REFINEMENT OF STRATEGIC GROUNDWATER SOURCE AREAS OF SOUTH AFRICA

Comments and Responses Register: Refined Methodology Report

August 2025

The Comments and Responses Register (CRR) documents all comments, inputs, and suggestions made by internal and external stakeholders following the circulation of the Draft Refined Methodology Report for the "Refinement of Strategic Groundwater Source Areas of South Africa" project. The purpose of the CRR is to ensure that all stakeholders' feedback is captured and appropriately addressed in the finalization of the Refined Methodology Report. This study, commissioned by the DWS Directorate: Reserve Determination (D: RD), maintains the CRR as a formal record of all inputs considered during the report's finalisation. Once the project leader, Kwazikwakhe Majola, and the project manager, Stanley Nzama, are duly satisfied with the process and resolution of comments, the Refined Methodology Report is approved. This report serves as a portfolio of evidence (PoE) for the project deliverable and is required for processing the consultant's or PSP's invoice, in this case, invoice generated by Umvoto South Africa (Pty) Ltd.

No.	COMMENTATOR	COMMENTS, QUESTIONS AND CONCERNS	RESPONSE(S)
1	SANBI	**Cover Page** REFINEMENT OF STRATEGIC GROUNDWATER SOURCE AREAS OF SOUTH AFRICA Is the name changing to Strategic Groundwater Source Areas? The previous products refer to as Strategic Water Source Areas – Groundwater	According to Le Maitre et al. (2018) in the Integrated Report on the Identification, Delineation and Importance of the Strategic Water Source Areas of South Africa, Lesotho and Swaziland, terminology for Strategic Water Source Areas specific to groundwater (SWSA-gw) varies throughout the document: • In the executive summary (p. iv) and on p. 3, it is referred to as "Strategic Water Source Areas for Groundwater (SWSA-gw)". • The acronym table (p. xxx) lists it as "Groundwater SWSA (SWSA-gw)". • The groundwater chapter (p. 5) uses the term "Strategic Groundwater Source Areas". Despite these inconsistencies, the concept of groundwater-specific SWSAs is clearly defined as a distinct strategic area, building on work by Nel et al. (2013). In alignment with the DWS project title, Refinement of Strategic Groundwater Source Areas for South Africa (RFP WP 11446), the project will consistently use the term Strategic Groundwater Source Areas (SWSA-gw), as seen in both the Final Inception Report and the Gap Analysis Reports, and agreed upon by the DWS project team.
	SANBI	Agreed, naming must be consistent with the acronym. May we please apply consistent term usage? This makes mainstreaming efforts much easier. This would be Strategic Water Source Area for Groundwater (SWSA-gw), and this aligns with the acronym that was identified. This is based on a decision taken a couple of years ago. They are all Strategic Water Source Areas, they just differ on being for surface water or groundwater	

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2	SANBI	**Executive Summary** South Africa's water security is increasingly under pressure due to rising demand, climate variability, and governance challenges. While national water resource management has traditionally focused on surface water, groundwater plays an equally crucial role, particularly in arid and semi-arid regions where surface water is scarce. Does this include aging and not well-managed infrastructure that also contribute towards water quantity and quality?	Yes, this statement encompasses all governance challenges.
	SANBI	Yes, this should, governance encompasses all of this	
3	SANBI	**Executive Summary** Strategic Groundwater Source Areas (SWSA-gw), first introduced by Nel et al. (2013), are critical zones that contribute significantly to groundwater recharge, ecosystem sustainability, and socio- economic development. In 2018, Le Maitre et al. refined this framework, identifying 37 nationally significant groundwater source areas. Including 20 sub-national	Added the 20 sub-nationally significant

