TOTAL HYDROGRAPHIC

Reservoir Case Study

# Strategic Planning Made Easier with Hydrographic Surveying


**WHY YOU SHOULD TRUST US TO SURVEY YOUR RESERVOIR!**

# Delivering essential information for efficient reservoir management.

In a drought prone country like Australia, where millions of people rely on the country's many reservoirs for a safe and dependable water supply - efficient, forward thinking and strategically planned reservoir management is crucial.

The risk involved in reservoir management can be mitigated with quick access to relevant and accurate data.

An up-to-date, comprehensive survey of an entire reservoir can provide an abundance of vital information that is used to make more intelligent and informed management decisions.

A high detail reservoir survey will deliver:

- The current capacity of the reservoir
- A 3D model of the reservoir that will provide a better understanding of the reservoir bed surface
- An estimate of sediments within the reservoir
- Capacity tables and graphs to quickly identify how much water is available at any given level
- A 3D model of dam walls, outlet structures and the reservoir bed to identify sedimentation of dam outlets

Total Hydrographic integrate various surveying techniques to provide you with full reservoir coverage granting you otherwise unobtainable information about the reservoir both below and above water level.
The underwater section is captured with either a Multibeam Echo Sounder (MBES) or a Single Beam Echo Sounder (SBES). The above water data is captured using Mobile Laser Scanning (MLS) from a vessel, RTK GNSS survey, drone photogrammetry or airborne LiDAR.

A combination of these methodologies is often used to ensure full coverage for the survey model.

# Maroondah Reservoir, Victoria

## Background

Maroondah Reservoir, constructed on the Watts River near Healesville, supplies greater metropolitan Melbourne with potable water.

## Problem

Maroondah Reservoir includes a dam wall and an outlet tower.  Melbourne Water's concerns focused primarily on sedimentation around the outlet tower and improving their knowledge in regards to the sediment volume and reservoir capacity.

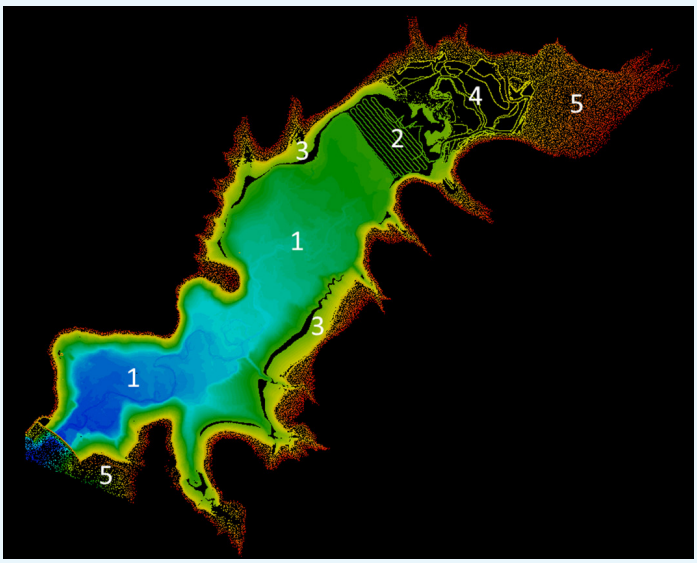

## Objective

- To capture a full survey model of the reservoir beyond the full supply level
- To scan the outlet tower footings and dam wall footings to observe sedimentation
- To generate a general idea of sedimentation across the entire reservoir

## Proposed Solution

A combination of Single Beam Echo Sounder (SBES) and Multibeam Echo Sounder (MBES) would be used to scan the bed of the reservoir as well as the underwater footings of the dam wall and outlet tower. MBES would provide a 3D point cloud of the dam wall and outlet tower. SBES dual frequency survey would be used to capture information on the sediments within the reservoir and acquire data in the shallow water areas. MBES backscatter mapping would assist in identifying the areas of sedimentation across the reservoir.

Mobile Laser Scanning (MLS) mounted on the vessel would capture 3D point cloud data of the above water structures and reservoir banks. RTK GNSS rover to capture surfaces that are out of the MLS range. An existing airborne LiDAR data set would be merged with other data sets to complete the coverage.

