**THEMBISILE HANI LOCAL MUNICIPALITY**

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

**APPOINTMENT OF A PANEL OF 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

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## 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:<br>▪ inspected by the Engineer and found to comply with this specification.<br>▪ deliver, installed, and commissioned to the address in THLM, defined in a purchase order issued by THLM; and<br>• 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.

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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

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| 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 |

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|---|---|
| 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

**STANDARD SPECIFICATION – TECHNICAL**

GENERAL: Thembisile Hani Municipality has identified this project for off-grid area/public lighting in various municipal wards and clusters. This section of the specification covers the standards of materials, equipment and workmanship and general methods.

Tenderers must provide a dailux lighting simulation, to verify that components match the product offered. Products must be supplied with IEC 60598-2-3 test report or at the least, IEC or TUV certification on electronics.

**1. SOLAR STREET LIGHTING:**

**1.1. 80W INTEGRATED SOLAR STREETLIGHT SPECIFICATION**

The streetlight must be a fully integrated system with full die cast Aluminium housing, including the mono crystalline photo-voltaic (PV) solar panel, single LED luminaire, maximum power point tracker (MPPT) charge controller, night and microwave sensor, lithium LifePO4 battery (that is, all 5 components).

· Luminaire ingress rating of IP66

- Aluminium lamp housing shall be robustly constructed, weatherproof, hail proof, corrosion proof and vandal resistant. It shall be manufactured with nanoporous anodic aluminium Oxide (AAO) and tempered glass and shall be grey in colour.
- Luminaire shall have an operating temperature of -20°C to 65°C. The diffuser lens must be a manufactured with polymethyl methacrylate (PMMA). The lamp shall consist of a chip LED board arrangement which conforms to IESNA LM80-08.
- The IP66 ingress protection rating shall withstand high ambient temperature and vandalism (IK10) and ensure that all components are protected against the ingress of dust and moisture, which leads to corrosion and premature failure. All screws, bolts and metal parts shall be stainless steel and anti-corrosion treated material.
- A separate fuse holder containing a 10A fuse shall be located on the outside on the sealed unit, allowing for easy replacement.
- A microwave sensor and night sensor with a 120° wide detecting angle shall be incorporated into the luminaire. The night sensor shall allow the lamp to switch off during the day and on at night. The microwave sensor shall allow the light to dim to 30% of the maximum light output

when there is no motion and back up to 100% light output when there is motion, thus allowing for maximum possible autonomy from the system.

- Luminaire must have a minimum of 8000 lumens (provide supporting lighting simulation results).
- Luminaire shall have an 18V 100W high efficiency mono crystalline silicon solar PV panel.
- The luminaire shall have a lithium battery (12.8V45AH) with charge-discharge cycles between 1500-2000.
- Luminaire shall have a maximum power point tracker (MPPT) controller with a 96% charging efficiency.
- Luminaire weight shall be up to 25kg.
- Luminaire correlated colour temperature (CCT) shall be 6000K with a CRI of >75.
- Luminaire shall have a fixed tailstock that shall fit on a pole of 50-90mm.

### 1.2. LED LUMINAIRE SPECIFICATIONS

The LED luminaire shall be designed to meet the lighting criteria for Class B roads. The luminaire shall be designed in accordance with SANS specifications and the following requirements:

- Design life: In excess of 25 years.
- The replacement, upgrading and servicing of the LED unit and the battery shall be possible.
- Minimum IP rating of the luminaire: IP66.
- Glass protector of the solar panel and the LED diffuser shall be tempered.
- To operate at an ambient temperature of -30C to +60C.
- Thermal design shall be for Mpumalanga, South Africa exterior conditions, i.e. high temperatures, low pollution, low corrosive.
- The LED life expectancy shall be 50,000 hours at 80% lumen maintenance – Bidder to attach documentary proof or evidence, that is, technical data sheets which demonstrate the statistical correlation.
- High efficiency LEDs > 85 lumens/watt absolute photometry CRI > 75. (Bidder to attach documentary proof or evidence showing compliance, shall submit with the tender.
- Colour temperature shall be neutral white 5000K.
- Submit a report for LEDs used in the luminaire, which shall include ff.:
    - Measured LED junction temperature for a given test condition and extrapolated for an ambient temperature of 35°C.
    - LED drive current.

