obligation of the contract shall also be recorded here.
- 4 Any change or addition to the Bid documents arising from the above agreements and recorded here shall also be incorporated into the Contract.

1. **Subject** _____

Details _____

2. **Subject** _____

Details _____

3. **Subject** _____

Details _____

4. **Subject** _____

Details _____

By the duly authorised representatives signing this schedule of deviations, Sentech and the Bidder agree to and accept the foregoing schedule of deviations as the only deviations from and amendments to the documents listed in the Tender Data and addenda thereto as listed in the Bid schedules, as well as any confirmation, clarification or changes to the terms of the offer agreed by the Bidder and Sentech during this process of offer and acceptance.

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

Contract Data

Part one - Data provided by Sentech given in all contracts

1. The *Purchaser* is

SENTECH SOC LIMITED,

Sender Technology Park

Octave Road

Radiokop

Honeydew

Johannesburg

2. General

The National Treasury General Conditions of Contract for goods and services (NT GCC, 2010) or General Conditions of Contract for Works (2015) as issued by National Treasury and the Construction Industry Development Board of the Republic of South Africa apply, respectively.

The goods are specified in the Scope of Work. The Special Conditions of Contract (SCC) are stipulated in the Tender Data.

3. Goods information:

The *Goods Information* is in the document called "Scope of Work" and in the documents and drawings referred to by it.

4. Terms of Delivery

The *Terms of Delivery* are contained in the General Conditions of Contract (GCC) and Special Conditions of Contract.

5. Language

The *language* of this contract is English.

6. Governing Laws and Jurisdiction

The Contract shall be governed by and interpreted according to the laws of the Republic of South Africa.

In the event of a conflict between or inconsistency in the laws applicable in the various provinces of the Republic of South Africa, the law as applied and interpreted in the Gauteng Province shall prevail.

The parties irrevocably submit to the exclusive jurisdiction of the South Gauteng High Court, Johannesburg in respect of any action or proceeding arising from this Bid.

This Bid and all contracts emanating there from will be subject to the General Conditions of Contract issued in accordance with Treasury Regulation 16A published in terms of the Public Finance Management Act, 1999 (Act 1 of 1999). The Special Conditions of Contract are supplementary to that of the General Conditions of Contract. Where, however, the SCC are in conflict with the GCC, the SCC shall prevail.

7. Sub-contracting post award

A Bidder awarded a Bid may only enter into a subcontracting arrangement with the approval of Sentech. The successful bidder may not subcontract more than 25% of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level of contributor than the Bidder concerned, unless the contract is subcontracted to an EME that has the capability and ability to execute the subcontract.

8. Transformation Plan

A transformation plan is a record of activities an entity intends to undertake to improve its BBBEE Level through Ownership, Management and Control; Skills Development; Enterprise and Supplier Development and Socio-Economic Development.

Sentech reserves the right to request a BBBEE transformation plan with clearly defined timelines and milestones if the recommended bidder does not meet Sentech's transformation goals. These milestones

must be achieved over the term of the contract. This transformation plan shall be submitted within 10 working days from the written request, failing which Sentech reserves the right to withdraw its appointment of the preferred recommended Bidder.

9. Warranty

The warranty period is 12 months after Delivery.

10. Payment

The method and conditions of payment are contained in the Tender Data, GCC and SCC.

The interest on late payment is 0 % per complete week of delay.

11. Currency

South African registered businesses that purchase equipment overseas and quote in foreign currency will be required to provide Sentech a 6-month forward cover contract on appointment. The 6 months forward cover will be re-negotiated and renewed every 6 months should the contract term on this tender be longer than 6 months.

12. General - Prices

Unless approval has been obtained from Sentech, no adjustment in contract prices will be made.

Applications for price adjustment must be accompanied by documentary evidence in support of any adjustment.

13. Price Negotiations

Sentech reserves the right to negotiate market related prices. If market-related prices are not agreed to, Sentech reserves the right to cancel the Bid.

14. Liabilities indemnities and insurance

Insurance is required from the Bidder in respect of delivery and transportation where applicable.

15. Disputes

Should any dispute, disagreement or claim arise between the parties ("the dispute") concerning this Agreement, the parties shall try to resolve the dispute by negotiation. This entails one party inviting the other party to meet and attempt to resolve the dispute within fourteen (14) days from the date of the written invitation.

If the dispute has not been resolved by such negotiation as referred to in this clause above, the Parties shall submit the dispute to the Arbitration Foundation of Southern Africa ("AFSA") for administered mediation, upon the terms set out by the AFSA secretariat.

Failing such resolution, the dispute shall be resolved by arbitration in accordance with the rules and procedures of AFSA by an arbitrator appointed by AFSA. Where the arbitration route is followed, the dispute must be adjudicated within Johannesburg in the English language and finally resolved in accordance with the rules of AFSA, by an arbitrator or arbitrators appointed by that Foundation.

The provisions of this clause shall not preclude any party from obtaining relief from a Court of competent jurisdiction. To this extent, the Parties hereby consent to the jurisdiction of the South Gauteng High Court, Johannesburg, South Africa. The provisions of this clause shall continue to be binding on the Parties, notwithstanding any termination or cancellation of this Agreement.

