Technical Requirements

The provision of managed bandwidth links for the South African National Research Network (SANReN) Western Cape Garden Route Sites to the CSIR.

RFP No.3786/13/11/2026

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Glossary

Abbreviation	Term	Description
CAC	Customer Acceptance Certificate	Certificate of Acceptance that the SANReN customer needs to sign off on when 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 United Nations specialized agency for information and communication technologies (ICTs) that sets global technical standards, coordinates radio spectrum and satellite orbits, and works to improve global connectivity.
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	Fibre patch panel
PoP	Point of Presence	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
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.[1]

Acronyms

SANReN	South African National Research Network
CHPC	Centre for High-Performance Computing
SANSA	South African National Space Agency
NMU	Nelson Mandela University

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SANReN Managed Bandwidth links for the Western Cape Garden Route Sites

This document provides the technical requirements that tenderers must comply with. These requirements will be evaluated in the Technical Compliance Matrix (Annexure C1). The information captured in the tab labelled “Response Instructions” applies to all links mentioned in this document. The proposed links will be active for a period of five (5) years.

1 Requirement Level Keywords

To eliminate ambiguity, tenderers 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. A copy of RFC 2119 is attached as Annexure J - RFC 2119.

2 Technical Compliance

Tenderers shall note the evaluation criteria applicable and the weights attached to each criterion and complete the Technical Compliance Matrix (Annexure C1) accordingly. Tenderers are permitted to respond to any of the links that they are able to provide a solution to. Therefore, tenderers that wish to respond with a solution to any of the proposed links MUST complete the tab (or tabs) labelled “**link x**”, where x is the link number the tenderer is responding to.

2.1 Technical Evaluation Criteria

- The evaluation of the technical detail of the proposal will be based on the Technical Compliance Matrix (in spreadsheet format).
- The tenderer 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. **NB:**

Even though PDF versions of Annexure C1 are acceptable, tenderers are requested to still provide the excel version of their completed self-evaluation.

- Tenderers will be eliminated from further evaluation if their technical evaluation yields a score of less than 75 overall percentage points or less than 50% on any individual criteria.

3 Link specifications

Proposals are hereby invited for the supply of fixed-line managed circuits with 10Gbps committed rates between the SANReN sites identified in Table 1: Link End-points below.

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 End Points

The tenderer must provide a 10Gbps managed bandwidth links between the end points specified below in *Table 1*. The name, address and, coordinates for each endpoint are provided. The required links are schematically shown in section **Error! Reference source not found.** below.

Table 1: Link End-points

Link Number	Site A	Site B	Bandwidth Capacity
1	CHPC Cape Town	SANSA Hermanus	10 Gbps
2	SANSA Hermanus	NMU George	10 Gbps
3	NMU George	NMU Port Elizabeth	10 Gbps
4	Teraco Rondebosch	NMU George	10 Gbps
5	NMU George	UCT George Res	10 Gbps

The site details are as shown in *Table 2* below.

Table 2: Site Details

Site Name	Address	Co-ordinates
CHPC Cape Town	15 Lower Hope Street Rosebank, Cape Town 7700	-33.955200, 18.474800
SANSA Hermanus	HMO Building Hospital Street Hermanus 7200	-34.424100, 19.224700
NMU George	Madiba Drive George 6529	-33.955200, 22.529700

Site Name	Address	Co-ordinates
NMU Port Elizabeth	Building 07, South Campus University Way Summerstrand Gqeberha 6001	-34.009574, 25.667986
Teraco Rondebosch	Great Westerford Building 240 Main Road Rondebosch Cape Town 7701	-33.971200, 18.464900
UCT George Res	66 Plover Road Heatherlands George 6529	-33.951028, 22.452472

3.2 Network Design Philosophy

Tenderers are requested to take note that network descriptions (including diagrams) serve to communicate 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.

The CSIR is aware that it is not always feasible (in terms of cost and time constraints) for tenderers 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.

In order to make the above determination, the CSIR requires detailed information about the underlying physical infrastructure over which the required links will be provisioned. Tenderers must avoid provisioning circuits using shared infrastructure between any two (2) links in this tender. All instances of shared infrastructure must be clearly identified and communicated to the CSIR as part of the tenderer's response. Tenderers shall disclose this information with at least the level of detail necessary to identify any and all shared infrastructure within the scope of the bid, including the physical routing of cable infrastructure, shared equipment and shared exchange points. This will be used by the CSIR to independently determine where infrastructure is shared between links or with other providers that the CSIR could be obtaining

services from. If overlapping infrastructure exists, the CSIR may request, during negotiations, that the tenderer revise the physical routing of their solution to provide a solution without any overlapping infrastructure that may cause single points of failure on the network.

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

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

Tenderers 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 tenderers must design the network to optimize their available infrastructure. Tenderers must wherever possible provide a reasonably direct route between the endpoints. Please note that the award of all the links is subject to the availability of budget. The client (i.e. CSIR) reserves the right not to award a link if; a) sufficient funding is not available, or b) no viable technical solution is provided for the link in question, i.e. proposed solutions do not adhere to the technical specifications stipulated in this document.

Tenderers 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 each of the links and any shared infrastructure as described in section **Error! Reference source not found.** above. A high-level diagram or detailed text description is sufficient, but a KML file showing the physical routing will be

preferred. In the event that the winning tenderer does not provide a KML file with detailed physical routing information, they will be required to provide it during negotiations.

