THEMBISILE HANI LOCAL MUNICIPALITY

PROJECT No: THLM/SCM23/2025-2026/E04.

APPOINTMENT OF A PANEL ELECTRICAL CONTRACTORS FOR THE SUPPLY, DELIVERY AND INSTALLATION OF HIGH MAST LIGHTS AS AND WHEN REQUIRED FOR A PERIOD OF 36 MONTHS

SCOPE OF WORK

C 3.1 DESCRIPTION OF WORKS

C 3.2 STANDARDS

C 3.3 TECHNICAL SPECIFICATIONS

C.3.4 SCHEDULES

Scope of Works. **Part C3**

TABLE OF CONTENTS

Scope of Works **Part C3**

DEFINITIONS AND ABREVIATIONS

Client	Thembisile Hani Local Municipality, local government utility of South Africa
Contractor	Contractor appointed to Supply, Install and Commission the works as described in this specification
Engineer	The person or persons authorised by THLM to carry out inspections during manufacture, prior to or after delivery, of the items covered by this specification and acceptance thereof on behalf of the THLM
Acceptance	Means that the goods shall have been accepted by Thembisile Hani Local Municipality having been: ▪ inspected by the Engineer and found to comply with this specification. ▪ deliver, installed, and commissioned to the address in THLM, defined in a purchase order issued by THLM; and • received and signed for by an authorised employee of THLM on its behalf.
Employer	Thembisile Hani Local Municipality, local government, South Africa
Professional Engineer	Professional Engineer registered as a PrEng with the Engineering Council of South Africa (ECSA).
Marked Up drawings	Drawings clearly indicating with red all changes carried out at the site during the erection and testing works. The changed or cancelled items shall not be deleted by eraser or liquid corrector, but crossed only, to keep
THLM	Thembisile Hani Local Municipality
LV	Low Voltage (230V or 400V)
MV	Medium Voltage (11kV for this project)
O&M	Operation and Maintenance
OSH Act	Occupational Health and Safety Act
SHEQ	Safety, Health, Environmental and Quality

C3.1. DESCRIPTION OF THE WORKS

1. PROJECT DESCRIPTION

1.1. Overview of the Works

This contract includes the design, supply, delivery to site, off-loading, erection, installation, commissioning, testing, and handing over in full working order a high mast lighting structure, including floodlight luminaires, in Thembisile Hani Local on an "**as and when**" basis for a period of three (3) years.

Tenderers must allow for all items, whether specified or not, required to complete the installation.

Over and above all the items listed in Section 1.2 and1.3, the Contractor's Scope of Work will specifically include the following:

1. Complete Engineering of Works (refer to Section 1.3).
2. Geotechnical studies of proposed sites and issuing of soil test results.
3. Design, preparation and cast of appropriate foundations.
4. Design, supply, delivery to site, off-loading, erection, installation, commissioning, testing, and handing over in full working order a 30meter high mast pole complete with Luminaries and control panel as specified.
5. Perform an electrical connection to the installation from the Municipal Supply Point.
6. Test and commissioning of the high mast lighting installation.
7. Issuing of a certificate of compliance (COC) in terms of SANS 0142 Code of Practice.
8. Thembisile Hani Local Municipality to supply the electrical connection point to the base of the pole.

1.2. Scope of contract

This contract is envisaged to be a standard EPC project.

The Contractor shall perform all work and furnish labour, equipment and materials, construction plant, temporary works (including site welfare and temporary supplies), equipment, auxiliaries and accessories, special tools, spare parts and performing all operations and work required for the design, engineering, material selection, manufacturing, inspection and testing at the Vendor's or his Sub-vendor's Works, delivery at site including packing, forwarding, loading, transportation to site, custom clearance as required, transit insurance, unloading, storage at site, preservation, transportation from site-store to construction site, erection, finishing, painting, testing & commissioning, performance guarantee tests with all materials, tools, tackles, handling equipment, testing equipment/kits and putting into successful commercial operation complete with standard accessories/attachments as per the relevant technical Specifications, particular equipment specifications, data sheets, relevant codes and practices, which are described in the sections below, as well as applicable statutes, regulations and safety codes of Local Statutory authorities. In case of any conflicts between these requirements the Contractor shall refer to the Engineer for clarification.

Material, designs, labour, and devices, which are normally part of the contractor's scope of supply, essential for the proper supply, installation and operation of all equipment or are necessary for the proper functioning of the whole installation, shall be supplied/included even if not explicitly called for in this Specification at no additional cost to the Employer.

Specifically related to execution the Contractor must note the following:

1. The contractor shall perform all work in accordance with this Tender package. In case of any conflicts between this Tender package and any of Thembisile Hani Local Municipality standards and/or the Local Statutory authorities' regulations and safety codes, the Contractor shall refer to the *Engineer* for clarification.

In line with these requirements, the Contractor will be responsible for all relevant Plans, Working Methodologies and Registers, which will include, but not be limited to:

1. The Contractor is responsible for the development of Method Statements for all works to be accepted by the *Engineer*.
2. The Contractor must provide to the *Engineer* a list of all material to be used and the suppliers from which these materials have been procured including internal and external labelling. Labelling quality must be agreed to during the design stage.
3. The Contractor must provide to the *Engineer* a detailed construction programme and Construction Management plan, clearly indicating all quality control hold points for the relevant stakeholders to do inspections.
4. The Contractor must schedule a site construction kick-off meeting and ensure Thembisile Hani Local Municipality representatives (*Engineer* and Site Supervisor/Clerk of Works) are present.
5. The Contractor is responsible for safety checks and acceptance, and the development of a Health & Safety Plan, including all risk registers to be accepted by the *Engineer*.
6. The Contractor is responsible for the development of a Quality Control Plan to be accepted by the *Engineer*. The Contractor must comply with the Quality Control Plan.
7. The Contractor is responsible for ensuring compliance to Construction Regulations.
8. The Contractor is responsible for the development of an Environmental Management Plan to be accepted by the *Engineer*. The Contractor must comply with the Environmental Management Plan. The Contractor must serve all notices and pay all fees due in terms of the Environmental laws and regulations.
9. The Contractor is responsible for submission of three sets of as-built drawings after construction.