16. Termination

Sentech shall have the right, at its sole and exclusive discretion, upon written notice to the Bidder, to terminate this Agreement, in whole or in part should the Bidder fail to perform any of its obligations or deliver any deliverable timeously or should Sentech not be satisfied with the quality of any service/s in terms of this Agreement, to the satisfaction of Sentech.

Sentech shall furthermore have the right, as a result of such termination, to appoint a third party to perform the obligations of the Bidder in terms of the Agreement and the Bidder indemnifies Sentech against all costs incurred by Sentech in appointing such third party to fulfil the obligations of the Bidder.

Sentech shall have the right, at its sole and exclusive discretion, to terminate this Agreement, at any time, upon 30 (thirty) days' written notice to the Bidder.

17. Contract Term

This contract will be a once off supply and install of a pre-defined list of sites

18. Supplier Due Diligence

Sentech reserves the right to conduct supplier due diligence at any time pre, during and post the contract period. This may include announced or unannounced site visits.

19. Cession

Sentech shall be entitled to cede, delegate, assign, charge, transfer or otherwise dispose of this Agreement or any rights or obligations therein in whole or in part, upon prior written notice to the Bidder.

20. Monitoring and Evaluation

The service delivery and performance of the Bidder will be monitored and evaluated by Sentech at all relevant times. In the event that the Bidder defaults in any manner or form, Sentech reserves the right to blacklist the Bidder on the National Treasury Database of Prohibited Suppliers and Tender Defaulters, and to take such further steps as may be warranted in the circumstances which steps shall be determined at Sentech's sole and exclusive discretion.

21. Protection of Personal Information Act No. 4 of 2013 ("POPI")

Sentech is POPI compliant, and the Bidder will ensure that it conducts itself within the prescripts of the prescribed legislation.

Should Sentech need to collect Personal Information by law or in consideration of the Tender, and the Bidder fail to provide the Personal Information when requested, Sentech may refuse to accept the relevant services from the Bidder, and the Bidder will be notified in this event.

By agreeing to the terms of this Agreement, the Bidder voluntarily authorizes Sentech to process its' personal information (including its' name, credit card & banking details, physical address, telephone numbers, reference letters & any other information it has provided to Sentech) for purposes of Tendering and contracting.

The Bidder consents to the transfer of such personal information to third parties.

This consent is effective immediately and will endure until the relationship between the Bidder and Sentech has been terminated.

The Bidder indemnifies and holds Sentech harmless against any loss, whether direct or indirect, arising out of the failure to process any of its' personal data in accordance with applicable laws.

22. Delay damages and Penalties

Delivery will be measured against the Project Plan on a weekly basis. If any deviation from the submitted Project Plan is not rectified within 5 (five) working days, Sentech reserves the right to cancel the appointment of the Bidder and reallocate work to other Bidders. All incomplete deliverables at the time of cancellation will not be compensated.

Furthermore, in the event that the Bidder fails to meet any deliverable within any timeframe specified in the Project Plan, for any reason whatsoever, the Bidder shall be liable to pay Sentech a penalty of 20% (twenty percent) per week, per site of the accepted quoted amount.

Sentech's Representative is

Name: Mr. Zunaid Adams

Address: **SENTECH SOC LIMITED,**

Sender Technology Park
Octave Road,



Radiokop, Honeydew
Johannesburg

Tel No. 0114714400

Sentech's Representative is the Executive: Legal and Regulatory.

Contract Data

Part two - Data provided by the Bidder

Statements given in all contracts

The Bidder is:

Name _____ Address

a company / close corporation / partnership duly incorporated in accordance with the laws of the Republic of South Africa.

PART C2: PRICING DATA

PRICING

Pricing Validity and Instructions

All prices must be for equipment delivered to Sentech with all duties paid.

Tender Specifications	Compliance YES/NO	Reasoning and References
All prices shall be valid for a period of 12 months from Tender closing date.		
Pricing shall not increase without written consent from Sentech.		
The Tenderer shall specify the maximum price escalation that may be applicable following the 12-month period.		

Quotation Costing Structure

Tender Specifications	Compliance YES/NO	Reasoning and References
Tenderers shall provide a detailed cost breakdown of equipment, delivery, support services, and any other elements/services.		
Tenderers shall clearly show costs as local and/or international costs.		

Mast Pricing

In compliance with the quotation structure:

Tender Specifications	Compliance YES/NO	Reasoning and References
State the price per site for 15m masts as per the set Scope of work installed on the locations as per Table A below. (For evaluation purposes)		
State the price breakdown for the following components of every mast, (Mast, Delivery to site, Base, Earthing, COC)		
State the price for all other standard available mast or pole options available between 6m- 60m height. (Complete Table B below)		

INSERT PRICING TABLE TO GET TO SINGLE AMOUNT TO EVALUATE THE PRICE

Table A (Pricing Schedule)

Site Name	Latitude	Longitude	Mast Cost	Base Cost	Installation Cost	Delivery Cost	COC Cost	Earthing Cost	Total Cost
Huguenot	- 33.72825	18.97728							
Cookhouse	- 32.74269	25.80725							
Pietermaritzburg	- 29.61175	30.36936							
Gravelotte	- 23.95725	30.61428							
Oberholzer	- 26.34272	27.39481							
Noupoort	- 31.18083	24.95050							
Sutherland	- 32.39594	20.66808							
Pretoria North Sentech	- 25.74239	28.53178							
Total Excl VAT									
VAT									
Total Incl VAT									

Table B (Additional Masts)

State the price for all other standard available mast or pole options available between 6m- 60m height.

