

Development, Review and Update of Real-time Decision Support System for the Operation of Lower Orange River System

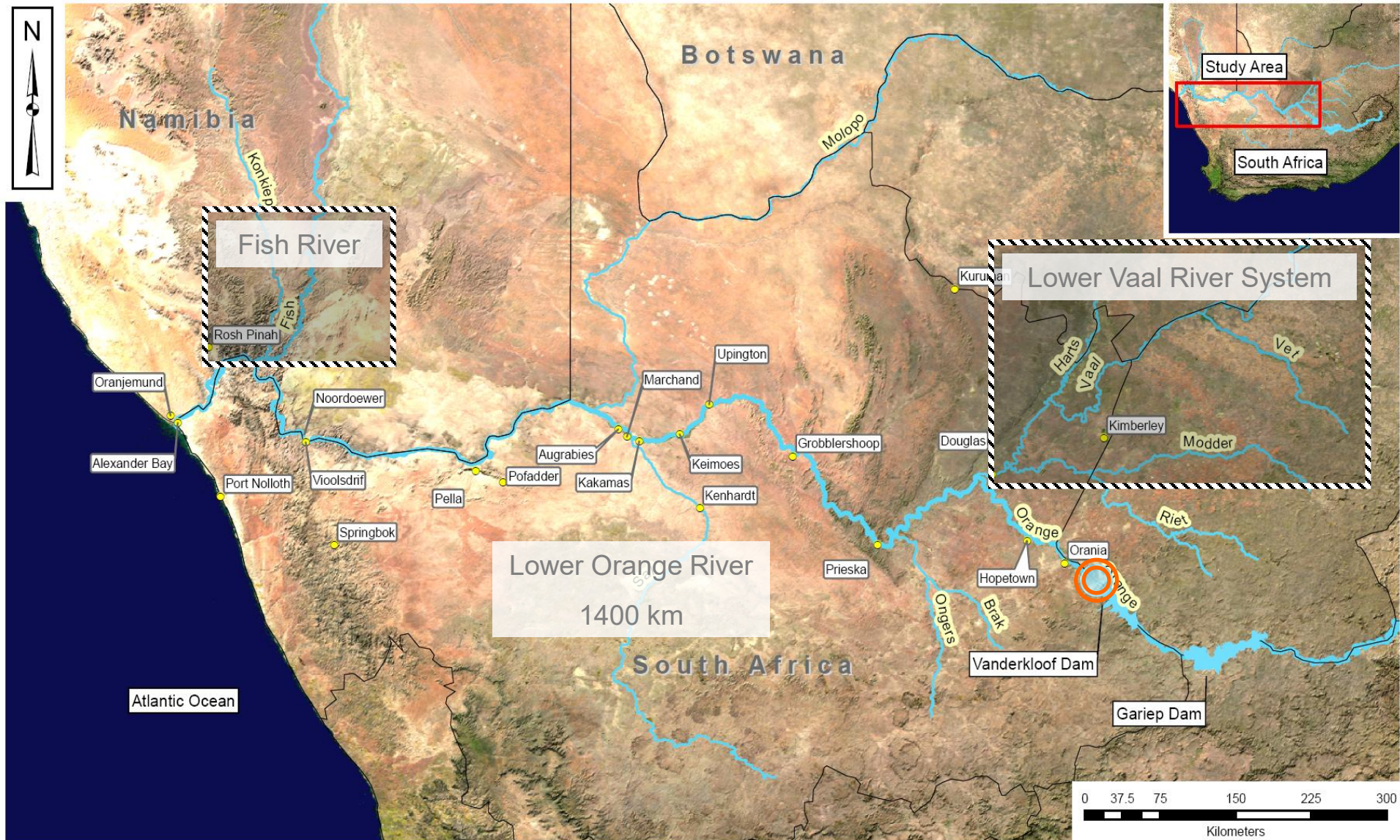


Tender Briefing Session Name: Ms Celiwe Ntuli 23 September 2026

**DWS : Directorate Water Resource Management Planning
Systems Operation**



Study area



Study Overview

Purpose of the study

- Minimize losses from the Lower Orange River System thereby maximizing the yield in the ORS by optimizing releases from Vanderkloof Dam making use of real-time flow gauging stations while taking into account:
 - *Downstream water user requirements*
 - *Environmental water requirements*
 - *Evaporation losses*
 - *Operating losses*
 - *Inflows from the Vaal River and other tributaries*
- *Improve system yield*

Current Operational Practices

- Orange River Annual Operating Analysis (AOA) determines the monthly releases from Vanderkloof Dam
- AOA updated bi-annually :
 - May and November each year