1.3. Complete Engineering of Works

It will be the responsibility of the Contractor to prepare and provide all the designs for the works to comply with the Employer's design requirements, which will consist of all Detailed Designs, Engineering and Construction Designs, including all calculations and drawings, for each element of the Works, to the Engineer for their review and approval, prior to the Procurement and/or Construction of any work. This will be at no additional cost to the project or the Client. The Complete Engineering Works will include, but not limited to, all geotechnical, civil, structural, mechanical and electrical aspects.

Immediately after the starting date, the Contractor shall start with the design of the works and the equipment.

During this design phase of the contract the Contractor is required to hold design review meetings to confirm all Employer requirements and to obtain the *Engineer's* acceptance for all design concepts, design interfaces and specifications to ensure that quality is designed into the final product.

Structural and component design shall be verified and signed by the Contractor's *Professional Engineer*.

If required by the Employer, the services of an independent third party will be engaged by the Employer to review the Contractor's design and the Contractor must give the necessary co-operation and supply all the necessary design data as required. The cost of the design review by the third party will be borne by the Employer.

All shop drawings to be presented, discussed, and confirmed with the *Engineer* prior to manufacture.

Time required for all the activities associated with the design of the equipment must be allowed for and indicated by the *Contractor* in his programme.

2. PROGRAM AND COMPLETION

2.1. Tender Period

The intension of this Tender is to award a Contract for a 3-year period from the date of contract acceptance, i.e., 2022/2023 financial year to 2024/2025. Tenderers are required to supply and install high mast lighting structures on "an as and when" required basis per the availability of funds.

Tenderers must state in the schedules the completion period for a project in weeks from date of official purchase order until the date of complete supply, installation and erection of the mast. The delivery period for any additional sundry items procured for the project will run concurrently with the installation project.

2.2. Construction Program

The Contractor will be required to develop and maintain for the full duration of the contract, a works programme whose purpose will be to ensure that the work is carried out and controlled in such a way that the contract is completed within the time stated in the tender or in the time extended by the Engineer in writing.

The Contractor shall take all aspects regarding the conditions on site, access, transportation, restricted working space, the availability of material, machines and labour into account during the tender stage and the compiling of a construction programme.

The Contractor is to submit his programme of works to the Engineer not later than 14 days after the Contractor has been provided with an order.

The programme is subject to the Engineers approval and remains so for the duration of the contract. Should it be required, the Engineer may instruct the Contractor to adjust his programme accordingly to suit other activities.

The programme submitted by the contractor shall make provision for forecasted quantities of work to be performed each week, together with plant used and cash flow for each activity. Should the abovementioned programme fall behind schedule, or the sequence of operations is altered, or if the programme is deviated from in any other way, the contractor shall, within two days after being notified by the Engineer, submit a revised programme.

Should the programme require to be revised due to the contractor falling behind his programme, he shall produce a revised programme showing how he intends to regain lost time to ensure completion of the Works within the time for completion as defined in the General Conditions of Contract or within any granted extension of time. Any proposal to increase the tempo of work must be accompanied by providing more labour and plant on Site, or by using the available labour and plant in a more efficient manner.

Failure on the part of the Contractor to submit the agreed deliverables according to the programme or revised programmes shall be sufficient reason for the Engineer to take steps as provided for in the General Conditions of Contract.

The approval by the Engineer of any programme shall have no contractual bearing apart from the requirement that the Contractor undertakes to carry out the work in accordance with the programme to the satisfaction of the Engineer. It shall not limit the right of the Engineer to instruct the Contractor to vary the programme should circumstances make this necessary.

3. SERVICE CONDITIONS

3.1. Site Conditions

All components must be designed for at least the site conditions stated in Table1 **Error! Reference source not found.**More onerous requirements may be specified for individual components, but otherwise these minimum requirements apply. The specific sites for the high masts must still be determined by Council.

Tenderers must allow for all conditions on site in their tenders, since extra claims arising from difficult site conditions in respect of transport, handling, loading, off-loading, labour, housing, etc.; will not be entertained.

Table 1: Site Operating Conditions.

Description	Unit	Value
Altitude above mean sea level	M	200
Maximum ambient temperature for design purposes	°C	40
Average ambient temperature for design purposes	°C	25
Minimum ambient temperature for design purposes	°C	-10
Maximum average humidity	%	95
Maximum 3 second wind gust velocity	m/s	44
Earthquake loading for design purpose		Negligible
Mean annual rain fall	mm	700
Lightning flash density	Flashes/km^2/$_a$annual	2
Level of atmospheric pollution	Heavy (coastal)	

3.2. Geotechnical Conditions

A geotechnical investigation has not been performed previously. It will be the responsibility of the Contractor to perform geotechnical studies of the various installation sites.

4. INSPECTIONS AND TESTS

4.1. General

During manufacture and prior to despatch, the Engineer will inspect all poles at the Manufacturer's works. Each pole must be subjected to the tests specified below by the Contractor in the presence of the Engineer and to such tests as may deemed necessary by the Engineer to ensure good quality workmanship. All tests performed shall be at the expense of the Manufacturer.

Not less than ten (10) working days' notice in writing shall be given to the Engineer detailing when the poles will be ready for inspection and tests.

Unless the Engineer shall otherwise direct, no poles shall be delivered unless the Engineer has issued to the Contractor, in respect of such poles, a certificate in the form of a release note certifying that the poles have passed the tests required and are therefore released for delivery.

4.2. Galvanising test

The quality of the galvanising shall be tested in accordance with SANS 121.

4.3. Welding test

If transverse butt-welds are to be used, the poles shall be subjected, at each joint, to a bending load which causes the butt-weld (half circumference) to be under tension. The load shall be varied according to the section and shall not cause permanent set. The load (or the amount of deflection produced) shall be to the satisfaction of the Engineer and sufficient to ensure that each butt-weld is of adequate strength. The Engineer shall witness as many of these tests as he may deem necessary, preferably during the course of manufacture. The manufacturer shall give adequate notice, to permit the Engineer to attend the inspections. Any joint where cracking occurs shall be ground out to the full thickness of the material, re-welded and tested again.