[illegible]

PART C3: SCOPE OF WORK (Specification)

15M high ANTENNA SUPPORT STRUCTURE

Turnkey solution for the:

- Design (standard designs supplied by mast manufacturing companies), manufacture, delivery, assembly, erection, and certification of a 15m high structural steel antenna support structure.
- Design, construction, and certification of the RC foundation structure for a 15m high structural steel antenna support structure
- Ancillary site works

at various existing telecommunication sites around South Africa

TYPE OF ANTENNA SUPPORT STRUCTURE

15m Self-supporting (freestanding) structures with the following features will be considered.

Self-Supporting (freestanding) lattice tower structures:

- Triangular or square in plan
- Parallel or taper in elevation
- Tube legs, angle legs or solid round legs
- Tube, angle, or solid round vertical/horizontal bracing members
- All tower members hot-dip galvanized
- Face width according to height and load capacity
- Internal foot rest platforms as required by OHS
- Internal or external safety climbing ladder as determined by plan dimensions and as required by OHS regulations
- Internal or external vertical cable ladder

Self-supporting monopole tower structures:

- Circular in plan
- Taper in elevation
- Slip jointed, tapered hollow, hot dip galvanized steel tubes of high strength steel
- Diameter according to height and load capacity
- External safety climbing ladder as required by OHS regulations
- External vertical cable ladder

applicable codes AND STANDARDS

The design, fabrication, assembly and erection of the 15m self-supporting structure and the design and construction of the RC foundation structure shall be completed in accordance with the requirements and specifications of the following standards.

Design

- ANSI/TIA-222-H (Structural Standards for Steel Antenna Towers and Antenna Supporting Structures)
- SANS 10160 (Basis of structural design and actions for buildings and industrial structures)
- SANS 10162 (The Structural use of Steel)
- SANS 10100 (The Structural use of Concrete)
- SANS 10225 (The Design and Construction of Lighting Masts)

Fabrication/Construction

- SANS 2001-CC1 (Concrete Works – Structural Works)
- SANS 2001-CS1 (Structural Steelwork)
- AWS D1.1.10 (Welding Standard)
- SANS 50025 (Structural Steel Standard)
- SANS 121 and ISO 1461 (Hot Dip Galvanizing)
- Hot Dip Galvanizing Association of SA
- SANS 2001-DP3 (Cable Ducts)
- SANS 920 (Steel Bars for Concrete Reinforcement)
- SANS 2001-BE2 (Earthworks-General)
- SANS 12944 and ISO 12944 (Corrosion Protection of Structural Steelwork)
- OHS regulations

ANTENNA LOADING, SWAY AND TWIST

Initial and future antenna loading requirements to be incorporated into the design of the 15m self-supporting structure are depicted in the table below.

The maximum sway and twist at the top of the 15m self-supporting structure at the design wind speed is 0.5°.