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4	SANBI	**Executive Summary** To systematically assess groundwater conditions, a Current Status Matrix was developed to rank each SWSA-gw based on four key criteria: 1) Groundwater Quantity, 2) Groundwater Quality, 3) Threats & Risks, and 4) Protection Status. Each category was evaluated using available datasets, and SWSA-gw were classified into five status categories: In the context of this report, what would "protection" mean? Is it in the context of legislation like the National Environmental Management: Protected Areas Act (NEMPAA), NWA or other relevant legislation, or is it something else?	The assessment of protection status and groundwater dependence within the SWSA-gw regions made use of several spatial layers. Biodiversity and conservation areas were mapped using datasets from DFFE and DEA, including National Parks, Nature Reserves, Marine Protected Areas, Biosphere Reserves (DFFE, 2024), and Subterranean Groundwater Control Areas (SGWCAs) from CSIR (1998). Broader conservation planning zones were also sourced from DEA (2018) and DFFE (2024). Groundwater- dependent ecosystems (GDEs) were identified using wetland datasets from CSIR's National Wetland Map 5 (NWM5, 2018), CSIR's groundwater dependence classifications (2011), and the DWA GDE layer (2010), which were used to classify the degree of groundwater reliance. Additionally, Ramsar Sites (DFFE, 2024)— internationally recognised wetlands of ecological importance—were included to assess their functional dependence on groundwater inputs.
	SANBI	Agreed, the narrative around SWSAs is to achieve security as previous efforts for formal protection at a large scale were not politically palatable due to existing land uses. Speaking to securing allows for existing compatible land uses and avoids incompatible future land uses.	
5	SANBI	**Executive Summary** **Current Status Matrix used for assessing the groundwater conditions of each SWSA-gw.** Is this Matrix quantitative or qualitative?	The overview and summary of the Current Status Matrix used to assess groundwater conditions in each SWSA-gw are primarily qualitative, with some quantitative elements included (explained further in Chapter 3). The Executive Summary has been updated for clarity.

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6	SANBI	**Executive Summary** The table below summarises the Current Status Scores, ranking each region based on the four key parameters to illustrate groundwater sustainability trends and identify priority areas for management and protection. How is the ranking summed or quantified? The total score, how it is determined?	The Current Status Score of each SWSA-gw (which is based on evaluating each SWSA-gw using the Current Status Matrix) is evaluated based on descriptions and various metrics, which are outlined in Chapter 3. In summary Each SWSA-gw was assessed using key indicators, including groundwater use versus recharge volumes, land use (built-up and mining areas), climatic zones and MAP, climate change impacts on recharge, population growth rates, contamination risks, and the percentage of protected area. These factors together inform groundwater stress, vulnerability, and management priorities.
7	SANBI	**1 Background and Motivation** South Africa faces increasing challenges in securing sustainable and equitable access to water due to rising demand, climate variability, and governance constraints. Historically, groundwater was underrepresented in national water planning. As well as infrastructure challenges.	Updated.

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8	SANBI	**Background and Motivation** These areas, covering approximately 9% of South Africa's land area, play a critical role in maintaining river baseflow, supporting ecosystems, agriculture, and human settlements. However, the 2018 SWSA-gw delineation was constrained by several methodological challenges, including limitations in the scale and coverage of national datasets, discrepancies in groundwater recharge estimates, variability in hydrogeological data, and inconsistent groundwater use reporting. ……..additional as well as ecological progresses.	The phrase "support ecosystems" refers to all mechanisms necessary for maintaining ecological functioning, including the full range of ecological processes.

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9	SANBI	**1.1 Background and Motivation** Beyond the results of these studies and its inclusion in NWRS III (2023), additional pressures listed in the NWRS III (2023) continue to impact the sustainable, on-the-ground management of SWSA-gw. Climate change is altering precipitation patterns and increasing the frequency and intensity of droughts, worsening national water shortages. Rapid population growth and economic expansion are driving up groundwater demand, placing further strain on vulnerable aquifers. Governance and enforcement challenges, particularly for transboundary groundwater systems, also persist, as effective groundwater management requires coordinated efforts across multiple institutions, local authorities, and stakeholders. Cite	All the “additional pressures” listed here, including climate change, population growth, and others, are drawn from NWRS III, which is cited in-text and referenced at the start of the paragraph.
10	SANBI	**1.1 Background and Motivation** This project aims to enhance the identification, delineation, and protection of groundwater source areas (both nationally and transboundary) at a spatial precision fine enough to be aquifer-specific (where feasible). The areas have already been identified. Those this mean new SWSA-gw are going to be identified in addition to the delineation process?	The project’s Terms of Reference, as defined by DWS and outlined in the Inception Report, aim to develop a methodology for delineating SWSA-gw across national and transboundary aquifers. This supports the broader project goal of enhancing the identification, delineation, and protection of groundwater source areas at aquifer-specific precision (where feasible). Existing SWSA-gw serve as a foundation, but

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	SANBI	I assume this is speaking of the refined boundaries	refinement may result in changes to their size, shape, or extent. Depending on the outcomes, new areas may be added, and some existing ones may be removed.
11	SANBI	**1.1 Background and Motivation** The refined delineation will support the implementation of protective measures mandated by the (NWA, Act No. 36 of 1998), requiring collaboration between government and non-government stakeholders in alignment with the Integrated Water Resource Management (IWRM) approach outlined in NWRS III (2023). Something crucial also is for inclusion it - Integration to municipal instruments and sectoral plans.	Noted and Updated.
12	DWS	**Section 1.1 Background and Motivation** “By incorporating the most recent and most comprehensive hydrogeological data, this assessment aims to enhance based decision-making for long-term groundwater protection and sustainable use.” Consider using the phrase “evidence-based” or remove the word “based”	Updated