5. QUALITY SYSTEM

The Contractor's quality assurance system shall be approved in terms of SANS 9001 or an alternative quality assurance system to the approval of the Engineer. A copy of the registration certificate shall be submitted with the tender.

6. DAMAGE TO OTHER SERVICES

The Contractor shall assume full responsibility in the event where he or any person in his service is directly or indirectly responsible for any damages caused to other services already installed (water, sewerage, storm water, roads, surveyors' pegs, etc.) Any such damage shall immediately be reported to the Engineer.

The Contractor shall be held fully responsible for the repair of such damage to the satisfaction of the Engineer. The costs for the repair of such damage shall be borne by the Contractor. Claims by the Contractor in this connection will not be considered.

Should any portion of the works in terms of this Contract, for which the Contractor is responsible, be damaged by other Contractors, the Contractor shall repair such damage at the tendered rate and shall submit full details of such damage to the Engineer so that he can recover such costs from the responsible party. This repair work may only be done on the written instruction from the Engineer. The contractor shall make provision for a full scan of the area to determine the position of services in the area.

7. LOCAL LABOURAND LOCAL AUTHORITIES

7.1. Local Labour

It is intended that the project must make maximum possible use of local labour which is presently unemployed in the area of which the project is performed. All unskilled labour shall be from Thembisile Hani Local Municipality.

.

Engagement of local labour shall be controlled in a formal manner through the client's labour liaison body. It is furthermore expected that the labour liaison body will assist in the monitoring of labour goals.

7.2. Liaison with Local Authorities

The contractor will have to liaise with local authorities regarding the following matters:

1. Dealing with traffic.
2. Locating of existing underground services.
3. Protection of existing services during construction.

It is the contractor's onus to immediately contact all these authorities and to accommodate their involvement in his programme of work. The contractor should also warn the authorities at least 48 hours before the actual work commences. Compensation for delays, losses or accidents will not be considered should the contractor at any time have failed to keep the local authorities informed.

The engineer or employer must immediately be notified, should the contractor experience any problem regarding work, which involves a local authority.

7.3. Community Liaison and Community Relations

In all dealings with the community and workers employed from within the community, the Contractor shall take due cognisance of the character, culture and circumstances of the community involved and shall at all times use his best endeavours to avoid the development of disputes and to foster a spirit of co-operation and harmony towards the project.

The Contractor shall at all times, keep the Engineer fully informed on all matters affecting the contractor and the community, and shall attend all community meetings relating to the project as may be reasonably required by the Engineer. All matters concerning the community shall be discussed and where possible, resolved at such meetings.

Where any resolution of a community meeting shall be contrary to the terms and provisions of the Contract, the Contractor shall not give effect thereto without a prior written instruction from

the Engineer. Where the Contractor is of the opinion that any instruction of the Engineer issued in terms of this clause will result in the incurring of additional costs which were not provided for in his tendered rates and/or that a delay in the progress of the works will result, he shall be entitled to submit a claim in terms of Clause 48 of the conditions of contract, provided always that the period of twenty-eight (28) days referred to in Clause 48 shall be reduced to three (3) normal working days in respect of all claims submitted in terms of this clause.

8. CREW

A competent supervisor must be on site at all times to supervise the work undertaken by the crew.
The work crew shall comprise at least the following:

1. A Rigger (Certificate to be submitted).
2. Installation Electrician.
3. Responsible person in terms of NRS 040.
4. Labourers.

9. OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993)

Contractors shall meet the health and safety requirements as stipulated in health and safety plan.

9.1. Safety Precautions

Notwithstanding the fact that the Contractor is solely responsible for the actions of his staff and any duly appointed sub-contractors, the Engineer reserves the right for himself, or his nominated representative, to inspect and monitor working methods and materials handling to ensure that safe working practices are being adhered to at all times.

9.2. Health and Safety Plan

Tenderers are to note the requirements of the Occupational Health and Safety Act No. 85 of 1993 and the Construction Regulations 2003 issued in terms of Section 43 of the Act. The tenderer shall be deemed to have read and fully understood the requirements of the above Act and Regulations and to have allowed for all costs in compliance therewith.

In this regard the tenderer shall prepare and attach a Health and Safety Plan in respect of the Works in order to demonstrate the necessary competencies and resources to perform the construction work all in accordance with the Act and Regulations. Such Health and Safety Plan shall cover inter-alia the following details:

1. Management Structure, Site Supervision and Responsible Persons including a succession plan.
2. Contractor’s induction training programme for employees, sub-contractors, and visitors to the Site.
3. Health and safety precautions and procedures to be adhered to in order to ensure compliance with the Act, Regulations and Safety Specifications.
4. Regular monitoring procedures to be performed.
5. Regular liaison, consultation, and review meetings with all parties.

6. Site security, welfare facilities and first aid.
7. Site rules and fire and emergency procedures.
8. Tenderers are to note that the Contractor is required to ensure that all sub-contractors or others engaged in the performance of the contract also comply with the above requirements.

9. The tenderer shall also consider the additional requirements stated in the Scope of Work when drawing up the Health and Safety Plan for the contract.

Each Tenderer shall submit a pro-forma Occupational Health and Safety (OHS) file within 3 days of request. This file shall sufficiently demonstrate their competence and resources regarding OHS documentation. Failure to comply with this clause will disqualify the tender. This OHS file shall contain the following chapters demarcated with suitable dividers:

1. General Information chapter stating the project name, the site office for the project, names and contact numbers of the engineer, the mandatory, inspectors, and other key personnel as well as a complete list of emergency telephone numbers for the area.
2. a chapter containing all Non-Compliance Notices and engineer's Instructions.
3. a chapter containing all Inspection Sheets
4. a chapter containing the outcome of Safety Review Meetings.
5. a chapter containing Mandataries, Appointments, Certificates, and Proofs of Good Standing.
6. a chapter containing a List of Employees Allowed on Site, temporary and permanent personnel that have successfully completed induction training.
7. a chapter describing the Induction Course.
8. a chapter containing a complete Risk Assessment for the project that shall include at least:
    a) the identification of risks and hazards to which persons may be exposed to.
    b) the analysis and evaluation of the risks and hazards identified.
    c) the list of relevant documented Safe Operating Procedures (SOPs) to mitigate, reduce, or control the risks identified.
    d) a monitoring plans.
    e) a review plans.
    f) any additional documentation required to ensure compliance with the OHS Act and Regulations,
9. a chapter containing all relevant or any additional Safe Operating Procedures.