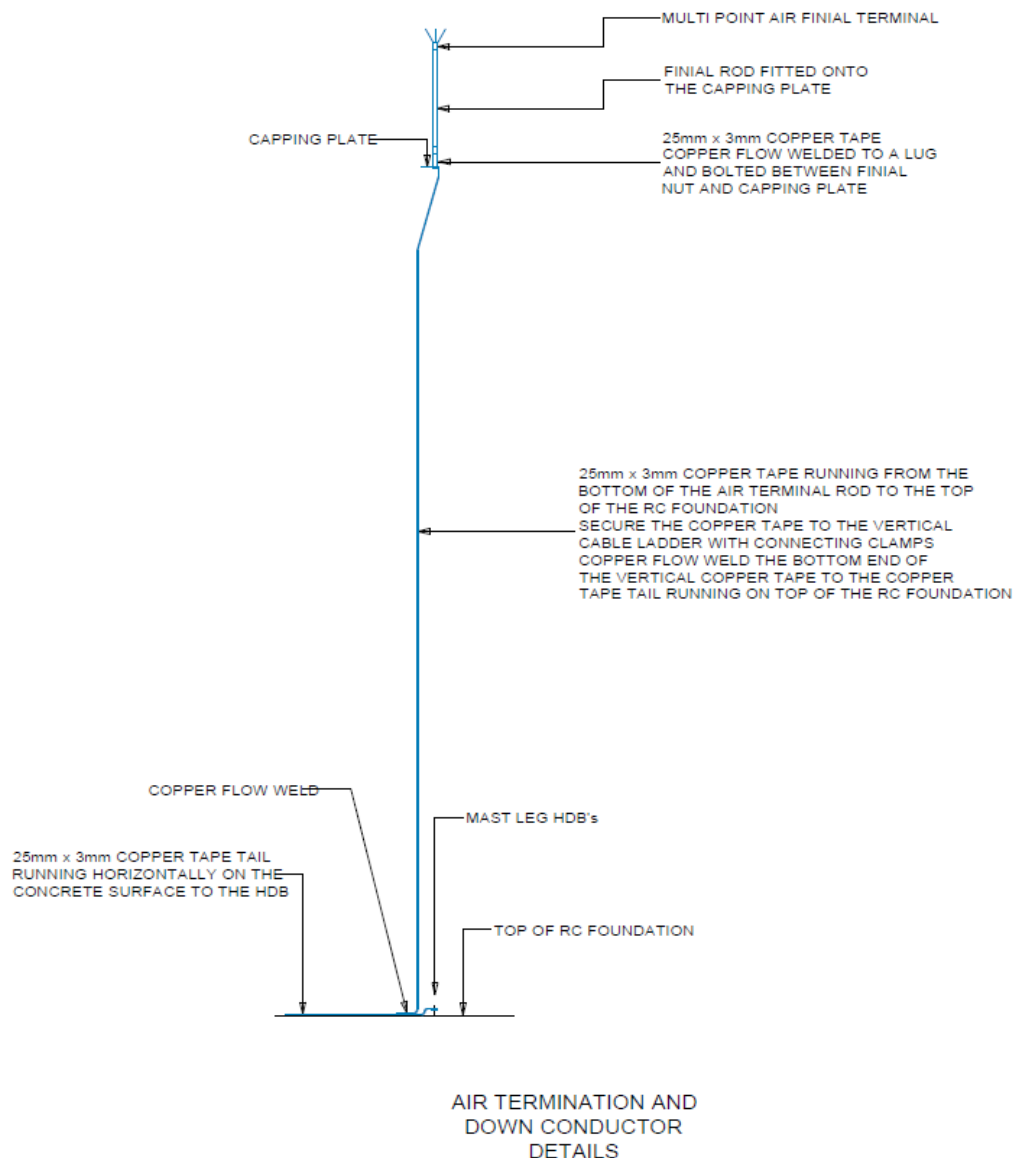
Table of typical initial and future antenna loading requirements:

Typical Antenna Load									
Make	Description	Qty	Weight (kg)	H (mm)	W (mm)	D (mm)	Mounting method	Mid Antenna Mounting Position (m)	Antenna Cable No, Ø and Kg/m
	Sector Antenna	4	4.51 kg	500m m	300m m	75mm	Direct mount	14.5m and one to each	6mm x 12,6gram/ft

								quadrant , in plan	
	Parabolic Dish	1	17	900m m	900m m	400m m	300mm Offset brackets, 1m long Ø80mm mountin g pole	10m	10,29mm x 0,1kg/m
	Parabolic Dish	2	8	600m m	600m m	350m m	300mm Offset brackets, 1m long Ø80mm mountin g pole	10m	10,29mm x 0,1kg/m

15m SELF-SUPPORTING STRUCTURE ACCESSORIES AND ADDITIONAL SITE BUILD REQUIREMENTS

- A 1000mm long lightning finial and bracket installed at the top of the tower structure
- A 25x3mm copper tape running from the from the lightning spike on top of the mast to the base of the mast. 25x3 copper tape running from the from the earthing spike on top of the mast to the base of the mast. Secure the copper tape to the cable support ladder at max 1.0m intervals



- Sub-foundation copper earthing mat and tail system formed from 25x3mm copper tape
- A steady burning low intensity, type A (minimum of 10 candela) dual AWL system complete with circuit breaker, photo cell switch, junction box, 3 core 2.5 mm² shielded cable (AWL to junction box), mounting brackets and stainless steel cable ties. System must be configured for redundancy operation as per the requirements of the Civil Aviation Authority. An Electrical Certificate Of Conformance is to be supplied for the installation
- Hot dip galvanized structural steel vertical climbing ladder and safety cage
- Hot dip galvanized structural steel foot rests mid-way up the structure if climbing internally and the structure serves as the safety cage
- 450mm wide hot dip galvanized structural steel vertical cable ladder mounted to the structure. Cable mounting horizontals a maximum of 1m vertical intervals
- 3no Ø110 Sub-surface uPVC cable ducts cast under/into the RC foundation, terminating under the bottom of the cable ladder and originating (sub-surface) at a point 1m from the foundation edge. Termination and origin ends to be capped. Vertical change in direction by means of slow bends
- Rigid tower foundation anchor bolt template for setting out and mitigating misalignment during RC foundation construction
- A name plate fixed to the RC foundation indicating North, date of installation and site co-ordinates

TOWER DESIGN AND DRAWINGS

The 15m self-supporting structure shall be designed by an ECSA certified professional Structural Engineer using data supplied by Sentech and data specific to the site under consideration. The structure shall be designed to withstand the full expected dynamic loads namely; antennae, feeders, wind loading, etc. Standardization of members and parts for the main structure should be considered to facilitate remote site delivery and ease of assembly.