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13	WSP	**Section 1.2. Terms of Reference** "2. Reviewing and refining the scale of SWSA-gw to the aquifer level." I assume this is due to the "actual" hydrogeological characteristics of aquifer systems.	Correct. The Terms of Reference are drawn up directly from the RFP, and the refinement process aims to enhance delineation by incorporating detailed hydrogeological characteristics where available.
14	SANBI	**Terms of Reference** Developing an approach for the protection and management of the refined SWSA-gw. There is a process underway that is looking at protecting SWSA-sw. They should be incorporating the lessons and linkages from that process. These two processes should mirror each other when it comes to protection and management. I don't see any mention of that	The project team is aware that the DFFE's Five- Year Strategic Plan (2019–2024) includes securing 11 of the 22 surface water SWSAs (Mechanisms Framework, DFFE 2022), as well as the Technical Report on Fine-Scale Delineation of Strategic Water Source Areas for Surface Water by Lötter & Le Maitre (2021), prepared for SANBI. While this project will align to some extent with the mechanisms developed for securing surface water SWSAs, it will not mirror them entirely. Groundwater systems require a fundamentally different approach to protection and management, as they often cross surface water catchments and administrative boundaries. This is noted in the report.
	SANBI	Agreed, this should be aligning with the mechanisms to secure the SWSAs document developed by DFFE as it speaks to all SWSAs and is very detailed on what should be done	

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15	SANBI	**Aims and Objectives of this Report** Evaluate groundwater quantity, quality, and protection status within these areas, identifying pressures related to abstraction, land use, and contamination risks, as well as their implications for long-term resource sustainability. Inclusion or integration into various sectoral plans or municipal instruments. This is crucial for their protection/management or sustainability.	See response to comment 11
16	SANBI	**Table 1-1 Refinement of Strategic Groundwater Source Areas Deliverables and Associated Tasks for each Project Phase.** D3.3:Delineation of Refined SWSA- gw Report These two words need to be relooked (Delineate & Refine). One refinement process includes delineation. The state doesn't read properly from a process point of view.	Noted. It will be updated to "Delineation of SWSA- gw using Refined Methodology Report" moving forward.
17	DWS	**Section 1.4 Report Structure** It provides an brief overview of the key legislative frameworks, including the NWA (Act 36 of 1998) and the NWRS III (2023), and explains the need for refining SWSA-gw delineations. Changed "an" to "a"	Updated.

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18	DWS	**Section 1.4 Report Structure** Section 3 establishes the Statis Quo assessment framework, detailing the categories used to evaluate SWSA-gw. Changed “Statis” to “Status”	Updated
	SANBI	**Report Structure** Section 3 establishes the Statis Quo assessment framework, detailing the categories used to evaluate SWSA-gw. The framework consists of two key components: Status	Updated

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19	SANBI	**2.1. Summary of Previous Delineation** Le Maitre et al. (2018) developed a methodology for delineating SWSA-gw by adapting the Strategic Surface Water Source Areas (SWSA-sw) concept from Nel et al. (2013) to groundwater resources. The approach addressed several key aspects missing from the Nel et al. (2013) study, including broad- scale mapping of groundwater resources at national and sub-national levels, an improved understanding of aquifer dynamics, and a methodology for using proxies, such as groundwater recharge and hydrogeological characteristics, to assess groundwater availability and practical applicability. SWSA-gw were characterised as follows: Broad-scale mapping… What it should be addressing is the fine-scaling mapping of SWSA-gw at the national scale.	Chapter 2: Previous Methodology provides a synthesis of previous work relevant to this project, including Le Maitre et al. (2018), which builds on the original SWSA concept introduced by Nel et al. (2013). The intention of this chapter is solely to provide context by summarising and interpreting earlier studies. It does not represent the methodology or scope of the current study. Rather, it serves as a foundation upon which the new refinement approach will be developed. Le Maitre et al. (2018) contains further detail, which this study builds on but will apply updated data and a new, fine-scale delineation methodology.
20	SANBI	**2.1. Summary of Previous Delineation** **1.** Areas that have high groundwater availability, 2. Are nationally important groundwater resources, or 3. Meet both criteria. There might be criteria on reliance on groundwater supply that was used to identify these.	Correct. As noted in the response to Comment 19, the work by Le Maitre et al. (2018) is summarised in Chapter 2 purely for context and reader reference. The criteria used in their delineation of the 37 existing SWSA-gw are presented in the table directly below the referenced paragraph (see Table 2-1, Criterion 4).