This file will be presented and discussed with the Engineer and the H&S Agent for approval before any work commences.

The OHS file is the property of the client and shall remain on site for the duration of the project.

9.3. Detailed Health and Safety Requirements

In addition to the general requirements above the following risk assessment and compliance plans shall be required.

1. Fall protection plan, work on structures, formwork and support work as required on the project.
2. Excavation work in all cases.
3. Scaffolding, suspended platforms, boatswain's chairs, material hoists, batch plants, explosive powered tools, cranes, if required on the project.
4. Construction vehicles in all cases, if required on the project.
5. Electrical installations and machinery on construction sites, use and temporary storage of flammable liquids on construction sites, water environments, if required on the project.
6. Housekeeping on construction sites in all cases.
7. Stacking and storage, fire precautions on construction sites, if required on the project.
8. Construction of welfare facilities in all cases.
9. Specific requirements as detailed on the project documentation or required by the Engineer.

In addition to the general requirements above the following Safe Operating Procedures (SOPs) shall be included:

1. Working at height.
2. Barricading, excavation, in all cases.
3. Cable pulling, working with flammable gases and lead, if required on the project.
4. Working in close proximity to existing live high, medium, and low voltage overhead and underground electrical services
5. The safe storage of the mast and its associated equipment on site which would include accidental movement.
6. Working in close proximity of existing water, storm water, Telkom cables and other fibre optic cables from different network providers.
7. Rigging and crane work for the erection of the mast
8. SOPs as detailed on the project documentation or required by the Engineer.

Notwithstanding full documentation compliance with the act, any official of the Thembisile Hani Local Municipality, or Electricity shall, if unsafe conditions are deemed to exist on site, is obliged to stop work by noting the non-compliance in writing.

Work shall only continue once the compliance is signed off by such official or The Engineer.

10. PARTICULARS

The following information must be submitted with the Tender:

1. Full technical design drawings and specification details of the equipment offered in respect of each item tendered. The information must be submitted with the tender documents, failing which, the offer will be deemed non-responsive.
2. Computer simulations for the flood light luminaires on electronic media in a form compatible with the Dailux Lighting computer program. The information shall have been approved by the South African Bureau of Standards (SABS) or the CIE.
3. The location of and the manufacturing facilities of the Tenderer.
4. The number of similar high mast lighting poles in actual service in South Africa.
5. The names of previous purchasers of high mast lighting poles offered and in service.
6. Samples of flood light luminaires offered within 5 working days of being requested to do so.
7. A copy of the manufacturer's Certificate of Listing in terms of SANS 9001.
8. Design calculations signed and certified by a Professional Structural Engineer to be submitted.
9. Certificate of the Professional Structural Engineer to be submitted within 3 days of request.
10. Proof of qualifications of all construction staff to be engaged in contract work.

The Contractor shall, prior to commencement of any work:

1. Appoint a competent person to sign and submit the "Memorandum of Agreement."
2. Supply proof of public liability insurance to indemnify the Municipality from public liability claims up to R20 million per incident. (See Clause 8.3 of Special Conditions of Contract).
3. Provide the Engineer with a list of cell phone numbers of his staff required to be contactable.

11. APPOINTMENT OF CONTRACTOR

The Thembisile Hani Local Municipality intends appointing a Main Contractor and in addition reserves the right to accept an Alternative Contractor, i.e., a different Manufacturer.

Also, should the Main Contractor not be on site with a reasonable workforce within 2 weeks of date of official purchase order or, in the instance of purchase orders relating to goods only, fails to deliver within the specified delivery period, the purchase order will be cancelled and placed with the Alternative Contractor.

C3.2 STANDARDS

The following documents contain provisions that, whether referenced in the text or not, constitute requirements of this specification.

Note that the National equivalent of IEC standards are generally the same but may include specific variations to be taken into account. Information on currently valid national and international standards can be obtained from the South African Bureau of Standards.

SANS 121 - Hot dip Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods

SANS 857-1 - Defines metal welding processes and related terms

SANS 920 - Steel bars for concrete reinforcement

SANS 1200 A - Standardized specification for civil engineering construction Section A: General

SANS 1200 AA - Standardized specification for civil engineering construction Section AA: General

SANS 1200 G - Standardized specification for civil engineering construction Section G: Concrete (Structural)

SANS 1200 GA - Standardized specification for civil engineering construction Section GA: Concrete (small works)

SANS 1200 H - Standardized specification for civil engineering construction Section H: Structural steelwork

SANS 1200 HC - Standardized specification for civil engineering construction Section HC: Corrosion protection of structural steelwork

SANS 1700-14.1/11 - Fasteners Part 14: Hexagon nuts Sections 1 to 11

SANS 2394 - General principles on reliability for structures

SANS 9001 - Quality management systems - Requirements

SANS 9692-1 - Welding and allied processes - Recommendations for joint preparation Part 1: Manual metal-arc welding, gas-shielded metal-arc welding, gas welding, TIG welding and beam welding of steels

SANS 10142-1 - The wiring of premises Part 1: Low-voltage installations

SANS 10144 - Detailing of steel reinforcement for concrete

SANS 10145 - Concrete masonry construction

SANS 10160-1 - Basis of structural design and actions for buildings and industrial structures Part 1: Basis of structural design

