REVIEWER 1 REPORT

African Journal of Community and Environmental Health

Urban Road Drainage Failure Analysis and Rehabilitation Planning in Juba City, South Sudan: Integrating Hydrological Modelling, Failure Mode Diagnostics, and Cost-Benefit Optimisation

Structured peer-review report for editorial verification

Reviewer	Reviewer 1
Recommendation	Major Revision
Journal	African Journal of Community and Environmental Health
Date	27 Mar 2026

Overall Summary

This study addresses a critical urban infrastructure challenge in Juba City, South Sudan, with a comprehensive methodology integrating field surveys, hydrological modelling, and cost-benefit analysis. The work is timely and relevant, particularly as the first systematic engineering analysis of drainage failures in this context. However, significant methodological limitations and insufficient contextualisation undermine its rigour and practical applicability, requiring substantial revisions before publication.

Major Issues

- The reliance on the Rational Method for hydrological modelling in a complex urban catchment is a major weakness; more sophisticated models (e.g., SWMM) should be employed or justified given Juba's specific conditions.
- The manuscript lacks critical discussion of data limitations, particularly the reliability and spatial representativeness of 42 years of rainfall data from a single airport station for city-wide analysis.
- The cost-benefit analysis appears overly optimistic; assumptions about future maintenance costs, discount rates, and benefit quantification (especially social benefits) require thorough justification and sensitivity analysis.

Minor Issues

- The abstract exceeds typical length limits and contains incomplete sentences (cut off mid-analysis).
- Inconsistent referencing to figures and tables throughout the text disrupts readability.
- The introduction provides insufficient background on South Sudan's institutional and financial constraints, which are crucial for contextualising rehabilitation feasibility.

Questions for the Authors

- What specific validation was performed for the IDF curves derived from the Sherman equation, and how were discrepancies with the three independent gauge stations reconciled?
- How were the 28 sub-catchments delineated, and what digital elevation model or topographic data was used given Juba's limited mapping infrastructure?
- For the field survey of 1,166 failure events, what quality assurance procedures were implemented to ensure consistent classification across different surveyors or districts?

Required Changes

- Replace or substantially justify the use of the Rational Method with a more appropriate hydrological model for an urban setting, detailing its limitations.
- Expand the methodology section to explicitly address data limitations, uncertainty analysis, and assumptions in both hydrological modelling and economic appraisal.
- Restructure the abstract to be concise and complete, ensuring it accurately reflects the full study's scope and key findings.
- Strengthen the discussion by comparing findings with similar studies in other African cities and explicitly addressing practical implementation barriers in Juba's context.

Decision Rationale

The study addresses an important gap with a multi-disciplinary approach, but methodological flaws and insufficient critical analysis of data and assumptions significantly weaken its scientific contribution. Major revisions are required to enhance rigour, transparency, and contextual relevance before it meets publication standards.