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21	SANBI	**2.1. Summary of Previous Delineation** Land-use pressures, such as mining, urban expansion, and intensive agriculture, were also examined for their potential impacts on groundwater quantity and quality. Habitat degradation should also be considered due to its impact when it comes to the quantity of recharging the aquifers.	As noted in the response to Comment 19, the work by Le Maitre et al. (2018) is summarised in Chapter 2 for context only. It does not represent the methodology or scope of this study. The purpose of this chapter is to provide a reference point for how the 37 existing SWSA-gw were originally delineated, with their criteria presented in Table 2-1.
	SANBI	I assume this may be covered under the risks and threats section.	
22	WSP	Figure 2-1. Strategic Water Source Areas for groundwater and surface water as delineated by Le Maitre et al. (2018). Suggest numbering the delineated SWSA-gw on the map for easy reference Suggests that the reference numbers used in Table 2-3 are shown on this map.	Map Updated.

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23	WSP	Table 2-3: List of SWSA-gw highlighting where these overlap with SWSA-sw (after Le Maitre *et al.,* 2018). Should now (2025) include some of the Kalahari Group Aquifer of the Northern Cape Region and head-water sections of the Sak, Vis, and Renoster Rivers.	As noted in the response to Comment 19, the work by Le Maitre et al. (2018) is summarised in Chapter 2 for context only. It does not represent the methodology or scope of this study. Additionally, Table 2-3 is taken directly from the 2018 study. The updated SWSA-gw would certainly include information for Kalahari Group Aquifer of the Northern Cape Region and head- water sections of the Sak, Vis, and Renoster Rivers.
24	SANBI	**2.2 Summary of Previous Status Quo** As part of the Le Maitre et al. (2018) delineation of SWSA-gw, a Status Quo assessment was conducted to evaluate hydrology and drainage, geology, groundwater availability, use, and associated risks. There have been refinements to the SWSA-sw (Lotter and La Maitre, 2021) I think it is useful to also refer to that technical process.	The project team is aware of the study by Lötter, M.C. & Le Maitre, D. (2021), Fine-scale Delineation of Strategic Water Source Areas for Surface Water in South Africa using Empirical Bayesian Kriging Regression Prediction: Technical Report, and has referenced its data and results in previous project reports (Inception and Gap Analysis). For this report, however, the 2021 study was intentionally omitted. From a groundwater status quo perspective, its focus was more closely aligned with delineation methodology - an element to be addressed in the next phase of this project - rather than with the current assessment of surface water resource conditions (which would have been an important consideration if translated to groundwater)..

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25	SANBI	**2.2 Summary of Previous Status Quo** Climate Variability: Climate variability was assessed using WR90 precipitation data (Midgley et al., 1994) and topographic analysis from the National Spatial Biodiversity Assessment (Driver et al., 2005). Refer to the latest National Biodiversity Assessment.	As noted in the response to Comment 19, the work by Le Maitre et al. (2018) is summarised in Chapter 2 for context only. It does not represent the methodology or scope of this study. Chapter 3 outlined the updated dataset that was used for this Status Quo Assessment.
26	SANBI	**2.2 Summary of Previous Status Quo** Land Use Impacts: Land use analysis incorporated the National Land Cover (NLC) dataset from GeoTerraImage (GTI, 2015), the Mine Water Atlas (WRC, 2016), and the CSIR land-use datasets. Consider the latest dataset. The have been numerous updates.	As noted in the response to Comment 19, the work by Le Maitre et al. (2018) is summarised in Chapter 2 for context only. It does not represent the methodology or scope of this study. Chapter 3 outlined the updated dataset that was used for this Status Quo Assessment.
27	DWS	**Section 2.2. Summary of Previous Status Quo** Land Use Impacts: Land use analysis incorporated the National Land Cover (NLC) dataset from GeoTerraImage (GTI, 2015), the Mine Water Atlas (WRC, 2016), and the CSIR land-use datasets. **Why not use the DFFE 2022 LC dataset that was used and mentioned later on?**	As noted in the response to Comment 19, the work by Le Maitre et al. (2018) is summarised in Chapter 2 for context only. It does not represent the methodology or scope of this study. Chapter 3 outlined the updated dataset that was used for this Status Quo Assessment.