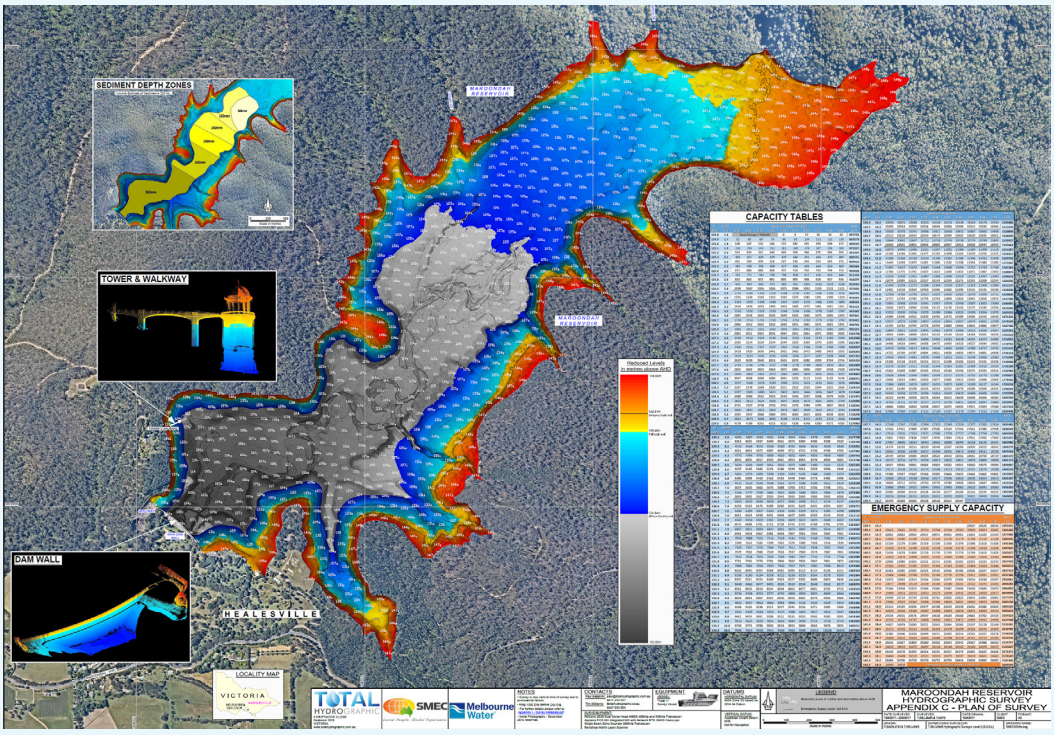



## Implementation

1. **Multibeam Echo Sounder (MBES) Survey**
   *Captured by Total Hydrographic*
2. **Single Beam Echo Sounder (SBES) Survey**
   *Captured by Total Hydrographic*
3. **Mobile Laser Scanning Perimeter Survey**
   *Captured by Total Hydrographic*
4. **RTK GNSS Topographic Survey**
   *Captured by Total Hydrographic*
5. **Airborne Lidar Survey**
   *Supplied by Melbourne Water*