- LED manufacturer data that clearly correlates LED junction temperature and LED drive current to lumen maintenance.
- Attach proof confirming that failure of one LED will not cause additional LE's to fail.

- The controller shall incorporate a temperature sensor which shall reduce the current to protect the LEDs at higher than rated ambient temperatures. The temperature sensor not to switch off the LEDs at high temperatures.
- Luminaire closure shall be by means of 4 stainless steel tamper-proof screw allen/hex bolts at the rear and front of the luminaire and secured by a tamper-proof screw / torq anti-theft bolt to minimise theft and vandalism.
- The control unit shall be incorporated into the luminaire housing.
- The luminaire shall automatically disconnect the supply to the power supply once the luminaire is opened.

**1.3. PHOTOMETRIC REQUIREMENTS**

Attach detailed calculations to confirm photometric results, to the tender document. Submit the photometric data based on measurements undertaken by an internationally certified lighting laboratory. The photometric report shall contain :

- Absolute candela values, at an ambient temperature of 24.5°C and humidity of 65.7%
- Description and photograph of the luminaire under test.
- Supply voltage and LED currents during testing.

Calculations shall be based on the following criteria:

- LED lumen depreciation of 80%
- Maintenance factor of 0.9 (allowing for a 10% light loss due to dirt on the protector surface).

**1.4. CONTROL UNIT:**

The control unit shall have the following features:

- Charging temperature at daytime shall be between 0°C to +60°C,
- For temperatures < 0°C,the control system will automatically stop to protect the battery, and it will revive to charge the battery when the temperature goes higher than 0°C,
- Discharging temperature at night is between: -20°C to +60°C,
- Solar controller must be supplied with a MPPT solar controller technology.

## 1.5. WARRANTY

- The bidder shall provide warranty that the goods supplied under the contract are new, unused, of the most recent or current models and incorporate all recent improvements in design and materials. The bidder shall warrant that all goods supplied under this contract shall have no defect, arising from design, materials, or workmanship or from any act or omission of the supplier, that may develop under normal use of the supplied goods under prevailing site conditions.

- The bidder shall warrant that each luminaire supplied under the contract shall have a maximum lumen depreciation of not more than 10% of the original lumen output of the luminaire during the period of warranty.

- The warranty shall remain valid for twelve (12) months after the goods or any portion thereof as the case may be, have been delivered.

- The municipality shall promptly notify the service provider in writing of any claims arising under this warranty.

- Upon receipt of such notice, the service provider shall, within the specified period and with all reasonable speed, repair or replace the defective goods or parts thereof, without costs to the municipality.

- If the service provider, having been notified, fails to remedy the defect(s) within the specified period, the municipality may proceed to take such remedial action as may be necessary, at the service provider’s risk and expense and without prejudice to any other rights which the municipality may have against the service provider under the contract.

## 2. SOLAR STEP POLE SPECIFICATION (9m TOTAL LENGTH)

The total pole length shall be 9,2m – the poles shall be 9.2 m long suitable for planting on the ground, giving a mounting height of 8m. Pole dimensions 127/101/76mm.

### 2.1. WORKING LOADS

- All poles shall be designed according to SANS 10225, to carry the luminaires as specified. Applicable criteria: -

    - Terrain category 3
    - Design wind speed 40m/s
    - Altitude 0m
    - Horizontal and vertical deflections shall not exceed the requirements of SANS 10225 code.

### 2.2. CONSTRUCTION

- Poles shall be of tubular design with a minimum diameter at the base of 127/101/76 - 76mm diameter at the top.

- The base of the smaller diameter tube shall be securely welded to the top of the bigger tube by means of a reducing washer. A reducing cone of a minimum thickness of 3mm and a minimum height of 140 mm shall be welded to the smaller and the bigger tube.

- The steel used in the manufacture of the poles shall comply with the SABS specification 1431 Grade 355WA with minimum yield strength of 355MPa. Tests and analyses certificates must be provided upon request by the municipality. No steel sections shall be less than 2.5mm – wall thickness.

- All welding shall be carried out by coded welders only. Proof that all welders have been tested shall be provided upon request by the municipality.

- A galvanized base plate, the size of the access opening, is welded to the bottom of the pole.