Design data details are to be submitted, in the form of a design document, for each 15m self-supporting structure deployed at each individual site, clearly indicating but not limited to the following:

- Design engineering information
- Site information
- International/SANS design codes and standards used
- Design software package used to model the design
- Site specific wind load parameters
- Application of wind loads from antennas, members, cable ladder, cat- ladder, etc
- Design loading
- Material strengths
- Design reactions at tower/foundation interface
- Certified by the Structural Engineer

A set of design drawings, for each 15m self-supporting structure deployed at each individual site, are to be Included in the design documentation. The drawing pack should comprise of, but should not be limited to:

- Fully dimensioned and annotated tower plan, elevation and section general arrangement drawings
- Fully dimensioned and annotated tower plan, elevation and section assembly drawings
- Fully dimensioned and annotated base plate, leg splice, gusset, etc plan, elevation and section detail drawings
- Fully dimensioned and annotated cat ladder, cable ladder, lightning spike, foot rest, etc plan, elevation and section detail drawings
- Certified by the Structural Engineer

TOWER FABRICATION AND ERECTION

Tower Fabrication

- Steelwork to be in accordance with SANS 2001-CS1
- All steelwork to be hot dip galvanized in accordance with SANS 121
- Welding to be in accordance with AWS D1.1.10
- Steel to be grade S355JR in accordance with SANS 50025
- Hot dip galvanized grade 8.8 bolts, nuts, and washers
- Bracing connections to be welded or bolted (design dependant) but all site connections to be by bolt and nut
- Minimum bracing connection plate thickness design dependant
- Welds to be 6mm continuous fillet welds (U.O.N)
- All components to be free from burrs & sharp edges, etc
- Depending on the manner of procurement, fully detailed shop drawings are to be submitted to the Structural Engineer for approval before fabrication may commence
- Depending on the manner of procurement, the Tower structure is to be pre-assembled, complete with climbing ladder and cable ladder, for inspection by the Structural Engineer before galvanising
- No deviation from member sizes, dimensions or setting out points unless permission has been obtained from the Structural Engineer
- All tower structure members shall be labelled in detail and as per the assembly drawings, especially where the method of assembling is not obvious

- On towers where duplex protection systems are required (hot dip galvanizing and paint coating):
 - Sweep blast and clean all fabricated steelwork (except nuts, bolts and washers)
 - Painting shall take place as soon as possible after hot dip galvanizing
 - All shop painting and priming shall be done in accordance with the paint system manufacturers requirements
 - All mating surfaces must be unpainted (i.e. HD Galvanised only). Fabricator must mask off all mating surfaces including mating surfaces between steel sections and bolt heads/nuts prior to painting. The masked off area must be bordered by a strip of primer coat at least 20mm wide
 - Shop Painting of all fabricated steelwork (except nuts, bolts and washers) to consist of two or three coats depending on the paint product and severity of the environment. Coatings shall be applied within the dry film thickness range recommended by the manufacturer and as directed by the category for the environment of the site under consideration
- Hot dip galvanizing certificate of compliance to be submitted for all galvanized steelwork
- Quality control surface flaw detection test certificates to be submitted for fabrication welding
- Dry film thickness test certificates to be submitted for the shop painted system
- Performance guarantees, offered jointly by the coating manufacturer and coating applicator, are to be submitted for the applied coating system

Tower Erection

- Tower structure members shall be handled with care during loading and off-loading operations to mitigate mechanical damage and packed and strapped for delivery in a manner that prevents direct contact movement between tower structure members.
- Tower structure members shall be stored off the ground, on dunnage and in a manner that mitigates mechanical damage during site operations.
- The tower structure shall be adequately supported during the construction process
- No welding or drilling of holes in the tower structure for rigging purposes
- The Contactor is responsible for the design of rigging procedures as well as the design and fabrication of all rigging equipment and temporary supports to the tower structure
- The Contractor must submit a detailed rigging and de-rigging methodology to the Design Engineer for his/her approval.
- Bolt lengths shall be such that with the locking device in place, a minimum of one complete thread shall protrude beyond the nut.
- Bolt threads shall protrude inside the structure only
- Non-shrink grout below tower base plates
- Certification of the site installation by the Structural Engineer to be submitted
- Where required a temporary/emergency steady burning low intensity, type A (minimum of 10 candela) aviation warning light that shall remain operational on the new tower structure during the erection process at night or if power is not available
- Towers that are galvanised:
 - Repair all damage to the galvanized coating as a result of the delivery/erection process
 - Repairs by zinc rich epoxy or zinc rich paint are suitable for repairing galvanizing as well as two component, easy to use squish pack products, approved by and available from the Hot Dip Galvanizers Association of Southern Africa and all of its members
 - Site repairs should be limited to small coating defects. The coating thickness on the renovated areas shall be a minimum of 100µm. The paint coating should overlap the surrounding zinc by about 5mm.
 - Products referred to as 'cold-galv' are not suitable and must not be used
- Towers that are galvanised and painted:
 - Site painting, in accordance with paint manufacturers requirements/specification, of all previously masked off surfaces and all bolts and nuts after the mast is erected
 - Site touch-up painting to repair all areas of coating damaged by the delivery/erection process

FOUNDATION DESIGN AND DRAWINGS

The RC foundation shall be designed by an ECSA certified professional Structural Engineer using design reactions at tower/foundation interface, obtained from the tower design and geo-technical data obtained, by a competent soil testing specialist, for the installation site under consideration. RC foundations for the tower structures shall be designed to withstand the full (worst) expected dead and dynamic load combinations, transfer these loads from the tower structure via the tower/foundation interface and shall safely transfer such loads, through the RC foundation, to the founding surface in a manner that does not exceed the installation site safe soil bearing pressure.

