

Technical Requirements

The provision of managed bandwidth links for the South African National Research Network (SANReN) connectivity of University of Mpumalanga (UMP) Mbombela campus, Siyabuswa campus and Agricultural Research Council (ARC) Mbombela to the CSIR.

RFP No. 3704/16/10/2025

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Glossary

Abbreviation	Term	Description
ARC	Agricultural Research Council	The Agricultural Research Council is a premier science institution that conducts research with partners, develops human capital and fosters innovation to support and develop the agricultural sector.
BER	Bit Error rate	
CAC	Customer Acceptance Certificate	Certificate of Acceptance that the SANReN customer needs to sign off on when work done (including civil work) is done on the SANReN customer's premises.
CSIR	Council for Scientific and Industrial Research	A statutory body established in terms of Scientific Research Council Act 46 of 1988, as amended.
GIS	Geographic Information System	A system designed to capture, store, manipulate and visualise spatial or geographic data.
IETF	Internet Engineering Task Force	A body that defines standard Internet operating protocols such as TCP/IP.
ITU	International Telecommunication Union	The International Telecommunication Union, originally the International Telegraph Union, is a specialized agency of the United Nations that is responsible for issues that concern information and communication technologies. It is the oldest global international organization. Headquarters: Geneva, Switzerland Founded: 17 May 1865
LC/APC	Lucent/Little/Local Connector - Angled Physical Contact	Fibre optic connector of the LC type with angle-polishing on fibre end-face.
ODF	Optical Distribution Frame	A passive device that terminates fibre cables.
PoP	Point of Presence	A location where networking equipment may be accessed.
RFP	Request for Proposal	A request for organisations and companies to submit a proposal to supply goods and services to CSIR

Abbreviation	Term	Description
RU	Rack Unit	Unit of measure describes the height of electronic equipment designed to mount in a 19-inch rack. One rack unit is 1.75 inches (44.45 mm) high
SANReN	South African National Research Network	The South African National Research Network (SANReN) is a high-speed network dedicated to science, research, education and innovation traffic.
TUT	Tshwane University of Technology	Higher education institution in South Africa
UMP	University of Mpumalanga	Higher education institution in South Africa

Definition of Terms

Term	Definition
Managed Bandwidth Service	A service provided by telecoms companies where a point-to-point links/service of a particular bandwidth capacity is provided to the customer.

Technical Requirements

Bidders must comply with the technical requirements in this document. These requirements will be evaluated in the Technical Compliance Matrix – Annexure C1 – Technical Evaluation Matrix. Bidders that wish to respond with a solution for this project must complete the **tab/sheet for the link required** in the Annexure C1 – Technical Evaluation Matrix . Failure to complete the technical compliance matrix will exclude the bidder from being considered.

1. Requirement Level Keywords

To eliminate ambiguity, bidders are to interpret the meaning of functional (technical) requirements using the keywords; "must", "must not", "required", "shall", "shall not", "should", "should not", "recommended", "may", and "optional", as defined by the IETF RFC (Request For Comments) document designated as RFC2119.

2. Technical Compliance

Bidders shall note the evaluation criteria applicable, and the weights attached to each criterion and complete the Technical Compliance Matrix accordingly.

2.1 Technical Evaluation Criteria

- The evaluation of the bidder's proposal will be based on their response to the Technical Compliance Matrix (in spreadsheet format) – Annexure C1 – Technical Evaluation Matrix.
- The bidder must complete the Technical Compliance Matrix in accordance with the instructions tabled in the Technical Compliance Matrix spreadsheet. The Technical Compliance Matrix is a mandatory submission designed to facilitate evaluation.
- Bidders must complete Annexure C1 – Technical Evaluation Matrix, which will be used to evaluate the proposed solution.

- Proposals with functionality / technical points of less than the pre-determined minimum overall percentage of 70% or less than 50% on any of the individual criteria will be eliminated from further evaluation on Price and Preference Points Evaluation.

3. Link Specifications

Proposals are hereby invited for the supply of a 10Gbps fixed-line fibre managed circuits between the SANReN sites as specified in *Table 1* and the sections that follows.

Due to increased vandalism, theft, and other risks, the CSIR prefers underground fibre solutions, but overhead fibre solutions will be accepted if there are no underground fibre solutions available and/or affordable.