- Bidder to advise about supply of K-Clamp.

## 2.3. DIMENSIONS

- Pole dimensions 127/101/76mm – poles shall be tubular design.

- The poles shall be 9.2m long suitable for planting in the ground, giving a mounting height of 8m.

- The poles shall at the upper end have a diameter of 76mm to accommodate a post top filling. Solar bracket to be mounted onto the pole.

- Access opening complete with cover, not smaller than 230 x 90 to be provided 500mm above ground level. To be secured by two 5-sided stainless steel hot dip galvanized allen screws and galvanised mounting / gland plate.

- Upon special request from the municipality, two cable entries to be provided 300mm below ground level at 90° displacement from the access opening.

## 2.4. CORROSION PROTECTION

- For corrosion protection, all parts of the pole and associated parts shall be hot dip galvanised according to SANS 121 ISO 1461 specification and. Bidder shall provide inspection certificates upon on request from the municipality.

- No welding, drilling, punching, bending or removal of burrs shall be carried out after galvanizing.

## 3. SOLAR LED FLOOD LIGHT HIGH MASTS LIGHTING

The solar LED high mast lighting shall consist of :-

- 150Watt LED high illumination LED flood lights
- 400W mono crystalline solar PV panels
- Top mounted battery box/cabinet manufactured from 3C12 steel with enclosure
- 5.1kWh lithium LifePO 48-100A batteries
- Solar maximum tracker (MPPT) charge controllers
- Control electronic-interconnecting wire/cables and module mounting structure, at a height of 20 meters above the ground
- 19m/20m high mast pole split in sections, with 2m stubby to be buried in the ground in a cemented foundation. 17m/18m mast above the ground.

The solar LED high mast shall be designed in accordance with following requirements:-

- Design life of solar high mast be in excess of 5 to 10 years
- LED Luminaire rating of IP66.
- Die casted durable lamp housing shall be robustly constructed, weatherproof, hail proof, corrosion proof and vandal resistant. It shall be grey in colour.
- Luminaire shall have an operating temperature of -20°C to 55°C. The diffuser lens must be manufactured with polymethyl methacrylate (PMMA). The lamp shall consist of a LED board arrangement with a warranty. Must submit an IEC 60598-1 or IEC 60598-2-3 certification.
- The IP66 ingress protection rating shall ensure that all components are protected against the ingress of dust and moisture, which leads to corrosion and premature failure. All screws, bolts and metal parts shall be stainless steel and anti-corrosion treated material.
- LED flood light must have a minimum of 22000 lumens (provide supporting lighting simulation results).
- 400W high efficiency mono crystalline silicon solar PV panel with IEC / TUV certification.
- Lithium LifePO battery (48V 100A) with charge-discharge cycles between 30006000 with 10 to 15 design life cycle.
- Luminaire shall have a maximum power point tracker (MPPT) controller with a 96% charging efficiency.
- Luminaire weight 6kg per luminaire.
- Luminaire correlated colour temperature (CCT) shall be 5000K with a CRI of >70.

- Luminaire shall be supplied with a galvanized mounting bracket.
- IEC or TUV certification shall be provided for solar panels, lithium battery, and for solar controller.

### 3.1. PHOTOMETRIC REQUIREMENTS

Attach detailed calculations to confirm photometric results, to the tender document. Submit the photometric data based on measurements undertaken by an internationally certified lighting laboratory. The photometric report shall contain:

- Absolute candela values, at an ambient temperature of 24.5°C and humidity of 65.7%
- Description and photograph of the luminaire under test.
- Supply voltage and LED currents during testing.

Calculations shall be based on the following criteria:

- LED lumen depreciation of 80%
- Maintenance factor of 0.9 (allowing for a 10% light loss due to dirt on the protector surface).

### 3.2. SOLAR CONTROLLER UNIT

The solar controller unit shall have ff.

- Charging temperature at daytime shall be between 0°C to 60°C
- When temperatures goes below 0°C, the control system will automatically stop to protect the battery.
- When temperatures go higher than 0°C,
- Discharging temperature at night is between -20°C to 60°C.

### 3.3. WARRANTY

- The bidder shall provide warranty that the goods supplied under the contract are new, unused, of the most recent or current models and incorporate all recent improvements in design and materials. The bidder shall warrant that all goods supplied under this contract shall have no defect, arising from design, materials, or workmanship or from any act or omission of the supplier, that may develop under normal use of the supplied goods under prevailing site conditions.