Standard square pad foundation designs should be used for the purposes of the Tender.

- concrete characteristic 28-day strength: 30mpa
- nominal concrete aggregate size: 19mm
- minimum 75mm cover to main reinforcement
- 150kPa soil bearing pressures
- Top of foundation a minimum of 150mm protrusion above finished ground level
- Allowance for 3no Ø110 cable sleeves

The standard Tender foundation design shall be modified to suit the soil conditions found at the installation site once data from the site soil investigation has been confirmed.

Design data details are to be submitted, in the form of a design document, for each foundation design deployed at each individual site, clearly indicating but not limited to the following:

- Design engineering information
- Site information
- International/SANS design codes and standards used
- Design software package used to model the design
- Site specific design reactions obtained from the Tower design
- Site specific geo-technical data
- Design loading
- Material strengths
- Certified by the Structural Engineer

A set of design drawings, for each foundation design deployed at each individual site, are to be Included in the design documentation. The drawing pack should comprise of, but should not be limited to:

- Fully dimensioned and annotated foundation plan, elevation and section general arrangement drawings
- Fully dimensioned and annotated foundation reinforcement drawings
- Fully dimensioned and annotated anchorage detail drawings
- Certified by the Structural Engineer

RC FOUNDATION CONSTRUCTION, EARTHING MAT AND SUB SURFACE CABLE DUCTS

RC Foundation

- Excavate to firm founding level, including a minimum of 0.5m of working space around the foundation, for the RC Foundation, and set aside material for use as backfill
- Cable duct trenching to be conducted in conjunction with the RC foundation excavation
- Earthing tail trenching to be conducted in conjunction with the RC foundation excavation
- All exposed excavation beds and areas to receive fill, to be ripped to a depth of 150mm, wetted and compacted to 95% mod aashto
- Structural Engineer to inspect and approve founding level before placement of earthing mat casting of concrete
- All loose material to be removed from the bottom of the excavation and the sides thereof to be free of loose material

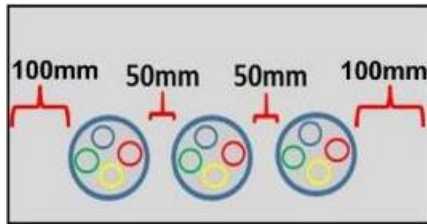
- in the event of over-excavation as a result of poor soil conditions, imported G4 fill material to be utilized and compacted in 150mm layers to 98% mod aashto, to bring founding up to the required level
- 50 mm layer of selected fill between concrete and earth mat, compacted to 98% mod aashto, to separate earth mat from RC concrete
- Formwork to be clean straight and rigid with tight joints which prevent any leakage of the concrete matrix
- Formwork to be designed to withstand all construction loads, to maintain the shape of the final structure and to ensure the safety of construction workers
- Stripping of formwork and propping times in accordance with SANS/Structural Engineers requirements
- All encased sleeves and holding down bolts and plates to be adequately secured in place to prevent movement during the placement of concrete
- Holding down bolt threads to be taped up for the concrete placement process and open ends of ducts to be capped
- Bending, fixing and positioning of reinforcement to be in accordance with SANS/Structural Engineer/drawing requirements
- Reinforcement to be placed on approved reinforcing cover devices, staggered with maximum spacing of 50d but less than 1000mm
- Structural Engineer to approve holding down bolt placement and reinforcement before casting of concrete
- Test results from 6No 150mm cubes per cast are to be provided. 3no cubes to be tested at 7 days and 3no cubes to be tested at 28 days
- Independent testing as above, in addition to the suppliers documentation, will be required if ready mix concrete is utilized
- Concrete placement to be continuous
- Backup mechanical vibration equipment to be on site in case of failure
- Concrete to be cured in accordance with SANS/Structural Engineers requirements
- All vertical exposed concrete to have a smooth off-shutter finish
- Finished horizontal surfaces to be level/slightly sloped, to mitigate ponding of water, and to be wood float finished
- Exposed horizontal corners to have a 20x20mm chamfer
- Cover to reinforcement to be measured from the outside of reinforcement
- Back filling of trenches and foundation excavations in 150mm layers compacted to 95% mod aashto
- Excess material from the excavations is to be removed from site and dumped at a municipal dumping site
- Completed foundation works to be certified by the Structural Engineer

SUB-SURFACE CABLE DUCTS

Each site installation shall have 3no Ø110 sub-surface uPVC cable ducts running from the equipment cabinet to the tower structure. Only a portion of installation is required under the tower works. The tower works portion consists of excavating, laying, backfilling, casting under/into the RC foundation, terminating under the bottom of the tower cable ladder and originating (sub-surface) at a point 1m from the foundation edge.