SANS 10160-2	- Basis of structural design and actions for buildings and industrial structures Part 2: Self-weight and imposed loads
SANS 10160-3	- Basis of structural design and actions for buildings and industrial structures Part 3: Wind actions
SANS 10162-1	- The structural use of steel Part 1: Limit-state design of hot-rolled steelwork
SANS 10162-2	- The structural use of steel Part 2: Limit-states design of cold- formed steelwork
SANS 10162-4	- Structural use of steel Part 4: The design of cold-formed stainless-steel structural members
SANS 10164-2	- The structural use of masonry Part 2: Structural design and requirements for reinforced and pre-stressed masonry
SANS 10225	- The design and construction of lighting masts
SANS 10313	- Protection against lightning – Physical damage to structures and life hazard
SANS 10389-1	- Exterior lighting Part 1: Artificial lighting of exterior areas for work and safety
SANS 10389-3	- Exterior lighting Part 3: Guide on the limitation of the effects of obtrusive light from outdoor lighting installations
SANS 14713	- Protection against corrosion of iron and steel in structures – Zinc and aluminium coatings - Guidelines
SANS 15607	- Specification and qualification of welding procedures for metallic materials - General rules
SANS 15609-1	- Specification and qualification of welding procedures for metallic materials - Welding procedure specification Part 1: Arc welding
SANS 15609-2	- Specification and qualification of welding procedures for metallic materials - Welding procedure specification Part 2: Gas welding
SANS 15609-3	- Specification and qualification of welding procedures for metallic materials - Welding procedure specification Part 3: Electron beam welding
SANS 15609-5	- Specification and qualification of welding procedures for metallic materials - Welding procedure specification Part 5: Resistance welding procedures

SANS 15614-1	- Specification and qualification of welding procedures for metallic materials - Welding procedure test Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys
SANS 17660-1	- Welding - Welding of reinforcing steel Part 1: Load-bearing welded joints
SANS 17660-2	- Welding - Welding of reinforcing steel Part 2: Non-load-bearing welded joints
SANS 50025	- Hot rolled products of structural steels
SANS 60439-3	- Guidelines for quality management system documentation
AWS D1.1	- Structural Welding Code - Steel
SANS 1091	- National Colour Standard
SANS 1250	- Capacitors
SANS 1266	- Ballasts
SANS 475	- Luminaires: Performance requirements
SANS 60529	- Degrees of Protection provided by Enclosures (IP Code)
SANS 60598-1	- Luminaires: Part 1. General Requirements and Tests SANS
60598-2-5	- Luminaires: Part 2-3. Particular requirements - Floodlights
SANS 60662	- High Pressure Sodium Vapour Lamps
SANS 60923	- Auxiliaries for Lamps (Ballasts)
SANS 60927	- Auxiliaries for Lamps (Starting Devices)
SANS 61048	- Auxiliaries for Lamps (Capacitors)
SANS 61049	- Capacitors (Performance requirements)
SANS 61347	- Lamp Control Gear: Part 1. General and Safety requirements
SANS 215	- Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
SANS VC 8011	- Lamp holders
ARP 035	- Guidelines for the installation and maintenance of street lighting

Reference to a particular standard or recommendation in this specification does not relieve the manufacturer of the necessity of the work complying with other relevant standards or recommendations.

Tenderers offering equipment to standards other than those mentioned above may be considered provided it is clearly indicated in which respects the equipment offered does not comply and the likely consequences of such non-compliance.

C3.3 TECHNICAL SPECIFICATION

1. MAST

1.1. Design

The masts must be designed in accordance with SANS 10225. The design, including calculation details, shall be submitted for approval to the Engineer before commencing manufacture.

The relevant structural documents must be signed by a Professional Structural Engineer and the technical design calculations and specification shall be submitted with the tender document.

The high mast structures must be designed to withstand a maximum 3 second wind gust velocity of 40 m/s measured at a height of 10m above ground level and acting on a projected area of the mast, masthead frame and luminaries allowing for the increase in wind speed with height as given in SANS 10160 & SANS 10225.

The fully equipped mast must be designed for terrain category 2 and for a lifespan of 50 years. The deflection of the mast top shall not exceed 2,5% of the mast height when subjected to two thirds of the maximum wind velocity.

The masts must be designed so that wind excited oscillations shall be dampened as much as practically possible, and allowance made for the stresses due to these oscillations. The manner in which this is to be achieved shall be clearly stated in the design calculations.

The axis of the mast when erected shall not deviate from the vertical by more than 0,3% of the height above the base flange nor from straightness by more than 0,3% of any length, measured at the centre of that length unless the mast is explicitly so designed.

The mast shall carry at its top the Floodlights evenly around its circumference.

Data on wind induced oscillations and the dynamic behaviour of the mast shall be submitted.

1.2. Construction

Masts and mast bases must be manufactured of Grade S355J0 steel plate complying with the requirements of SANS 50025.

All welding shall comply with SANS 10225 1991-1 specifications. Welding Procedure Specification and shall only be carried out by coded welders, tested according to the AWS specification. Proof of the relevant Welding Procedure Specification and Welding Qualification documents must be submitted on request. Inspection and acceptance certificates shall be furnished on request.

Any openings in the mast must be reinforced sufficiently in order not to weaken the structure.

Each mast must be constructed to form an evenly tapered totally enclosed hollow shaft with a steel base section. The masts must be delivered to site in sections and joined on site. A method statement must be submitted to the Engineer detailing the on-site assembly of the mast. Bolted or welded section joints will not be permitted i.e., site slip joints must be used to enable the erection of the masts.

The base section must be designed for mounting on a concrete plinth and must be fixed in position with bolts, nuts, and washers of adequate dimensions. For added security, gussets must be welded onto the base between mounting holes. This must be done before galvanizing.

1.3. Access Opening

An access hole with a hinged flush fitting weatherproof cover must be provided in the base of the mast, with the bottom lintel 600mm above the base plate, for easy access to the electrical distribution board ancillary equipment and the quick and safe attachment of the portable winch to mast and hoisting ropes.

The door shall be adequately protected against vandalism and secured by three tamperproof screws requiring a special opening tool, or alternative as agreed with Engineer.