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28	SANBI	**2.2 Summary of Previous Status Quo** Land Use Impacts: Land use analysis incorporated the National Land Cover (NLC) dataset from GeoTerraImage (GTI, 2015), the Mine Water Atlas (WRC, 2016), and the CSIR land-use datasets. Consider latest DFFE Land use/cover	As noted in the response to Comment 19, the work by Le Maitre et al. (2018) is summarised in Chapter 2 for context only. It does not represent the methodology or scope of this study. Chapter 3 outlined the updated dataset that was used for this Status Quo Assessment.
29	SANBI	**2.2 Summary of Previous Status Quo** Protection Status: The study assessed protection levels using the National Biodiversity Assessment (NBA 2018), the South African Protected Areas Database, and the Department of Environmental Affairs (DEA) Protected Areas Register. Correct name Protected and Conservation Areas Database	Updated.
30	SANBI	**2.2. Summary of Previous Status Quo** Protection Status: The study assessed protection levels using the National Biodiversity Assessment (NBA 2018), the South African Protected Areas Database, and the Department of Environmental Affairs (DEA) Protected Areas Register. DFFE	As noted in the response to Comment 19, the work by Le Maitre et al. (2018) is summarised in Chapter 2 for contextual purposes only. The Department of Environmental Affairs (DEA) was the name of the Department of Forestry, Fisheries and the Environment (DFFE) at the time of publication and is therefore referenced as such in the cited paragraph.

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31	SANBI	**2.2. Summary of Previous Status Quo** Protection Status: The study assessed protection levels using the National Biodiversity Assessment (NBA 2018), the South African Protected Areas Database, and the Department of Environmental Affairs (DEA) Protected Areas Register. Findings revealed that only 11% of all SWSAs were under formal protection, with 10 major SWSAs completely unprotected, making them highly vulnerable to land-use changes. Was this for all SWSAs or just SW? At this time, the recharge and supply dynamics were not known, so where to protect GW wasn't identified.	As noted in the response to Comment 19, the work by Le Maitre et al. (2018) is summarised in Chapter 2 for contextual purposes only. The values listed here come from the outcomes of the work by Le Maitre et al. (2018).
32	SANBI	**2.2. Summary of Previous Status Quo** Protection Status: The study assessed protection levels using the National Biodiversity Assessment (NBA 2018), the South African Protected Areas Database, and the Department of Environmental Affairs (DEA) Protected Areas Register. Findings revealed that only 11% of all SWSAs were under formal protection, with 10 major SWSAs completely unprotected, making them highly vulnerable to land-use changes. The study should extend their data collation to the Province because other information might not have yet been published through DFFE.	

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33	SANBI	**2.2. Summary of Previous Status Quo** Biodiversity & Ecosystems: Biodiversity assessments were conducted using the NBA (2018) and South African National Biodiversity Institute (SANBI, 2011) datasets. The study emphasized the ecological role of SWSA-sw in sustaining freshwater ecosystems, particularly through riparian zones, wetlands, and river corridors. However, no specific analysis was done for groundwater-dependent ecosystems (GDEs). Which dataset are they referring to?	As noted in the response to Comment 19, the work by Le Maitre et al. (2018) is summarised in Chapter 2 for contextual purposes only. The detailed reference to the dataset listed here was not explicitly included in Le Maitre et al. (2018).
34	SANBI	**2.2. Summary of Previous Status Quo** Conservation Areas: Conservation areas were mapped using the South African Protected Areas Database and the DEA Protected Areas Register. The study found that grassland-based SWSAs lacked formal conservation status, making them highly vulnerable to land-use change and degradation. This highlighted the urgent need for expanded conservation efforts to protect SWSAs and ensure long-term water security. Is this referring to the entire protected areas network? If so, could this term be used as conservation areas have a different meaning?	As noted in the response to Comment 19, the work by Le Maitre et al. (2018) is summarised in Chapter 2 for contextual purposes only.

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35	SANBI	**2.2. Summary of Previous Status Quo** Conservation Areas: Conservation areas were mapped using the South African Protected Areas Database and the DEA Protected Areas Register. The study found that grassland-based SWSAs lacked formal conservation status, making them highly vulnerable to land-use change and degradation. This highlighted the urgent need for expanded conservation efforts to protect SWSAs and ensure long-term water security. The CA are already mapped.	As noted in the response to Comment 19, the work by Le Maitre et al. (2018) is summarised in Chapter 2 for contextual purposes only.
36	SANBI	**2.2. Summary of Previous Status Quo** Conservation Areas: Conservation areas were mapped using the South African Protected Areas Database and the DEA Protected Areas Register. The study found that grassland-based SWSAs lacked formal conservation status, making them highly vulnerable to land-use change and degradation. This highlighted the urgent need for expanded conservation efforts to protect SWSAs and ensure long-term water security. Additional key datasets include PAES, CBA. Natural areas - condition of the land and ecosystem	As noted in the response to Comment 19, the work by Le Maitre et al. (2018) is summarised in Chapter 2 for contextual purposes only.