Current Operational Practices

Annual Operating Analysis

- Releases are based on estimated average monthly demands and losses
- Does not make use of inflows from the Vaal River to satisfy demands in the Lower Orange River
- Does not take into account the current situation along the Lower Orange River

Study Objectives

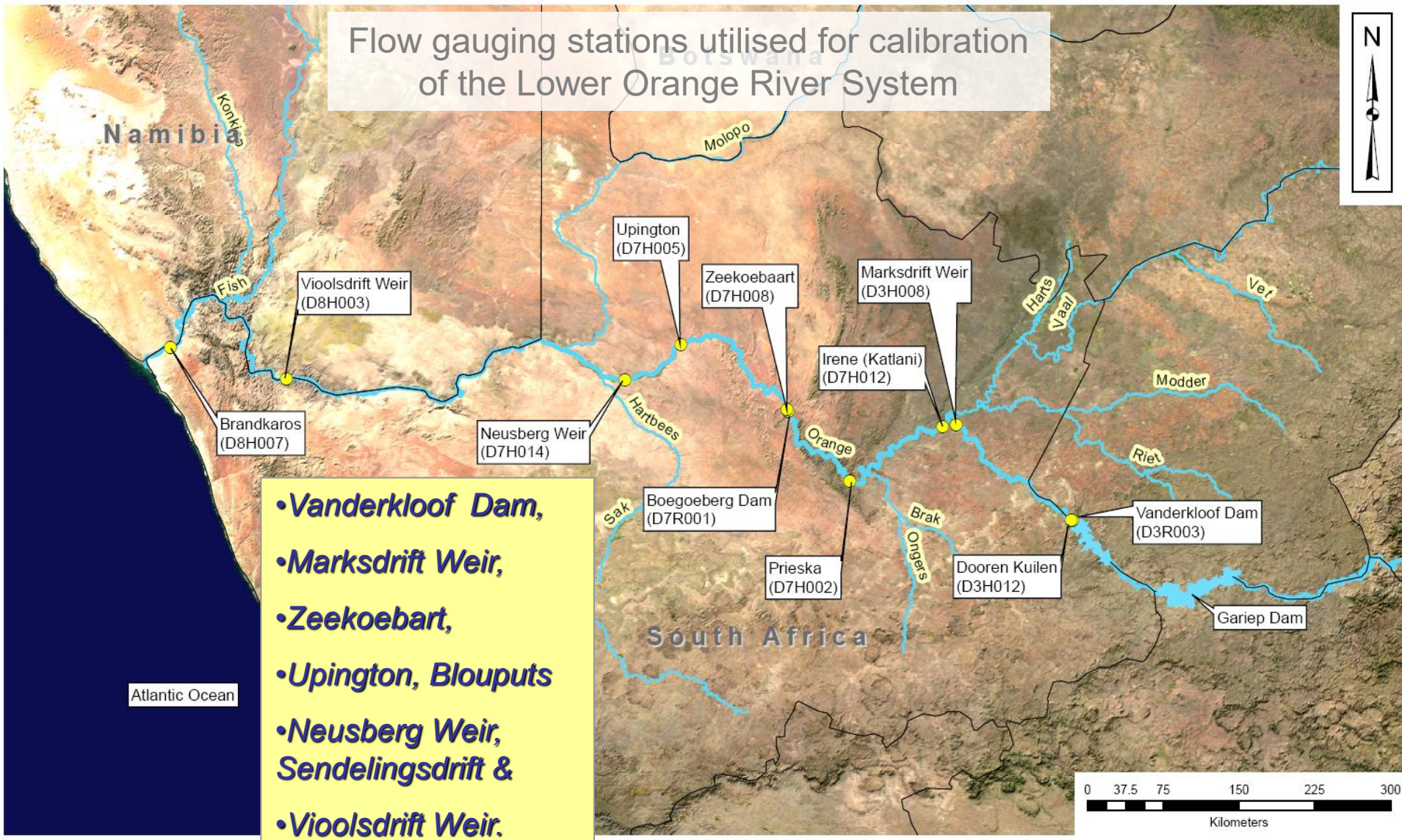
- Assess the existing real-time DSS for the Lower Orange River. This DSS is currently implemented on the MIKE Operation platform (2017 version).
- Evaluate the existing real-time gauges within the Orange River and Lower Vaal – determine the adequacy for efficient calibration of hydrodynamic model and operation
- Assess the existing hydraulic model – partially calibrated model using the Mike 11 and Operation platform
- Develop a weekly/bi-weekly water order system for the Lower Orange River: Actual monthly distribution of irrigation demands may differ from the monthly distributions in the Annual Operating Analysis
- Develop a hydraulic model to simulate the temporal and spatial variability of the hydraulic processes within the Orange River system
- Develop a method to optimize releases from Vanderkloof Dam to meet environmental and water use requirements in the Lower Orange River.
- Develop a user interface for operating, monitoring, and disseminating results from the DSS
- Provide training, capacity building, and technical support – Knowledge transfer