- The bidder shall warrant that each luminaire supplied under the contract shall have a maximum lumen depreciation of not more than 10% of the original lumen output of the luminaire during the period of warranty.
- The warranty shall remain valid for fifty-four (54) months after the goods or any portion thereof as the case may be, have been delivered.
- The municipality shall promptly notify the service provider in writing of any claims arising under this warranty.
- Upon receipt of such notice, the service provider shall, within the specified period and with all reasonable speed, repair or replace the defective goods or parts thereof, without costs to the municipality.
- If the service provider, having been notified, fails to remedy the defect(s) within the specified period, the municipality may proceed to take such remedial action as may be necessary, at the service provider's risk and expense and without prejudice to any other rights which the municipality may have against the service provider under the contract.
- 6x 150W – 132000lm minimum requirements
- 9x 150W –

### 3.4. SOLAR HIGH MAST POLE SPECIFICATIONS

The solar high mast pole shall be supplied in four sections with flanges at the end of each section to bolt together, to construct a single high mast design.

The total length of 19m/20m – 17m/18m

- 2m mounting stubby with dimensions of 273mm diameter
- 6m 273mm
- 6m 219mm
- 5m 177mm

### 3.5. CONSTRUCTION

- Poles shall be of tubular design with a minimum diameter at the base of 275mm (outer diameter) and constructed in four sections by means of flanges welded to the base of each section.

- The steel used in manufacture of poles shall comply with SABS spec 1431 Grade 355WA with minimum yield strength of 355MPa. Bidder to provide test and analysis certificates. No steel sections shall be less than 3mm wall thickness.

- All welding shall be carried out by coded welders only. Proof that all welders have been tested shall be provided on request.

- Bidder to advise about supply of K-Clamp

### 3.6. DIMENSIONS

- Pole dimensions 127/101/76mm – poles shall be tubular design.
- The poles shall be 19m long with a 2m stubby suitable for planting in the ground, giving a mounting height of 17m.
- The poles shall at the upper end have a diameter of 177mm at the smallest point at the top of the mast.
- Access opening complete with cover, not smaller than 230 x 90 to be provided 2000mm above ground level. To be secured by two 5-sided stainless steel hot dip galvanized allen screws and galvanised mounting / gland plate.
- Earthing.
- The high mast shall be provided with earthing straps and rod which shall be fastened to mast as a safety measure.

### 3.7. CORROSION PROTECTION

All parts of the pole and its associated parts shall be hot dip galvanized to SANS 121 ISO 1461 specifications. Contractor to provide an inspection certificate upon request from Thembisile Hani Municipality.

No welding, drilling, punching, bending or removal of burrs shall be carried out after galvanizing.

### 3.8. SCOPE OF WORK

The scope of work shall include design, manufacture, supply, install and commission of solar LED high mast lighting system including five years comprehensive warranty maintenance in various clusters within Thembisile Hani local Municipality.

### 3.9. COMPLETE SOLAR HIGH MAST

A complete solar high mast should comprise of the following:

- 9 X 80W LED high illumination luminaires with battery packs and solar panel.
- Minimum 57AH 12,8V Lithium battery packs built into the LED luminaires
- The luminaire shall have an 18V 100W high efficiency mono crystalline silicon solar panel.
- A minimum 20m high (above ground) steel pole capable of mounting all of the above-mentioned LED luminaires, batteries and can withstand the load.
- The successful service provider will be required to assess the identified project sites and provide a layout for the solar high masts.

### 3.10. SOLAR RECHARGEABLE BATTERY

The solar rechargeable battery shall have the following features :

- The battery should be at least 57AH at 12,8VDC lithium LifePO battery packs.
- Battery service Life shall be more than 2000 times, under normal conditions.
- Operate in temperatures of between -30°C and 60°C.
- Have a charged maintenance ability according to IEC standards.
- Be capable of rapid charging in 1 to 6 hours.
- Battery enclosure shall be secured by means of steel tamper-proof allen/hex bolts to minimize theft and vandalism.