37	WSP	1) SP is currently conducting the Classification and RQOs for the Upper and Lower Orange Catchments. It might be a good practise to “link the SWSA-gw” demarcations to the Quaternary/Secondary Catchments so that it can be included in the final Gazetting process; 2) SP has reviewed the methodology that was followed for the SQ report, but it might be considered to give a bit more detailed explanation of the approach (we believe it was based on GIS/Geospatial applications, ref Figure 3-1 of the SQ Report). We assume that recent/modern groundwater data/information was probably applied where possible – a short description of the process would be supportive as it has been noted that groundwater monitoring is still limited to only a few sites in the Catchments; and 3) WSP acknowledge the emphasis on (i) climate variation and (ii) land use exploitation, however, the responsibility of waste management in the Catchments is poor, and this has a significant impact on the groundwater quality even in the current SWSA-gw Areas. 4) The study team should consider expanding the SWSA-gw further towards the Western catchments of the Lower Orange Catchment – several sole water supply aquifer systems are currently under quality and quantity stresses. 5) Should there not be a final “Conclusions” chapter? 6) To conclude, WSP acknowledge the significant changes noted in the 30-Year Climate	1) The WSP study is noted. However, at this stage of the Refinement of Strategic Groundwater Source Areas of South Africa project, updated delineations of SWSA-gw have not yet been produced. Once available, it would indeed be valuable to align the refined SWSA-gw with the ongoing Classification and RQO work for the Upper and Lower Orange Catchments. That said, it’s important to recognise that groundwater resources do not necessarily follow surface water catchment boundaries, often crossing multiple catchments. If WSP can incorporate or consider the refined SWSA-gw in their ongoing work, this would be a worthwhile integration. 2) Chapter 3 has been updated to include additional detail on the recent groundwater data and GIS processes used in the study. This includes updated charts, descriptions, maps, and tables (available in the appendix for each SWSA- gw). 3) Waste management concerns in the catchments will be addressed in the next phase of the project. This will introduce groundwater quality into the updated delineation methodology, where it will be used to further refine the SWSA-gw boundaries. Additional GIS-linked detail will be included in upcoming reports. 4) The updated methodology will be designed to identify potential SWSA-gw beyond current boundaries, including areas in the western parts of the Lower Orange Catchment. The approach aims to delineate SWSA-gw at aquifer- specific precision across both national and transboundary aquifers. While existing SWSA-gw

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		Norm assessment – unfortunately there is not a sufficient coverage of rainfall stations in SA (just a note, Chapter 3.2.1), and the Status Quo Scores (Table 4-2) is very helpful for the WRC & RQOs study.	provide a foundation, refinement may lead to changes in their extent and possibly the addition or removal of areas based on updated evidence. 5) The conclusion has been included to close out the chapter the report and summarise key findings. 6) Regarding the 30-year climate norm assessment and rainfall station coverage, the Technical Report on Fine-Scale Delineation of Strategic Water Source Areas for Surface Water by Lötter & Le Maitre (2021), prepared for SANBI, includes an updated MAP (Mean Annual Precipitation) layer that may be valuable for WSP's RQO and Classification study.
38	SANBI	**3.1.1. Geospatial Context** Administrative Boundaries Provinces, district municipalities (DMs), and local municipalities (LMs) were identified, along with major towns and settlements (Municipal Demarcation Board, 2018). These boundaries provide essential context for regional and national groundwater governance. Area all the SWSA-gw boundaries within the SA borders; if not, it will be very useful to add the internationally transboundary aquifers	The updated methodology (the next step in this study) will be designed to identify potential SWSA-gw beyond current boundaries. The approach aims to delineate SWSA-gw at aquifer- specific precision across both national and transboundary aquifers. This report provides a status quo of the current 37 SWSA-gw only (Le Maitre *et al.* (2018).