The proposed links will be evaluated taking the whole project into account. The purpose is to design a solution that have no overlap or shared infrastructure. If that is impossible, the aim is to minimize the overlap or shared infrastructure of links that make up the solution, i.e. minimize common failures

Bidders must be cognisant of the following:

- The routing of the fibre will be dependent on the bidder's available infrastructure, and the bidder must ensure that it is optimised for minimum total distance.
- GIS Maps indicating the proposed routes in ESRI Shapefile or KML format must be provided, as well as diagrams annotated with sufficient detail to allow the CSIR to identify any and all shared infrastructure components, including the physical location of cable routes and ODFs (fibre optic patch panels), so that CSIR may independently determine where such infrastructure is shared among links.
- Bidders must include documentation for the physical installation and optical engineering standards used, as well as specifications of the fibre optic cable itself and the ODF to be installed at each site.
- CSIR expects the bidder to conduct a desktop study to plan for the required solution regardless whether the bidder intends to build a new route or propose an existing route
- The bidders must cater for an access build if it is required for the solution.
- Bidders must provide an end-to-end solution, i.e. from one ODF to the next ODF.

3.1 Requested Links

The bidder must provide managed bandwidth link between the endpoints specified below in *Table 1* and at the required bandwidth for specific links as indicated in the same table. The required links are schematically shown in Figure 1 below. Bidders may respond to this RFP in full or in part, i.e. bidders are allowed to respond **ONLY** to the link/s that they are able to provide. The name, address and coordinates for each endpoint where the CSIR would like the network to terminate is provided in *Table 2*.

Table 1: Requested Links

Link	Site A	Site B	Capacity
1	UMP Mbombela	TUT Mbombela	10Gbps
2	UMP Mbombela	ARC Mbombela	10Gbps
3	TUT Mbombela	ARC Mbombela	10Gbps
4	TUT eMalahleni	UMP Siyabuswa	10Gbps

Additionally, as a design requirement to minimize site/s isolation in the case of link/s failure, bidders must ensure that links 1, 2, and 3 cannot share ANY infrastructure, except on the last mile or exchange access point of presence (PoP).

Table 2: Site Details

Site Name	Address	Coordinates
UMP Mbombela	Cnr R40 and D725 Roads, Main Campus, Mbombela Campus DC2, Mbombela, 1200	Latitude: -25.435500 Longitude: 30.982800
TUT Mbombela	Cnr Madiba Dr & Techno Street, Bldg 1-G44, Mbombela Campus, Mbombela Campus, 1201	Latitude: -25.499300 Longitude: 30.955700
UMP Mbombela	Cnr R40 and D725 Roads, Main Campus, Mbombela Campus DC2, Mbombela, 1200	Latitude: -25.435500 Longitude: 30.982800
ARC Mbombela	Rivier Str, Admin Bldg 1st Flr, Computer Rm 18B, Mbombela 1201	Latitude: -25.451839 Longitude: 30.969729

Site Name	Address	Coordinates
TUT Mbombela	Cnr Madiba Dr & Techno Street, Bldg 1-G44, Mbombela Campus, Mbombela Campus, 1201	Latitude: -25.499300 Longitude: 30.955700
ARC Mbombela	Rivier Str, Admin Bldg 1st Flr, Computer Rm 18B, Mbombela 1201	Latitude: -25.451839 Longitude: 30.969729
TUT eMalahleni	19 OR Tambo Avenue, Building 7 G71, eMalahleni, 1035	Latitude: -25.878300 Longitude: 29.235400
UMP Siyabuswa	Bheki Mfundo Drive, Siyabuswa Satellite Campus, Siyabuswa, 0472	Latitude: -25.129892 Longitude: 29.073587

3.2 Network Design Philosophy

Bidders are requested to take note that network descriptions (including diagrams) serve to communicate to the bidders the CSIR's intent from a logical networking point of view. The mapping of a logical topology onto physical infrastructure may introduce common failure points that are not obvious from the logical design. The 10Gbps circuits must be provisioned on optic fibre end-to-end as per the link requirements set out in *Table 1*.

The CSIR is aware that it is not always feasible (in terms of cost and time constraints) for bidders to offer services that map cleanly from the logical design to physical infrastructure (in other words, without introducing common failure points), and it is therefore necessary to find a compromise on the acceptable level of failure risk.

To make the above determination, the CSIR requires detailed information about the underlying physical infrastructure over which the required link will be provisioned.

Partnership solutions must be specified and completed as one bid, identifying the partnership members and their individual responsibilities for service delivery.

3.3 Leased or otherwise Shared Infrastructure

Bidders that lease the underlying infrastructure offered as part of this bid with other downstream providers must disclose such information as part of their response. Bidders will not be penalised for offering solutions based leased infrastructure if this is disclosed.

Bidders that have provided SANReN with services that are not part of this bid must clearly indicate if their proposed solution shares any infrastructure with any such service already offered to SANReN.