- Termination and origin ends to be capped to prevent the ingress of soil and water during construction activities
- The buried end points to be clearly marked on the surface for future location by the equipment cabinet installation team
- Vertical and horizontal changes in direction to be achieved by means of slow bends
- Minimum of 150mm vertical protrusion above top of RC foundation
- Trenching to be conducted in conjunction with the RC foundation excavation
- The minimum depth of the trench to be 1000mm

- The minimum width of the trench to be 630mm with spacing as depicted in the diagram below



- A typical bedding, padding and backfilling profile is shown in the diagram below



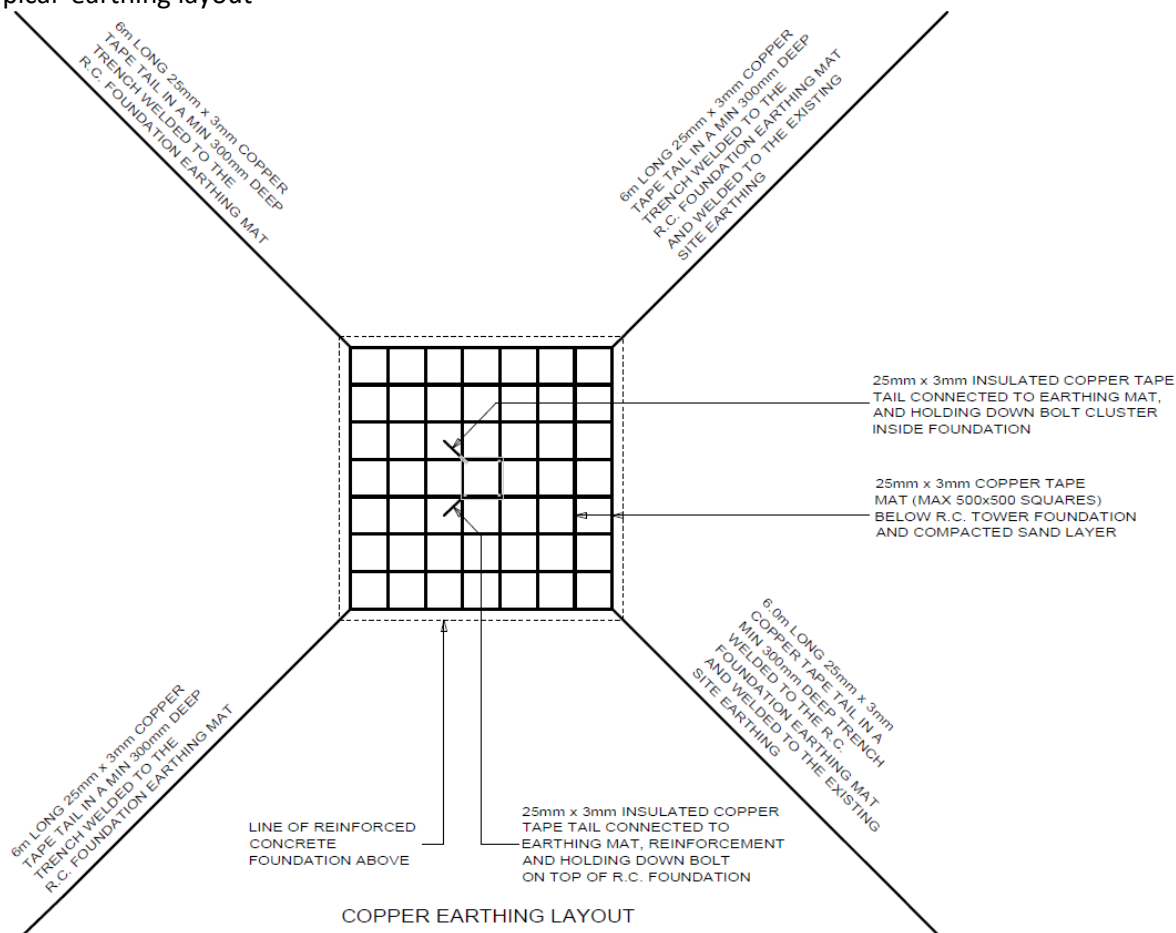
- Material used for bedding and padding to be of a granular, non-cohesive nature, graded between 0.6 mm and 13 mm. It is desirable to pass both bedding and padding through a sieve before putting it back in the trench
- Care shall be taken to place padding material simultaneously between and on both sides of the duct to prevent lateral duct movement during compaction
- Compaction of bedding and padding to be thoroughly and evenly executed using a hand tamper
- Material excavated from trench may be used as backfill, provided that it contains no stones, trash, or organic matter that could potentially damage the ducts. Backfill material is to be installed in layers not exceeding 150mm, with each layer compacted before the next is added. Manual compaction to be performed until the ducts are covered by both a 150mm layer of padding and 300mm of backfill. From this point on a vibratory plate compactor can be used
- The compaction of the final backfill layer to be by means of a compaction machine and shall be compacted to a density higher than or at least equal to that of the virgin soil parallel to the trench
- Excess material from the excavation is to be removed from site and dumped at a municipal dumping site
- After completion of the backfill, a DCP test is to be conducted and the test results submitted