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39	DWS	**Section 3.1.1 Geospatial Context** These boundaries provide essential context for regional and national groundwater governance. Include demarcation of Water Supply Schemes.	Unfortunately, no spatial layer containing this information could be located; however, the demarcations are referenced in the appendix tables for each SWSA-gw. The PSP has requested assistance from DWS to source the relevant layers.
40	DWS	**Section 3.1.3.** Geological Mapping: CGS is currently updating the mapping scale to 1:50 000. Where possible, maybe these maps should be recommended.	Noted. The 1:50 000 maps are still in production, and national coverage at this scale is not yet complete. The status quo assessment used the best available national datasets and aimed to highlight areas where additional information is needed. Where existing CGS 1:50 000 maps overlap with SWSA-gw, they will certainly be incorporated into the refinement and delineation process.
41	DWS	**Section 3.2.1 Quantity** Groundwater targets and average groundwater levels were determined using the National Groundwater Archive (NGA, downloaded Feb 2025), analysing long-term water level trends and borehole depth distributions over the past 25 years. NGA water-level will only have the latest groundwater level data, including active and active stations. Rather use the HYDSTRA data when comparing the water-level temporally.	Noted. NGA data was used to assess long-term historic groundwater level fluctuations; however, the primary dataset utilised from NGA was borehole depth recordings, which indicated groundwater targets. Hydrstra will be used in the Updated Status Quo assessment of the refined SWSA-gw.

No.	COMMENTATOR	COMMENTS, QUESTIONS AND CONCERNS	RESPONSE(S)
42	DWS	**Section 3.2.1 Quantity** A MAP comparison was therefore conducted using more recent rainfall data, focusing on weather stations with both 10+ and 30+ years of records. While a 30-year Climate Norm MAP is only available for select stations, the MAP was calculated at each station. A comparison of these values with the WR2012 MAP reveals differences ranging from 2% to 24%, with an arithmetic mean of 12%. Although this mean falls within an acceptable range, confirming the continued applicability of the WR2012 MAP dataset for first-order recharge estimations in the Status Quo, it must be noted that the MAP ranges for local weather stations may differ. To account for these potential discrepancies, MAP values were determined per SWSA-gw, expressed as both an average rate (mm/a) and a total volume (Mm3/a). Would like to know the areas where the largest discrepancies are?	The areas with the largest discrepancies in MAP are primarily found in regions with complex topography or historically limited rain gauge coverage. Notable differences were observed in the mountain summits of the Western Cape, where higher rainfall predictions result from improved capture of orographic effects using a high-resolution digital elevation model (DEM). The northern KwaZulu-Natal coast also shows increased rainfall values, reflecting the incorporation of more detailed local-scale datasets. In contrast, some escarpment areas now show lower predicted rainfall, attributed to enhanced topographic sensitivity in the updated interpolation methodologies. With respect to the 30-year climate norm assessment and rainfall station coverage, the Technical Report on Fine-Scale Delineation of Strategic Water Source Areas for Surface Water by Lötter & Le Maitre (2021), prepared for SANBI, provides useful insights into these MAP discrepancies.

No.	COMMENTATOR	COMMENTS, QUESTIONS AND CONCERNS	RESPONSE(S)
43	SANBI	**3.2.1. Quantity** Groundwater use was assessed using data from the WARMS (downloaded April 2024), which records registered groundwater users and their allocated abstraction volumes (Mm^3/a) per sector (e.g., domestic, industrial, agricultural, etc). This dataset provides key insights into abstraction trends and helps identify water use hotspots across SWSA-gw. The dataset was filtered to include groundwater use only, ensuring a focused analysis of groundwater-dependent sectors per SWSA-gw. Additionally, groundwater-dependent towns and settlements were identified using the Water Source Dependent Towns Map (DWS, 2024), providing a spatial understanding of municipalities that rely primarily on groundwater for supply. This should be added to the criteria used for identifying GW areas, as discussed above.	The updated methodology (the next step in this study, after the Status Quo Assessment) will certainly include groundwater use in the criteria.

No.	COMMENTATOR	COMMENTS, QUESTIONS AND CONCERNS	RESPONSE(S)
44	DWS	**Section 3.2.1. Quantity** Additionally, groundwater-dependent towns and settlements were identified using the Water Source Dependent Towns Map (DWS, 2024), providing a spatial understanding of municipalities that rely primarily on groundwater for supply. Assuming this was the map in the National Groundwater Strategy 2016, this was, however, updated and used in the NWRSIII 2023. Even though there was a lack of All Towns data for Limpopo and the Eastern Cape, there have been significant changes in KZN and the WC.	The map used is from the DWS website (dated October 2024): https://www.dws.gov.za/Groundwater/wsdt.aspx
45	WSP	**Section 3.2.1. Quantity** Similar to the approach used for population growth rates, groundwater dependence growth rates were determined per LM for each dependency category. These rates were then applied to the portions of Wards within the SWSA-gw to estimate the projected 2025 population reliant on regional schemes, groundwater, and surface water, as shown in the table below. Please reference Table no.	Updated