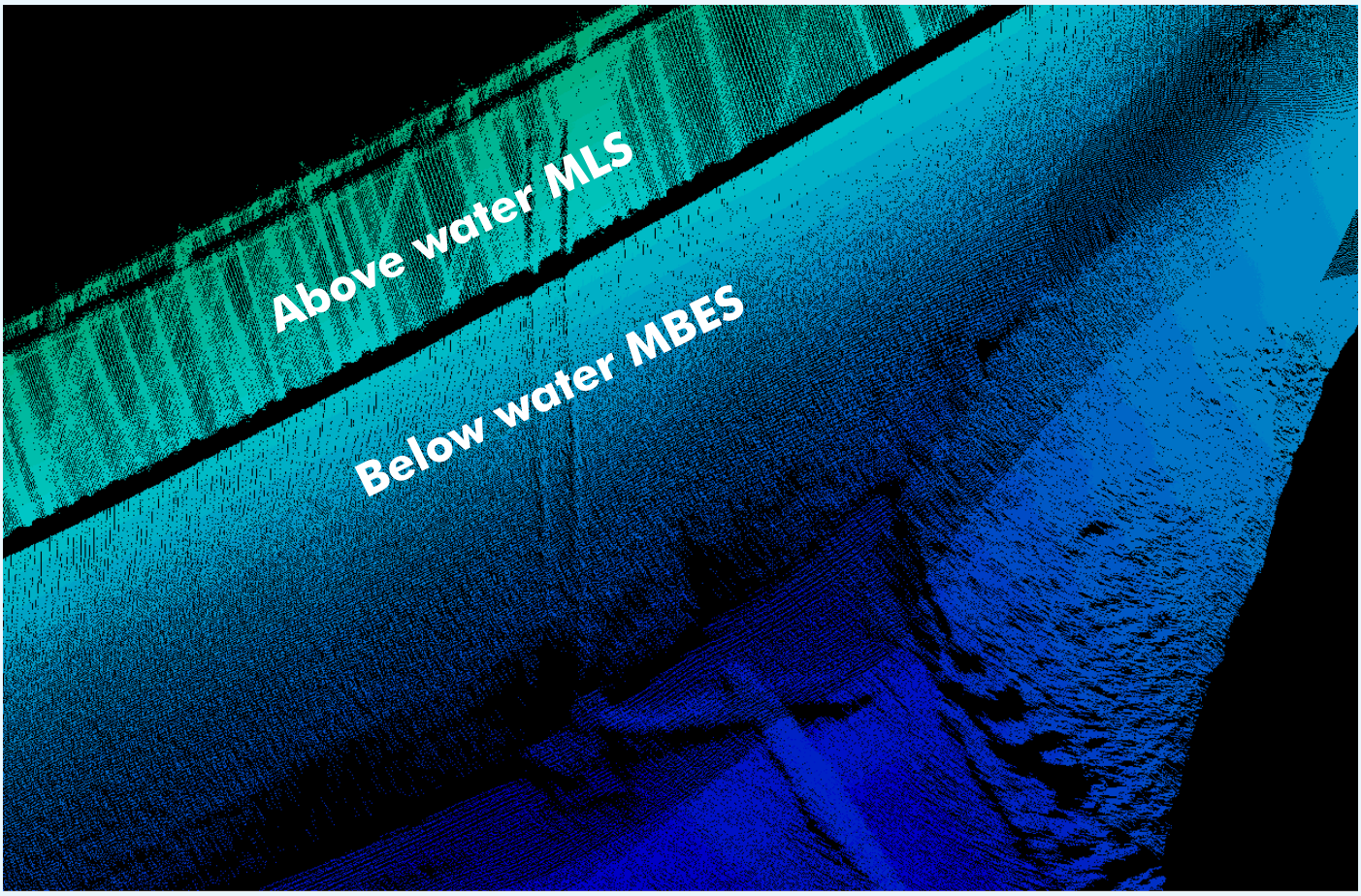
## Results

The combination of the above sensors enabled Total Hydrographic to capture a highly detailed 3D model of the reservoir. Additionally, a comprehensive 3D point cloud of the dam wall and outlet tower was also made available.



This provided Melbourne Water with the following results that they could rely on:

- An accurate visual display of the reservoir's available water capacity
- The ability to accurately identify the minimum supply level available after sedimentation
- A visual understanding of the reservoir bed that may not have been understood previously
- A visual and quantifiable understanding of where sedimentation has occurred within the reservoir




## Outcome

By using MBES to rapidly scan underwater structures and their relation to the reservoir bed as well as MLS to quickly collect detailed topographic data of the exposed reservoir bank Total Hydrographic were able to generate a sophisticated and interactive model. This innovative merging of different advanced surveying capabilities allowed Total Hydrographic to supply Melbourne Water with the results they needed to visually observe and explore their reservoir digitally.

## Testimonial

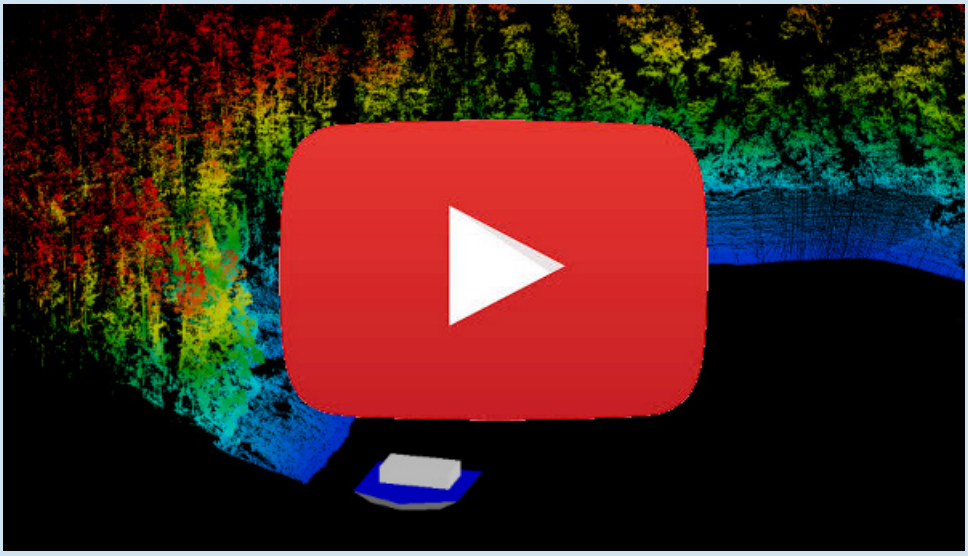
*"By utilising the technology Total Hydrographic has on offer we were able to visually review the underwater surface to a greater level to what we have been able to do previously.*

*We were also able to utilise the surface models to gain a greater understanding of the condition of the reservoir to assist in efficient operation. "*

Heath McMahon
Geospatial, Asset Data and Survey
Services Team Leader, Melbourne Water

## Want more?

To see a live Marine Mobile Laser Scanning Data Capture - check out our video!
https://youtu.be/ozrTj9_D7qs



To find out more on how Total Hydrographic can help you mitigate risks and supply you with current data for your reservoir please contact:

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