The opening perimeter must be reinforced to restore the section modules of the mast shaft and have a curved top and bottom to prevent stress concentrations. The door opening and closing mechanism shall correspond to similar masts in use by Thembisile Hani Local Municipality.

The mounting strips welded opposite the door opening shall be drilled for the mounting of a control board. Earth terminals, as well as a support bar for the incoming supply cables, shall be provided below the door opening.

1.4. UV Protected fibre glass canopy

Each mast shall have an UV protected fibre class canopy that will cover all electrical material on top of the mast against UV light. This will be of adequate design to match with the mast and reducing the wind load that is applied to the mast.

1.5. Raising and Lowering Device

Each mast shall be equipped with a three-point hoisting mechanism, consisting of three 6mm diameter suspension ropes of stainless steel 7/19 construction, running over three pairs of Aluminium pulleys on the head frame of the mast running on shafts manufactured from Stainless steel. The complete pulley assembly must be enclosed with a corrosion proof top cover, fixed with a bolt incorporating a lightning arrester, to prevent ingress of water.

All split pins, bolts, nuts, and washers shall be of stainless steel. Pulley shafts shall be positively prevented from rotating in their housings. **Two Rope systems shall not be considered.**

The luminaire carriage shall be drawn against three inverted cones to ensure level positioning of the fittings in the operating position. The hoisting ropes, which will remain under tension at all times, shall terminate inside the mast on a clevis plate, to which the rope of the hoisting unit can be connected or to which, when in the raised position, the locking device can be attached. The locking device shall be secured to a structurally sound member of the mast base. The other ends of the hoisting ropes shall be firmly secured to the luminaire carriage. Rope ends shall not be secured by Crosby clamps and crimped ferrules of compatible material shall be used. In addition, a safety chain shall be provided between the clevis plate and a structurally sound member of the mast base.

All fasteners connected with the raising and lowering device shall be secured by Nylok type nuts or stainless-steel split pins.

The raising and lowering gear must, in complete safety, facilitate the raising and lowering of the floodlight luminaire carriage for maintenance purposes by means of a portable winch.

A 12mm diameter earthing stud must be welded to the inside casing of the mast adjacent to the cable termination box. The stud shall be provided with two washers and a nut.

The top pulley assembly must have guides and docking stops designed and constructed in such a way that the luminaire ring is always in the same position after raising it to the top of the mast and that jamming of the ring is prevented.

1.6. Hoisting Unit (Optional)

Provision shall be made at the base of the mast to accommodate a removable type, approved oil bath winch of the Dymot /OM type.

The winch shall be of lightweight construction and mounted on a suitable frame for easy transfer from one mast to another, thus not requiring a winch in each mast. It should also, be easily coupled, uncoupled and removable through the door opening provided at the base of the mast.

This shall be a single drum worm gear type, self-sustaining at al loads and operating speeds, without the use of brakes and clutches. It shall have a gear ration of at least 50:1 and be suitable for both hand and power operation. The winch shall run in a fully enclosed oil bath.

The winch shall be fitted with a safety device to ensure that the drum is locked positively when the cranking handle or power tool is removed from the drive shaft. The safety device shall be applied automatically.

A test certificate, stating the safe working load of the winch and issued by a recognised testing authority, shall be supplied with each winch. Winches shall be fitted with a label and rating plate of a permanent nature in an easily visible position.

1.7. Hydraulic power tool (optional)

A Hydraulic power tool is required to drive the single drum winch and must have the following specifications:

A 1.5-kilowatt single-phase electrical motor running at 1440 rpm. A Hydraulic motor with variable speed ranging between 214 rpm and 268 rpm with a pump delivery of 5.5 L/ min.

1.8. Corrosion Protection

All steel parts shall be immersed in a heated wash trough to remove all fine foreign particles and lubricants.

If sheet steel is used that has not been pre-galvanised, immediately after degreasing, all parts shall be hot dip galvanised in accordance with SANS 121. All welds shall be de-scaled, all machining carried out and all parts shall be adequately cleaned prior to galvanising. The preparation for galvanising and the galvanising itself shall not adversely affect the mechanical properties of the coated material.

All articles shall be coated to the thickness detailed in Table 2 of SANS 14713 for corrosive category C5 and very long (≥20 years) typical life to first maintenance. All galvanised material shall be substantially free from white rust when it is erected on site. Close attention shall be paid to the manner in which the material is stacked and stored at the galvaniser's works and during its subsequent handling.

No welding, drilling, punching or removal of burrs shall be permitted after galvanising.

The repair to galvanising damaged by handling or transport shall be done by cleaning the area and applying 2 coats of a zinc rich primer giving a dry film thickness of at least 100 microns and containing at least 94% zinc in the dried film. If in the opinion of the Inspector, damage is excessive, such items will be rejected by the Inspector and shall be replaced by the Contractor at his own expense.

A galvaniser's guarantee or test certificate shall be submitted to the Engineer prior to installation.

2. LUMINAIRE CARRIAGE, ELECTRICAL CABLES, BOARD AND FLOODLIGHTS

2.1. Luminaire Carriage

The carriages for the 30m masts shall be designed and manufactured from suitably sized and graded channel formed steel considering the weight and the windage area of the number of flood light luminaires and all related equipment and shall accommodate at least the following:

1. 200W LED luminaires on the 30m masts.
2. A suitably sized glass reinforced polymer cable termination box (section 2.4) for the termination of the trailing cable and luminaire supply cables (refer to section 2.2).
3. A lighting arresting spike.
4. Guides and docking stops suited to those on the top pulley assembly.
5. At least four 12mm diameter (after galvanising) holes per luminaire for fixing purposes.
6. A 300mm long 4mm stainless steel wire safety leash with fixings shall be provided for each luminaire.

2.2. Electrical Connection to the Luminaires

A flexible, heavy-duty 5-core trailing cable, which runs over a separate set of Aluminium sheaves at the head frame, shall be provided. Sheaves shall be of Aluminium, running on UHDPE shafts. The shafts shall be positively secured from rotating in their housings. The Aluminium sheaves shall be adequately sized to prevent deformation of the cable.