## 3.11. LED LUMINAIRE SPECIFICATION

The solar LED high mast luminaire shall have the following specifications and parameters:

- Photocell
- 10° to 45° tilt angle
- Power output – 150W
- Voltage 48VDC
- Voltage fluctuation – 10% of rated voltage
- IP rating of IP66
- Minimum luminous flux of 22000Lm
- Colour temperature of 5000K
- Mounting height of 17m / 18m
- Working temperatures -30°C to +60°C
- Lighting time of 7 days a week, 12 hours a day/nights
- High efficiency LED > 130 lumens/Watt (bidder to provide proof or evidence)
- Colour rendering index (CRI) of 70/80
- Working lifetime of 50000 hours at 80% lumen maint. (Bidder to provide proof or evidence confirming statistical correlation).
- Warranty period of 5 years

- Submit a report for LEDs used in the luminaire, which shall include ff.:
    - Measured LED junction temperature for a given test condition and extrapolated for an ambient temperature of 35°C.
    - LED drive current.
    - LED manufacturer data that clearly correlates LED junction temperature and LED drive current to lumen maintenance.
    - Attach proof confirming that failure of one LED will not cause additional LED's to fail.
- Battery enclosure shall be secured by means of steel tamper-proof allen/hex bolts to minimize theft and vandalism.
- Controller must incorporate a temperature sensor which shall reduce the current to protect the LEDs at higher than rated ambient temperatures. The temperature sensor is not to switch off the LEDs at high temperatures.

## 3.12. MOUNTING POLE

The high mast pole to be designed in accordance to SANS 10225 under the ff. criteria and working loads :-

- Terrain category 3

- Design wind speed 40m/s
- Altitude 0m
- Horizontal and vertical deflections shall not exceed the requirements of SANS 10225.

The high mast pole shall be a galvanized steel pole with ff. minimum requirements

- At least 17m above ground level
- Strength of 500KN – withstand total weight of up to 5,000kg.
- Working load of 144km/h cross winds.
- Mechanical winch to hoist up the luminaires up and to lower them to a working height that is reachable for maintenance purposes.
- Brackets to be mounted underneath top mounted battery enclosure to support the 150W LED luminaires

### 3.13. BASE

The base shall consist of the following:

- 2600x2600x2000 steel foundation for concrete base.
- The high mast foundations shall be designed and constructed in accordance with SANS 10100 (Pt 1 & Pt 2) to withstand the forces imposed by the mast. The soil conditions and the soil bearing capacity shall be determined by a set of DCP tests for each individual mast. The results of these tests shall be recorded and placed in the project file for each high mast installation.
- The concrete cover of the reinforcing bars shall be not less than 50mm in all cases. The contractor shall provide evidence of the actual concrete cover achieved for the base and the plinth. The concrete shall have a design compressive strength of not less than 25 MPa after 28 days. The concrete strength of the base and the plinth shall be measured after 28 days by the Schmidt Hammer Test method for each foundation. The test results shall be recorded in the high mast project file.
- The plinth shall be designed to have a projection of not less than 300mm above nominal ground level after backfill compaction has been completed.
-

### 3.14. LIGHTNING CONDUCTOR

Each high mast shall be fitted with a lightning conductor spike at the top point of the luminaire. This spike shall be connected to the highmast earthing system. The steel high mast may be used as the earth path provided that a 70mm2 flexible copper cable is installed at hinge point to ensure that electrical currents do no pass through the hinge joint. The high mast shall be connected to the earthing system by means of a 16mm diameter stud welded to the inside of the mast.

### 3.15. GEO TECHNICAL SURVEY

The contractor shall be responsible to determine the soil conditions for each high mast location. This information shall be to the satisfactions and approval of the municipality to ensure design confidence.

### 3.16. PROCEDURES REGARDS EXISTING SERVICES AND EXCAVATIONS

- The contractor shall be required to take special care to locate existing services that would be affected by the installation of the high mast. The contractor will be responsible for the repair and reinstatement to any services damaged by them or any of their subcontractors.
- In the event of damage occurring to any existing services, the contractor shall immediately notify the Thembisile Hani Municipality and the owner of the service (that is, Nkangala District Municipality, Eskom, Telkom, Sanral or Mpumalanga Provincial Department of Transport). All minor and major damages shall be reported.
- All repairs to these services shall be to the satisfaction of the Thembisile Hani Municipality and the owner of the service.
- Penalties including consequential damage shall be levied at the sole discretion of the Municipality for damage to existing services caused under the following circumstances.
    - Damage due to unauthorized excavation
    - Damage due to unauthorized blasting activities.