Earthing Mat

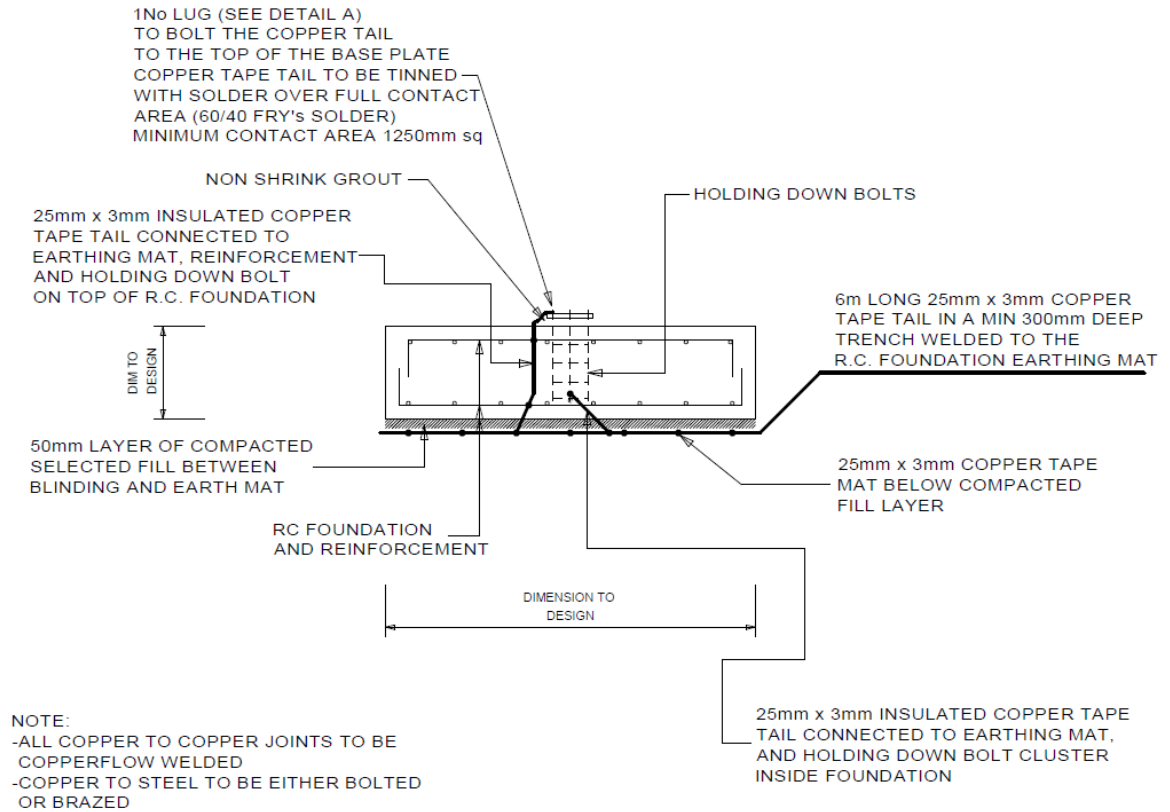
Typical copper earthing system to consist of:

- 25x3mm copper earthing tape with copper flow or cad welded joints to form a square earthing mat with squares of maximum 500mm
- 4no 6000x25x3mm diagonal copper tape tails with one end copper flow or cad welded to the square earthing mat at corners and the other end of two of the tails copper flow or cad welded to the existing site earthing. Length of tails

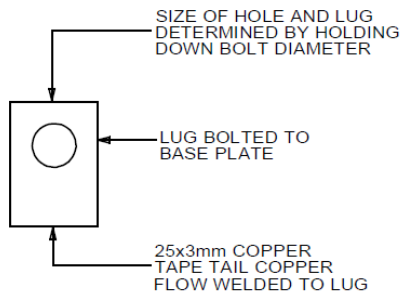
- 25x3mm insulated copper earthing tape (or insulated copper cable (70mm²) tail with one end copper flow or cad welded to the square earthing mat at a specific position and the other end connected to a holding down bolt, inside the foundation
- 25x3mm insulated copper earthing tape (or insulated copper cable (70mm²) tail with one end copper flow or cad welded to the square earthing mat at a specific position, connected to bottom and top reinforcement inside the foundation and the other end welded to a lug which is connected to a holding down bolt on top of the foundation
- Earthing mat to be inspected and approved before placing 50mm soil layer
- Resistivity and continuity test to be conducted and certificate to be submitted together with an Electrical Certificate Of Conformance
- Typical earthing layout



- Typical earthing elevation



TYPICAL FOUNDATION SECTION



DETAIL A