No.	COMMENTATOR	COMMENTS, QUESTIONS AND CONCERNS	RESPONSE(S)
46	DWS	**Section 3.2.2. Quality** Groundwater quality was assessed using data from the Water Management System (WMS) database (downloaded April 2024), focusing on key parameters including pH (acidity/alkalinity), Electrical Conductivity (EC), and major ions such as fluoride, sulphates, and nitrate + nitrite nitrogen. Please note that while groundwater quality data is usually provided as nitrate + nitrite nitrogen from the DWS database (Water Management System), in some cases, data obtained from other stakeholders, such as water users, may be provided as NO_3-N Nitrate. This is just to sensitize the team regarding data similarity and dissimilarity.	Noted, thank you. We acknowledge that groundwater quality data from the DWS Water Management System is typically reported as nitrate + nitrite nitrogen, while data from other stakeholders—such as water users—is often provided as NO_3-N (nitrate only). This distinction is important and will be taken into account during data comparison at the aquifer-specific SWSA-gw scale to ensure consistency and accuracy in the assessment.
47	DWS	**Section 3.2.2. Quality** To enhance spatial analysis, these results were compared with data from the Spatial Distribution of Groundwater Geosites in South Africa maps (October 2024). Where is this map from? Given the huge temporal and spatial groundwater quality gaps, a discussion with the DWS Regional offices and CMAs on using the data from the Integrated Provincial Water Monitoring Committees needs to happen as we would want to focus on data for these SWSA-GW regions only.	The map used is from the DWS website (dated October 2024): https://www.dws.gov.za/Groundwater/data/NGwL MN.aspx The project team concurs and is requesting DWS's assistance in facilitating a discussion with selected officials from the DWS Regional Offices and representatives from the CMAs to obtain data from the Integrated Provincial Water Monitoring Committees.

No.	COMMENTATOR	COMMENTS, QUESTIONS AND CONCERNS	RESPONSE(S)
48	Council for Geoscience (CGS)	**Section 3.2.3. Threats and Risks** Can Energy shortage fall as part of the threats and risks?	Yes it can, we will consider it in the next round.
49	SANBI	**3.2.4. Protection Status** Protected areas were mapped and described using DFFE Conservation Data (DEA, 2018; DFFE, 2024), including National Parks, Nature Reserves (DFFE, 2024), Subterranean Groundwater Control Areas (SGWCA) (CSIR, 1998), Biosphere Reserves, and Marine Protected Areas (DFFE, 2024). The comment above on the protected areas network applies here. Not all biodiversity important areas have security in protection. A suggestion is to have a separate section speaking to biodiversity importance, with formally protected areas falling under this section.	This section is focused on the formal protection status of SWSA-gw, specifically highlighting areas with legal or conservation designations relevant to groundwater - such as National Parks, Nature Reserves, and SGWCAs. We recognise that not all areas of high biodiversity importance are formally protected and that formal protection does not always equate to groundwater-specific safeguards. Your suggestion to include a distinct section on biodiversity importance was noted and will be considered in future reporting, particularly as the study progresses toward protection and management strategy development. This would help to distinguish more clearly between ecological value and formal protection.
50	SANBI	**3.2.4. Protection Status** Wetlands, estuaries, and other GDEs potentially reliant on groundwater (CSIR, 2011) were identified. Ramsar Sites (DFFE, 2024), which are internationally recognised wetlands of ecological significance, were also assessed to determine their dependence on groundwater resources. A suggestion is to have this discussed under biodiversity important areas.	

No.	COMMENTATOR	COMMENTS, QUESTIONS AND CONCERNS	RESPONSE(S)
51	SANBI	**4. 4. STATUS QUO ASSESSMENT** Table 4-2 Status Quo Scores of each SWSA-gw based on the Current Status Matrix More detail is required that will be unpacked how this will be translated to scoring and refining the boundaries.	Updated.
52	WSP	**4. 4. STATUS QUO ASSESSMENT** Table 4-6 Summary of the Status Quo Scores of each SWSA-gw based on the Current Status Matrix. Would it be possible to indicate/reference what aquifer-type these names represent, i.e., what aquifer type(s) are relevant in "Eastern Kalahari A / Eastern Kalahari B?	Updated (added to each SWSA-gw Appendix)
53	SAEON	With reference to our previous communications and shared data, SAEON would like to highlight the need for special consideration of the Lake Sibaya system. The lake remains below the previously established drought threshold due to the ongoing impact of known factors contributing to water level decline.	The concern regarding maintaining Lake Sibaya's status as a Strategic Water Source Area is noted and will be taken into consideration for this project. The PSP has provided a formal response via the stakeholder engagement portal and has indicated that Lake Sibaya has been included as a major dam and significant surface water feature within the Zululand Coastal Plain appendix of the Status Quo Report.