3.4 Network Diagram

The network diagram below, i.e. *Figure 1: Network Diagram*, illustrates the envisioned network. This diagram is for illustration purposes only and bidders must design the network to optimize their available infrastructure. Bidders must, wherever possible, provide a reasonably direct route between the endpoints.

Bidders must provide a diagram or detailed text description illustrating how the circuit is provisioned over their core infrastructure. This diagram or description must be detailed enough to understand the physical routing of the link. A high-level diagram or detailed text description is sufficient, but a KML file showing the physical routing will be preferred. If the winning bidder does not provide a KML file with detailed physical routing information, they will be required to provide it during negotiations.

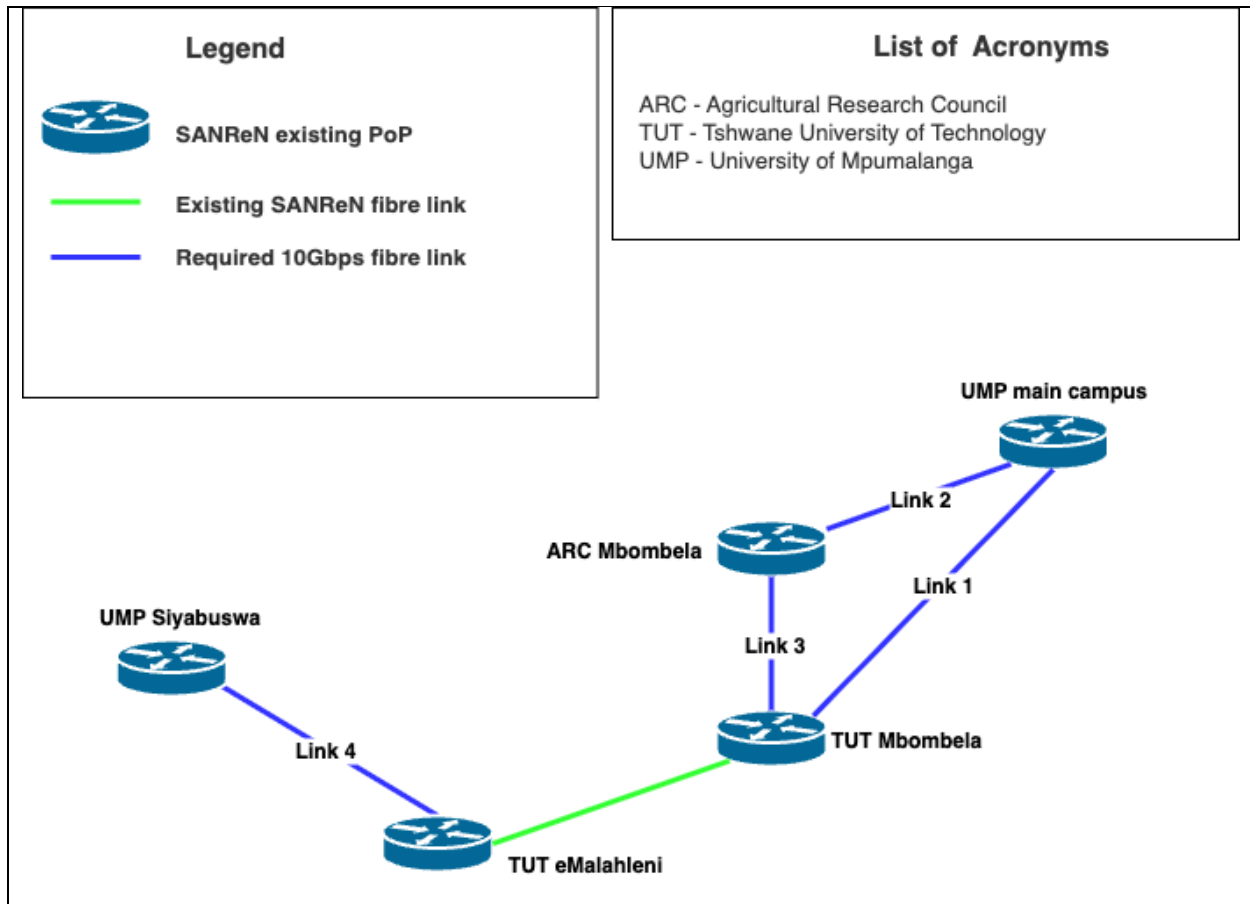


Figure 1: Network Diagram

3.5 Build Specifications

The bid is for end-to-end connectivity between the SANReN PoPs. This must include any last mile builds or links from the Bidder's PoP to the endpoints. Should additional infrastructure be required in order to meet the specification, provisioning of the link must be delivered within the timelines stated in section 6 below.