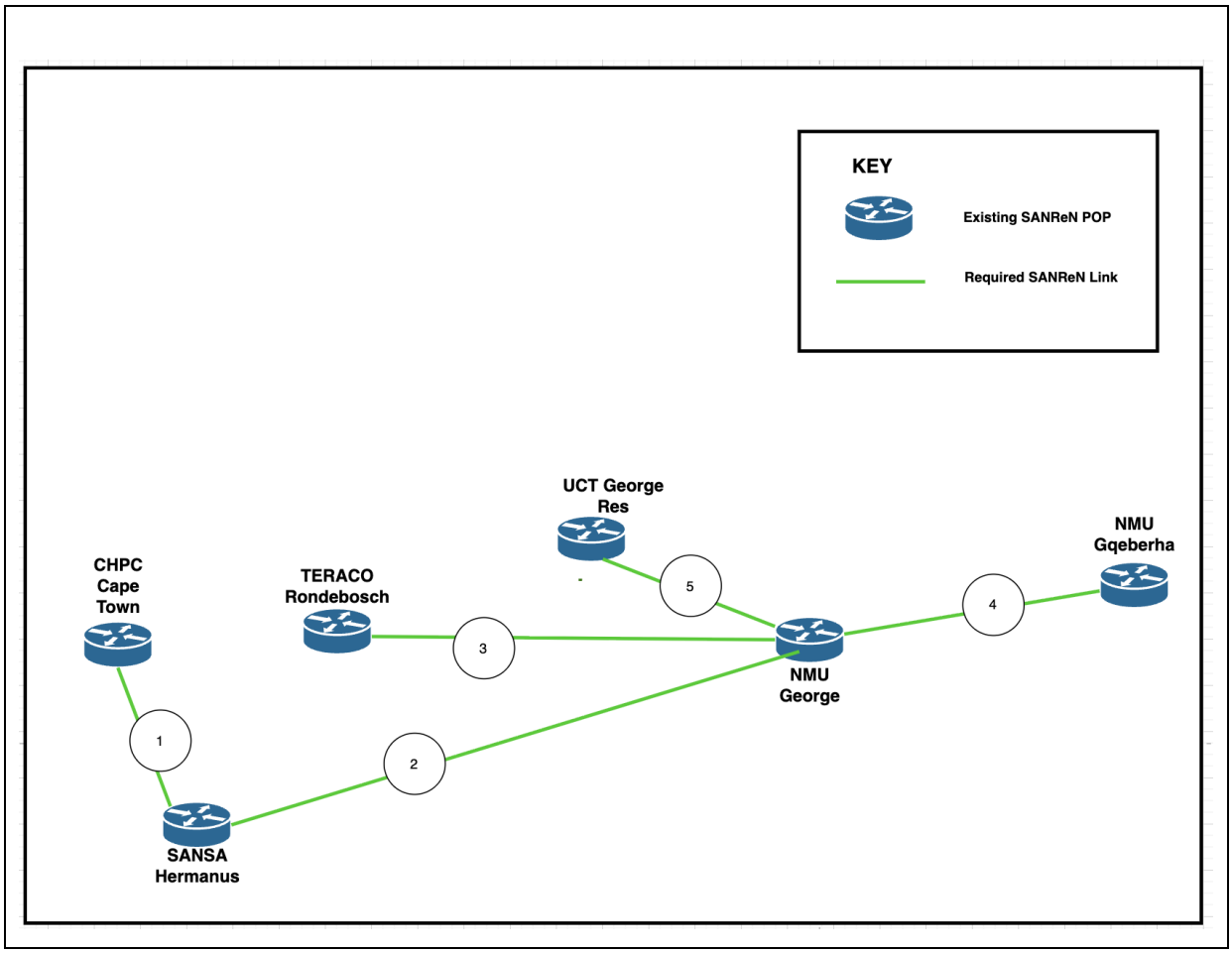


Figure 1: Network Diagram

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 links must be provisioned on fixed line infrastructure.
2. The links 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
7. The links handoff must be an Ethernet handoff on a 10GBASE-LR PHY interface
8. The client hand-off must terminate on a patch panel.

5 Reliability

5.1 Service Requirements

The CSIR requires that a minimum end-to-end up-time of 98% (calculated per quarter) to be maintained for the service. To manage these requirements, the CSIR requires all tenderers to include an SLA (Service Level Agreement) as part of its solution. Bids received without SLA options will be eliminated. The SLA shall provide the details of the service levels offered and as a minimum comply to the following criteria:

1. 24/7 access to a Network Operations Centre (NOC) to log support requests;
2. Maximum response time of 4 hours; and
3. Maximum service restoration time of 8 hours.

5.2 Maintenance

Details about the following aspects of the tenderer's maintenance and support capabilities are required in order to evaluate the quality of the maintenance that the tenderer 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 tenderer must specify whether the link being provided in this tender will be actively monitored or not. If the link is actively monitored, the tenderer 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

Tenderers who plan to deliver all links of the project within 3 months from the date of award will obtain full marks in the project plan section of the Technical Compliance Matrix. Tenderers who plan to deliver all links of the project between 3 and 9 months from the date of award will only obtain partial marks in the project plan section of the Technical Compliance Matrix. Tenderer's who plan to deliver any link after 6 months will not obtain any points for the project plan section in the Technical Compliance Matrix and will fail the evaluation. Tenderers must submit a project plan and schedule for this Project. The project plan must, at a minimum, cover the following items:

1. Planning 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 Documentation

In accepting a link, the CSIR will require a number of documents:

1. Test results for each link
2. CACs for the access builds at the end points (if applicable)
3. As-deployed documentation

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.

7.3 As-deployed documentation

A handover report is required by the CSIR. This should contain the following:

1. Photographs of the deployed equipment at each end-point with clearly identifiable and labelled demarcation points.
2. All of the test results as indicated in the section above
3. Any applicable CACs