### 3.17. REVIEW AND APPROVAL OF DRAWINGS AND DOCUMENTATION

The contractor shall submit 2 (two) sets of all documentation and drawings for review and subsequence approval by the Municipality. The Municipality shall complete the review within 7 (seven) working days and return ONE set of drawings and documentation to the contractor. These drawings and documentation will be marked with the review and approval status with comments where necessary. In the event of re-submittal of the drawings or documents being required, this shall be done within 7 (seven) working days after the request.

### 3.18. DESIGN FREEZE

Upon review and acceptance of drawing and calculations by Thembisile Hani Municipality, the design of each highmast shall be fixed. No modifications, revisions, or changes shall be made to the design and drawings, after this date, without prior written application to the municipality. The application shall include a full technical and commercial motivation for the changes.

### 3.19. DESIGN CHANGES

The contractor shall not change or modify the designs or drawings or documentation after it has been approved by the municipality, without written consultation, instruction or approval by the Thembisile Hani Municipality. The municipality is not obligated to approve or access any design changes that are proposed by the contractor after design freeze of the project.

### 3.20. RECORD KEEPING AND DOCUMENT TRACKING

- The contractor shall maintain a tracking system for documents and drawings.
- The latest approved drawings shall be used for carrying out all works.
- All quality records and data books shall be maintained and be traceable to the specific highmasts.
- The contractor shall maintain a copy of all records pertinent to this contract for a period of 5 years after completion of the contract.
- Contractor shall first notify the Municipality prior to destroying any records. Such notification shall be issued in writing at least 6 months prior to any action to dump or destroy the records.

### 3.21. PROGRAMME OF WORKS

Upon issuing of purchase order by Thembisile Hani Municipality, the contractor shall be required to submit a detailed manufacturing, construction, installation, and commissioning programme for the works (as per NEC Contract); within 5 working days. Key dates and milestones must be indicated in the program. The programme of works shall be reviewed and approved by the Municipality.

### 3.22.SERVICE LEVEL AGREEMENT

Service level agreements (SLA) shall be entered into between the Thembisile Hani Municipality and the successful service providers or contractors.

### 3.23. THEFT AND VANDALISM

Battery Enclosure and Solar Panels shall be secured by means of steel tamper-proof allen/hex bolts to minimize theft and vandalism.

## 4. NORMATIVE REFERENCES

The following table contains provisions that, through reference in the text, constitute requirements of the specifications. At the time of publication, the editions indicated were valid. All standards and specifications are subject to revision, and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

| SANS / NRS STANDARDS | STANDARD DESCRIPTION |
|---|---|
| NRS 025 | Photo Electric Control Units for Lighting (PECU) |
| ARP 035 | Guidelines for the Installation and Maintenance of Street Lighting |
| SANS 121 | Hot dip galvanized coatings on fabricated iron and steel articles |
| SANS 1088 | Luminaire entries and spigots |
| SANS 1200 A | General |
| SANS 1200 C | Site clearance |
| SANS 1200 D | Earthworks |
| SANS 1200 G | Concrete structural |
| SANS 1200 H | Structural steelwork |
| SANS 1200 HC | Corrosion protection of structural steelwork |
| SANS 1431 | Weldable structural sheets |
| SANS 2001 – CS1 | Construction works : Structural steel works |
| SANS 10100 | The structural use of concrete (Part 1 and 2) |
| SANS 10162 | The structural use of steel : The limit states design of hot rolled steelwork |
| SANS 10214 | The design, fabrication and inspection of articles for hot dip galvanizing |
| SANS 10225 | The design and construction of lighting masts |
| SANS 60529 | Enclosure for electrical equipment (Classified according to degree of protection that the enclosure provides) |
| SANS 60598-2-3 | Luminaires : Particular requirements for road and street lights luminaires |
| SANS 62305-3 | Protection against lightning |

## 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. Item | DESCRIPTION | SCHEDULE A |
|---|---|---|
| 1.18. | Warrantee (minimum 5 years) | |