Setup of Hydrodynamic Model

Positions of surveyed cross-sections



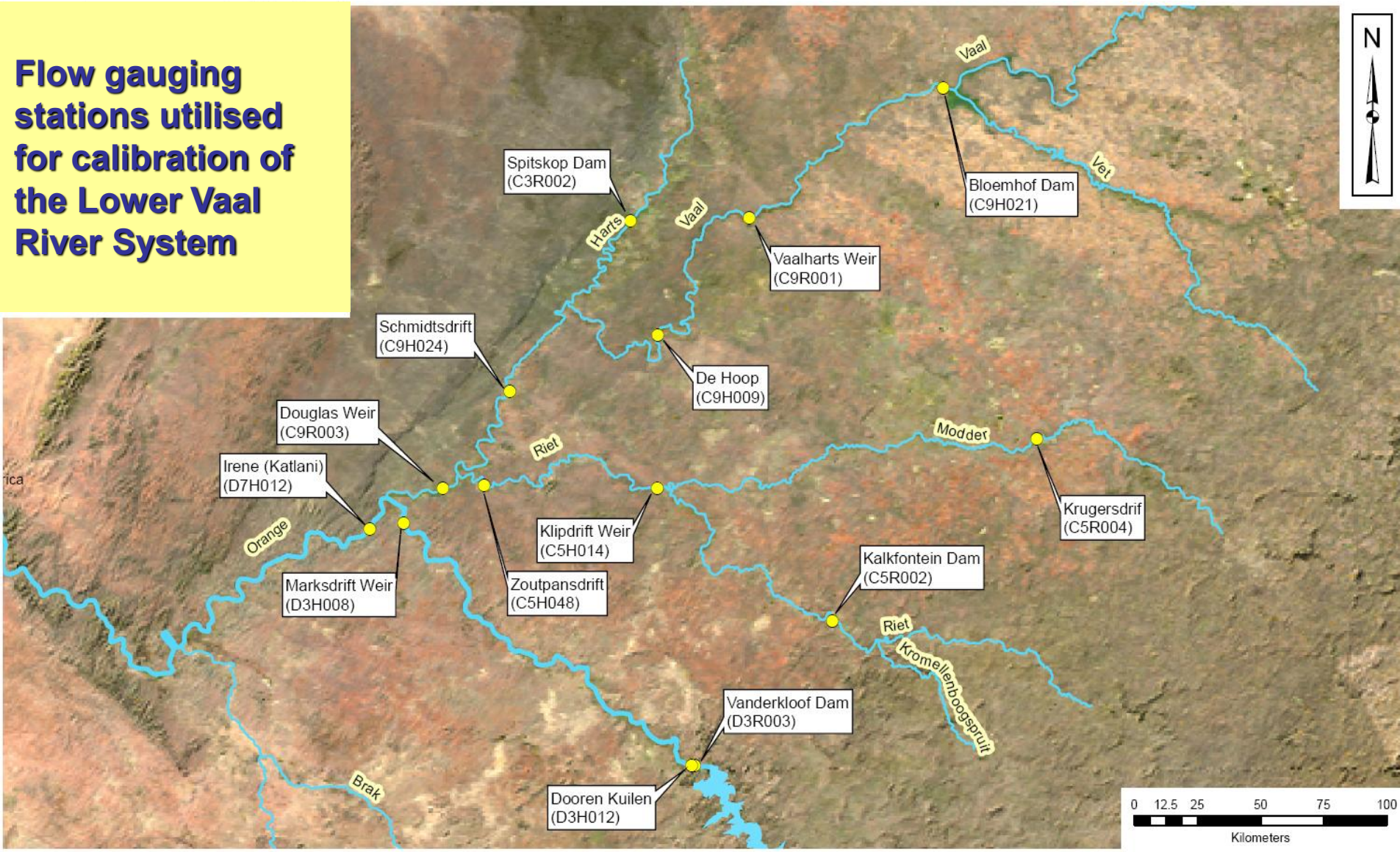
Setup of Hydrodynamic Model Calibration



Setup of Hydrodynamic Model

Calibration – Lower Vaal River

Flow gauging stations utilised for calibration of the Lower Vaal River System



Setup of Hydrodynamic Model

Design of Decision Support System

- Lower Orange River Model includes:
 - Orange River from Vanderkloof Dam to Orange River Mouth
 - Fish River from Ai-Ais Weir to Orange-Fish Rivers' confluence
 - Vaal River from Douglas Weir to Orange-Vaal Rivers' confluence