4. Link Requirements

The links must comply with the following requirements:

1. The link must be provisioned on fixed-line fibre infrastructure.
2. The link must terminate on active equipment at the sites specified.
3. All equipment deployed at the specified sites must be AC powered (220V 50Hz).

4. All equipment used must have their dimension requirements specified.
5. The links must support Link Loss Forwarding.
6. The links must support Jumbo Frames of 9000 bytes.
7. The link handoff must be an Ethernet handoff on a 10GBASE-LX (LAN) PHY interface.
8. The client hand-off must terminate on a patch panel.
9. The link handoff must be on LC/UPC or LC/APC connectors.

5. Reliability

5.1 Service Requirements

The CSIR requires that a minimum end-to-end uptime of 98% (calculated per month), but would prefer an uptime of 99% or better, to be maintained for the proposed link. To manage these requirements, the CSIR encourages all bidders to include a standard SLA (Service Level Agreement) as part of its response. The bidder must commit, as a minimum, to comply to the following criteria to pass the evaluation:

1. 24/7 access to a Network Operations Centre (NOC) to log support requests;
2. Maximum response time of 4 hours;
3. Maximum service restoration time of 8 hours; and
4. Quarterly end-to-end uptime reports for each circuit that is part of this tender.

The minimum end-to-end uptime to be maintained will be calculated using the following formula:

- Formula: total number of days in the month, multiplied by 24 hours multiplied by minimum end-to-end uptime percentage, equals minimum end-to-end uptime

For example, the minimum end-to-end uptime percentage of 98% is calculated as follows:

- Using the formula: total number of days in the month, multiplied by 24 hours multiplied by 98% equals minimum end-to-end uptime;
- For a 30-day month, 98% equates to an effective uptime of 705,6 hours out of 720 hours, allowing for 14.4 hours of downtime in the month; and
- For a 31-day month, 98% equates to an effective uptime of 729.12 hours out of 744 hours, allowing for 14.88 hours of downtime in the month.

For suppliers who wish to calculate the minimum end-to-end uptime on a quarterly basis, the number of days in the quarter under review, multiplied by 24 hours multiplied by minimum end-to-end uptime percentage will equal the minimum end-to-end uptime. Suppliers need to **explicitly state** whether their minimum end-to-end uptime percentage will be calculated either monthly or quarterly.

5.2 Maintenance

Details about the following aspects of the bidder's maintenance and support capabilities are required in order to evaluate the quality of the maintenance that the bidder will provide with respect to this link:

1. Mean Time to Repair;
2. Same day response, Working day response only, etc.;
3. Fault Logging Procedures;
4. Maintenance down time procedures and advance warning procedures;
5. Fault Monitoring and Alerting capability;
6. Scheduled reporting of incidents & performance measurements; and
7. Customer responsibilities indicated;

The bidder must specify whether the link being provided in this tender will be actively monitored or not. If the link is actively monitored, the bidder to provide the CSIR, or a CSIR designated party, regular notifications on the status of the link and other specific details when requested.

6. Project Plan

Bidders who plan to deliver the link within 6 months from the date of award will obtain full marks in the project plan section of the Technical Compliance Matrix. Bidders who plan to deliver the link after 6 months obtain points as per the evaluation criteria for the project plan section in the Technical Compliance Matrix.

Bidders must submit a project plan and schedule for this Project. The project plan must, at a minimum, cover the following items:

1. Planning Planned activities
2. Last Mile Civil Works (if applicable)
 - a. Way Leaves
 - b. Trenching
 - c. Blowing Fibre
3. Circuit Provisioning
 - a. Equipment procurement
 - b. Equipment deployment
 - c. Equipment configuration
4. Link Testing
5. Handover

7. Acceptance and As-deployed Documentation

In accepting a link(s), the CSIR will require several documents:

1. Test results for link.
2. CACs for the access builds at the end points (if applicable).
3. As-deployed documentation e.g., KML file; and
4. Acceptance test certificate documentation
5. Photographs of the deployed equipment at each endpoint with clearly identifiable and labelled demarcation points

7.1 Test results

The test results are to be provided for each link tested. The following information must be included on the Test Result Sheet / Acceptance Test Sheet:

1. 24-hour soak test results
2. BER Test results
3. Routing maps (Logical or Physical) of the actual service that was provisioned

7.2 Customer Acceptance Certificates

For access builds, CACs need to be signed off to ensure that all involved parties are satisfied with the work done by the supplier including required plans developed by the supplier be approved by relevant parties.

7.3 Sample Acceptance Documentation

Bidders must provide sample test results for previous similar work. The sample of the test result documentation must include samples of all acceptance documentation described above.