The trailing cable shall be firmly connected to the luminaire carriage at its one end and to the clevis plate at the other end. Suitable connectors of the CEE type with an IP44 rating shall be provided.

2.3. Distribution Board

A fully enclosed IP30 distribution board shall be mounted in the access opening in such a manner as to facilitate easy and safe access for maintenance purposes and shall be wired in a neat and workmanlike fashion.

The distribution board shall be of adequate dimensions and fitted with a hinged door with lockable catch. The door shall seal onto a neoprene gasket. Suitable vermin proofed ventilation holes shall be provided to prevent moisture build-up in the distribution boards.

The following equipment shall be suitably rated for the duty and must be accommodated in the distribution board:

- One (1) x three pole MCB main switch.
- Single pole MCBs for individual luminaire protection. Each circuit breaker must supply only one luminaire.
- One (1) x single phase switched socket outlet for the use of a power tool
- Means of isolating control cable supply voltage (inside the board)
- One (1) x single phase switched socket outlet for the use of a power tool
- One (1) x 5 pin CEE socket
- One (1) x adequately rated contactor

- One (1) x single pole MCB acting as by-pass switch
- One (1) x single pole MCB protecting the contactor
- One (1) x rated photocell
- The remote-control gear (if required).

The following must be noted:

- Contactors, if any, shall be operated electro-mechanically.
- Circuit breakers shall comply with SANS 156 and SANS 1426 with a fault rating not less than 10kA. All circuit breakers must be accessible from the front of the board.
- All equipment in the distribution board shall be mounted behind a removable cover with cut-outs to provide access to the circuit breaker toggle switch.
- All circuits in the distribution board shall be suitably labelled.
- The photocell of the National type shall be mounted 4m above ground level on the outside of the mast under a vandal proof cover by means of a special locking device.
- A Splitter box with IP65 rating shall be mounted on top of mast, fitted with a test socket of the CEE type with at least IP44 rating at the bottom of the box.
- All switchgear in the distribution board must be labelled to indicate the utilisation of the circuits. All labels shall be white “Traffolite” or equal to approval with black engraved numbers. The “Traffolite” labels shall be fitted to purpose made label holders/or screwed. No stick-on embossed tape shall be used.
- The distribution board shall be fully wired and ready for connection to the incoming supply cables.

2.4. Cable Termination Box

A glass fibre cable termination box mounted in each mast shall be a waterproof enclosure of adequate dimensions. The cable termination box shall be fitted with a lid secured with at least four captive screws. All metal parts of the housing shall be bonded to the main earth.

2.5. Floodlight Luminaires

The luminaires must comply with SANS 10389, SANS 475, SANS 60598-1, and SANS 60598-25.

The new LED luminaires to be installed shall be similar or approved equal to the 200W type and shall have the following minimum requirements:

1. Power consumption – 200W
2. LED lumen output – min 23,000 lm
3. LED lifetime – min 50,000 hours

1. The luminaires shall have an approved asymmetric luminous intensity distribution suitably controlled internally for a medium and narrow beam distribution.
2. The luminaire housing shall be robustly constructed of marine grade high pressure die cast aluminium and shall be weatherproof, hail proof, corrosion proof and vandal resistant. Glass reinforced polyester (GRP) luminaires are not acceptable.
4. Surge protection 10kV / 10kA

5. A minimum power factor of 0.9
6. Hinge pins, clips, clamps, set screws, bolts, nuts and washers shall be manufactured from an appropriate grade of stainless steel and shall be to the approval of the Engineer.
7. The front glass to the luminaire lamp enclosure must be manufactured from heat tempered, impact resistant glass with a minimum thickness of 5mm and must be fitted with a silicon gasket seal. Polycarbonate is not acceptable. The front glass shall be fixed at least at the four corners with stainless steel clamps and suitably sized screws to allow for the periodic cleaning and maintenance of the glass.
8. Silicon rubber gaskets shall be fitted into a groove in the housing and shall be kept in place such that the integrity of the IP rating is ensured. The gasket shall be screened against harmful radiation from the light source.
9. An exterior lip shall be provided on the housing to ensure that there is no direct rainwater contact with the gasket between the housing and the diffuser, thus ensuring that no moisture is sucked into the diffuser when the luminaire is switched off and cools down.
10. All metal parts of the luminaire must be connected to a suitable earth terminal.
11. Connections shall be brought to a suitable heat resistant screw type plug in terminal block using silicone heat resistant wiring. The terminal block shall be securely fixed to the control gear holding plate. The terminal shall be indelibly marked either by means of colour coding or by the letters L, N & E.

2.6. Degrees of Protection

The degree of protection shall comply with SANS 60598-2-3 and the categories shall be:

- Distribution board: IP 65
- Lamp compartment: IP 66
- Control gear compartment: IP 66

The IP rating shall be certified by a SABS test report in accordance with SANS 60598-2-3. Test certificates/reports pertaining to each type of luminaire offered must be submitted with the tender.

3. FOUNDATIONS

3.1. Excavations

To account for soil conditions that may vary along an excavation, rates for 3 different types of soil will be used- “Normal”, “Difficult” and “Hard”. Hard excavation will be measured as “Normal” with the use of necessary compressor and/or other mechanical equipment being measured as an extra over rate.

The types of excavation are defined as follows:

- Normal Excavation: Material that can be loosened and removed using pick and shovel (such as grass covered sand, soft clay, dry earth, small stones in sand which can be removed by hand, or thin layers of “koffieklip”).

- Difficult Excavation: Material that is difficult to loosen and remove using pick and shovel such as large layers of “koffieklip”, hard dry clay, ground containing boulders and layers of tar or where progress is slow and other services are affected. The cost of any

mechanical plant used to assist in loosening the material is to be included in the given rate.

- Hard Excavation: A solid mass of material, 1m or longer, that can be broken only using a paving breaker, or jackhammer and/or blasting and where progress is very slow.

The Engineer must authorise any difficult or hard excavation before it may be claimed.