Setup of Hydrodynamic Model

Design of Decision Support System

- Lower Vaal River Model includes:
 - Vaal River from Bloemhof Dam to Douglas Weir
 - Harts River from Spitskop Dam to Vaal-Harts Rivers' confluence
 - Riet River from Klipdrift Weir to Vaal-Riet Rivers' confluence



Setup of Hydrodynamic Model

Design of Decision Support System

- Upper Orange River Model:
 - anticipate flows from the upper Orange River a minimum of three days in advance
 - to anticipate releases by ESKOM from Gariep Dam
 - Existing hydropower tool



Forecasting Framework

- Forecasting framework, integration of:
 - Spatial GIS information
 - Real-time data (time series management)
 - Forecast Models
 - Dissemination Tools (web, e-mail, sms)
 - Alarm definition and warnings

Deliverables

1. Inception Report
2. Situation Assessment
3. Calibrated and Validated Hydraulic Model
4. Optimisation of Vanderkloof Dam Releases
5. method to optimise hydropower generation from Gariep and Vanderkloof Dams
6. Decision Support System
7. Capacity Building, Training and knowledge transfer

Outcomes of the DSS

- Hydrodynamic Optimisation on a daily basis
- Decision support for near-real time weather data, estimated evaporation losses, river flows and simulated releases
- Internet and e-mail publications issued on a daily basis
- Flexible scenario generation allows for additional simulations to be added

Evaluation System

Administrative Compliance

No	Criteria	Yes	No
1	Companies must be registered with National Treasury's Central Supplier Database. Provide proof of print out from CSD.		
2	Tax compliant with SARS (to be verified through CSD and SARS).		
3	Complete sign and submit SBD1, SBD 3.2 3.3, SBD4, SBD6.1, sign SBD		
4	The service provider (and in the case of a consortium or joint venture – at least one member of such consortium or joint venture) should submit a notary agreement between the parties must clearly identify the lead partner (if applicable)		
5	CERTIFICATE OF AUTHORITY FOR SIGNATORY (bidders to complete the relevant form.)		
6	Copy of an Identity document of the authorised individual to represent the Service provider as per the CERTIFICATE OF AUTHORITY FOR SIGNATORY form		

Phase 1: Mandatory Compliance

Bidders must submit the following mandatory documents

MANDATORY CRITERIA	REQUIREMENT	Yes	No
Study leader must be a civil/water resource engineer or hydrologist registered with the relevant professional body (ECSA or SACNASP) as Professional Engineer or Professional Natural Scientist	Attach Study Leader's valid Copy of Registration Certificate with ECSA or SACNASP		

Evaluation System

Phase 2: Technical Evaluation: Values: 0 Very Poor..... 1 Poor.....2 Average.....3 Good....4 very good 5 Excellent

Functionality Criteria		Weight
Company Experience	10 years of Past Experience of the company in: • Development of real-time operational systems for low and high flow management. • Water Resource management projects and • Development of hydraulic models. for real-time systems • Experience in Reservoir release optimisation	25
Methodology	• Understanding of the scope of work and Compliance with ToR; • Detailed, clear, feasible and effective method for each task • Quality assurance and control. And the Capacity to execute the methodology. • Detailed programme that includes project management, timelines and resource allocation. • Innovations or added value to the ToR	35
Team Capability	• The study leader must be registered with relevant experience of at least 10 years. • Team should have a range of experts in various fields (water resource engineer, hydrologist, software Programmer) minimum of 5 years of experience and • Other support structures GIS professionals, Admin, finance, messengers.	30
Capacity building and training	• Provide clear proposals on Capacity building and training of 10 DWS officials in the hydraulic model, optimisation methods, the DSS and/or technical aspects to be undertaken as part of this Study.	10

Evaluation System Cont'd

Phase 3: The 80/20 Principle based on Price and Specific Goals

The 80/20 Preferential Procurement System will be used in evaluating these bids:

Evaluation element	Weighting (Points)
SPECIFIC GOALS	20
PRICE	80
Total	100

PAUSE

QUESTIONS?

