

Bathymetric Multibeam and Aerial LiDAR Survey of Wemmershoek Dam: Accuracy Assessment, Volume Analyses and Heritage Insights

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SUMMARY

In June 2025, Tritan Survey conducted a multibeam sonar survey of Wemmershoek Dam, Western Cape, South Africa. The survey was complemented by an aerial LiDAR survey of the surrounding area. The primary objective was to determine the current storage volume of the dam accurately. However, the survey also revealed several unexpected opportunities for further study.

The bathymetric survey was conducted while the dam was full. The aerial and terrestrial LiDAR data was collected at lower dam levels resulting in overlap. This provided a rare opportunity to assess the accuracy and noise levels of the multibeam bathymetry data. Additionally, the survey allowed the recording of a historic valley landscape submerged after dam construction in 1957, revealing details of dam construction earthworks, farm terraces, roads, and former riverbeds.

Key questions arising from this work included:

- What is the achievable accuracy of these types of multibeam surveys?
- What is the impact of improved technology on volume calculation and understanding dam sedimentation processes?
- What heritage information can be gleaned from this survey of the preserved valley landscape?

To address these questions, the following analyses were undertaken:

- Comparison of overlapping aerial LiDAR and terrestrial laser scan data with bathymetric data to evaluate the accuracy and precision of the multibeam

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survey.

- Comparison with previous single-beam bathymetric surveys to quantify changes in volume calculations, resulting from technological improvements.
- Investigation of sedimentation evidence visible in the bathymetric data.
- Overlaying of historic maps with the bathymetric survey and identification of points of historic interest.

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