Excavations must be carried out in a neat and workmanlike fashion.

The Contractor must remove tar pieces, stones and sharp objects from the excavated soil and ensure that such material is removed from site daily. No stones, tar pieces or sharp objects may be put back in the trench.

No excavations or holes shall be left open for longer than 3 days or over a weekend.

Excavated material may not be dumped or stored against boundary walls or on landscaped gardens unless the prior consent of the property owners is obtained. The Contractor shall be responsible for the restoration of defaced property. Where excavated material is placed on road surfaces, care must be taken not to block stormwater drains or open channels.

Where grass sods or plants are removed, they must be neatly packed adjacent to the trench. The Contractor must keep the grass sods or plants damp after removal by watering or otherwise to ensure that they remain alive. The Contractor must ensure that all vegetation is replanted after the trench is properly backfilled and compacted. The Contractor must make good at his own cost any vegetation damaged during the excavation and not restored to its original condition.

Brick paving must be removed neatly and stacked adjacent to the area excavated at a location that is acceptable to the user of such brick paved surface. The Contractor shall be responsible for replacing any bricks that are broken. The Contractor must reinstall the removed bricks to the satisfaction of the user. The same method of operation shall apply for paving slabs.

When excavating through kerbs, channels, edgings, or any other edge unit, these shall be carefully removed up to the nearest whole unit and replaced. If these units are damaged, they shall be replaced with similar approved new units for the cost of the Contractor.

Any water accumulating in excavated trenches or holes, either as a result of rain or due to the level of the water table, must be pumped out by the Contractor to make work inside the trench or hole possible.

Care must be taken to ensure that effective barriers are erected around all excavations to ensure the safety of the general public. In this regard the contractor must install an orange meshed barrier screen (or other type of barrier if deemed by the Contractor to be more effective) up to at least a metre in height around the entire excavated area. The barrier must be secured in such a way that it will not be disturbed by adverse weather conditions. Where the public requires access across the excavation, suitable, safe crossings must be provided. The Contractor must detail in his safety plan the measures that will be taken to safeguard the public.

The Contractor shall be responsible for any liability arising out of his activities. This includes the safety of the public while the trenches are open.

The Contractor must consult the owners of properties who may be affected by the activities of the Contractor e.g., driveways, well maintained verges, or gardens.

3.2. Concrete Base

The concrete base, reinforcing cage and fixings shall be designed and constructed to the requirements of SANS 1200 A, SANS 1200 AA, SANS 1200 G, SANS 1200 GA, SANS 10144, SANS 10145, SANS 17660-1, SANS 17660-2, and SANS 920.

The base design shall include a minimum of 110mm PVC ducting to allow the supply cable and the two 35 mm^2 copper earthing conductors access from below ground level to the inside of the mast without being visible above.

The Contractor shall test the soil bearing pressure for each mast prior to casting the concrete base to ensure that the soil load bearing conditions are suited to the specific concrete base design. The cost of these tests shall be included in the pricing schedule. The results of these tests must be discussed with the Engineer prior to casting of the concrete base and hand the results over to the Engineer prior on completion of the project.

All reinforcing and foundation bolts shall have a minimum of 100mm concrete cover. The 28 days cube strength of the concrete shall be stated by the Contractor.

All foundations shall have a circular flat base from which a square plinth shall rise to above the surrounding ground level.

After casting of the foundation, the slab shall be covered by earth, properly compacted. The area around the plinth shall be brought to the original level and shall be left neat and tidy.

3.3. Holding Down Bolts

The holding down bolts shall be supplied as part of a welded-up cage for accurate casting into the foundations. Suitable templates shall be used to ensure correct vertical and horizontal alignment of the bolts.

Two nuts and washers and one locknut shall be supplied with each bolt, as part of the holding down bolt assembly.

The holding down U-bolts and the associated nuts and washers shall be mild steel hot dip galvanised to SANS 121.

4. EARTHING OF MAST

Earthing of the mast shall comply with SANS 10142 and SANS 10313. The minimum earthing shall however consist of two (2) x 2,4 m earth spikes installed on opposite sides of the mast. The top of the spikes shall be at least 600 mm below finished ground level. The two spikes shall be connected together and from each spike to the inside of the mast using a 70mm^2 bare copper conductor (or approved equivalent) via the ducting provided. There shall be no joints in the earth conductors and all terminations shall be to the manufacturer’s requirements.

5. MARKING

Each pole must be identified with an indelible identification mark. The method of marking shall be to the approval of the Engineer.

6. TESTING AND COMMISIONING

The complete installation shall be tested and commissioned in the presence of the Engineer for his approval.

C.3.4SCHEDULES – TO BE COMPLETED

Schedule A in the table below must be completed by the Tenderer providing guarantees and technical particulars of the equipment and materials offered. Failure by the Tenderer to complete Schedule A could invalidate the tender.

1.1 ITEM 1 – LED Flood Light LUMINAIRES

1. Item	DESCRIPTION	SCHEDULE A
1.1.	Lumens offered	
1.2.	Wattage	
1.3.	Efficacy	
1.4.	System Voltage 220V to 240V at 50 Hz. (Provide test report)	
1.5.	Power Factor Minimum 0.9. (Provide test report)	
1.6.	Surge Protection ≥ 10 kV, 10kA	
1.7.	Lumen Maintenance	
1.8.	Ambient Temperature -15 to 45 degrees Celsius	
1.9.	IP Rating of Light Fitting ≥ IP66 (Provide laboratory test report)	
1.10.	Connection of LED inside modules designed that the failure of one LED do not cause additional LED's to switch off.	
1.11.	Housing Inherently corrosion resistant material painted grey. Preference is for marine grade high pressure die cast Aluminum.	
1.12.	Are the simulation software calculations included with the Tender?	YES / NO
1.13.	Are all the mentioned test reports included with this Tender?	YES / NO
1.14.	Manufacturer	
1.15.	Place of Manufacture	
1.16.	Manufacturer's identification reference	
1.17.	Delivery Period	

1.18.	Warrantee (minimum 5 years)	