

**Can a non-invasive drone survey find hidden graves and grave markers for heritage tourists and cemetery stewards?**

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# A non-invasive drone survey is a sustainable and low-cost alternative to hidden grave recovery for heritage tourists and cemetery stewards

## Methods

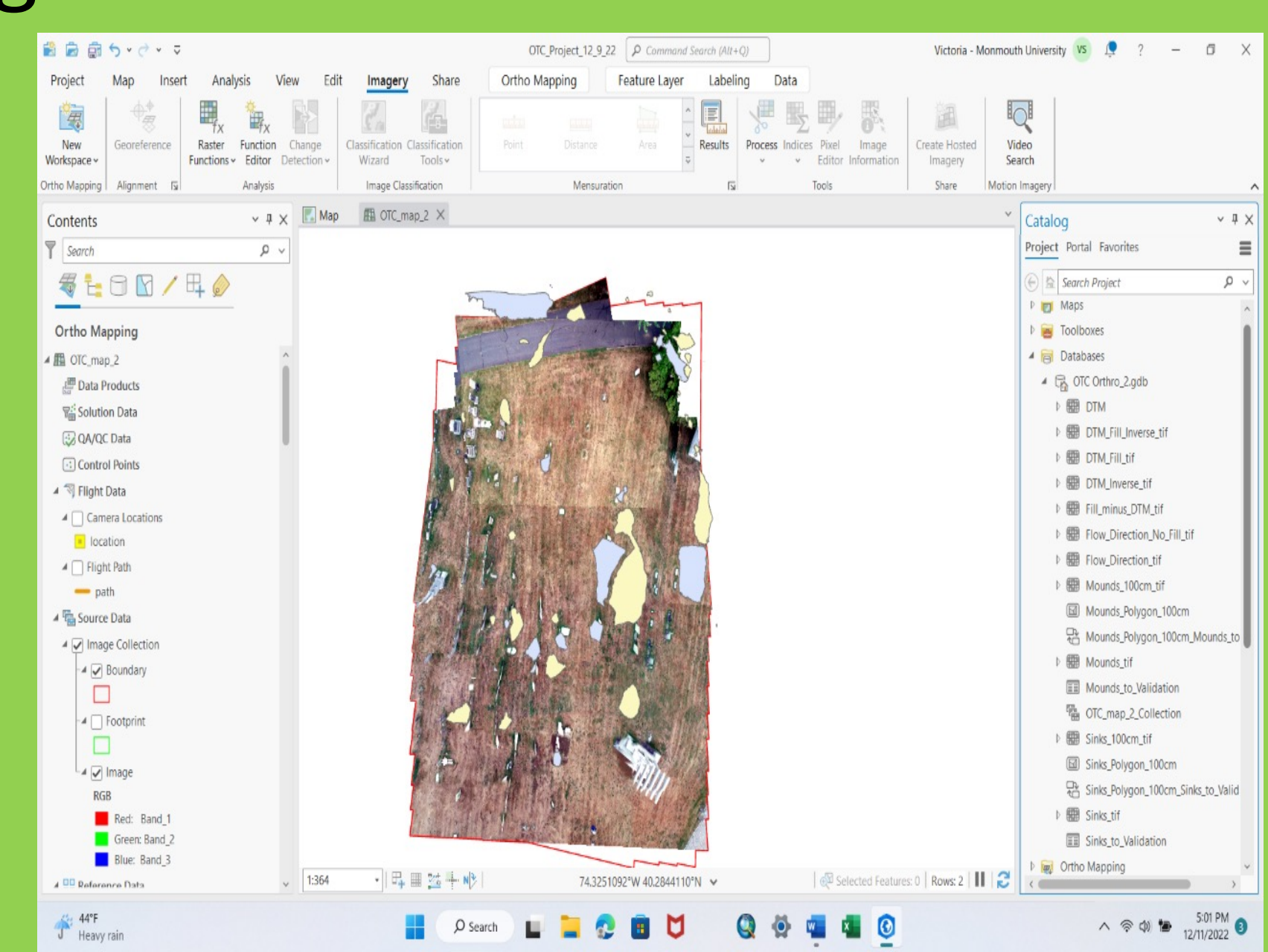
- 57 drone images imported into ArcGIS Hydrology Toolset.
- Layers of underground graves (grey) and buried grave markers (beige) created in a portable geodatabase for field validation.

## The Problem

Maps and keys to the locational burial data lost in time:

- Early cemetery clerks and board presidents traveled between their homes and church with burial records.
- At one point, a clerk's house burnt down along with it many records explains a former pastor.
- Today's cemetery management point to unmarked grave depressions in the ground that are within a surviving 1852 burial list, of interest to heritage tourists.
- Cemetery management of new burials presents a challenge.

- Uploaded layers to ArcGIS Online and Downloaded Layers to ArcGIS Field Maps for field validation.



Preliminary DEM

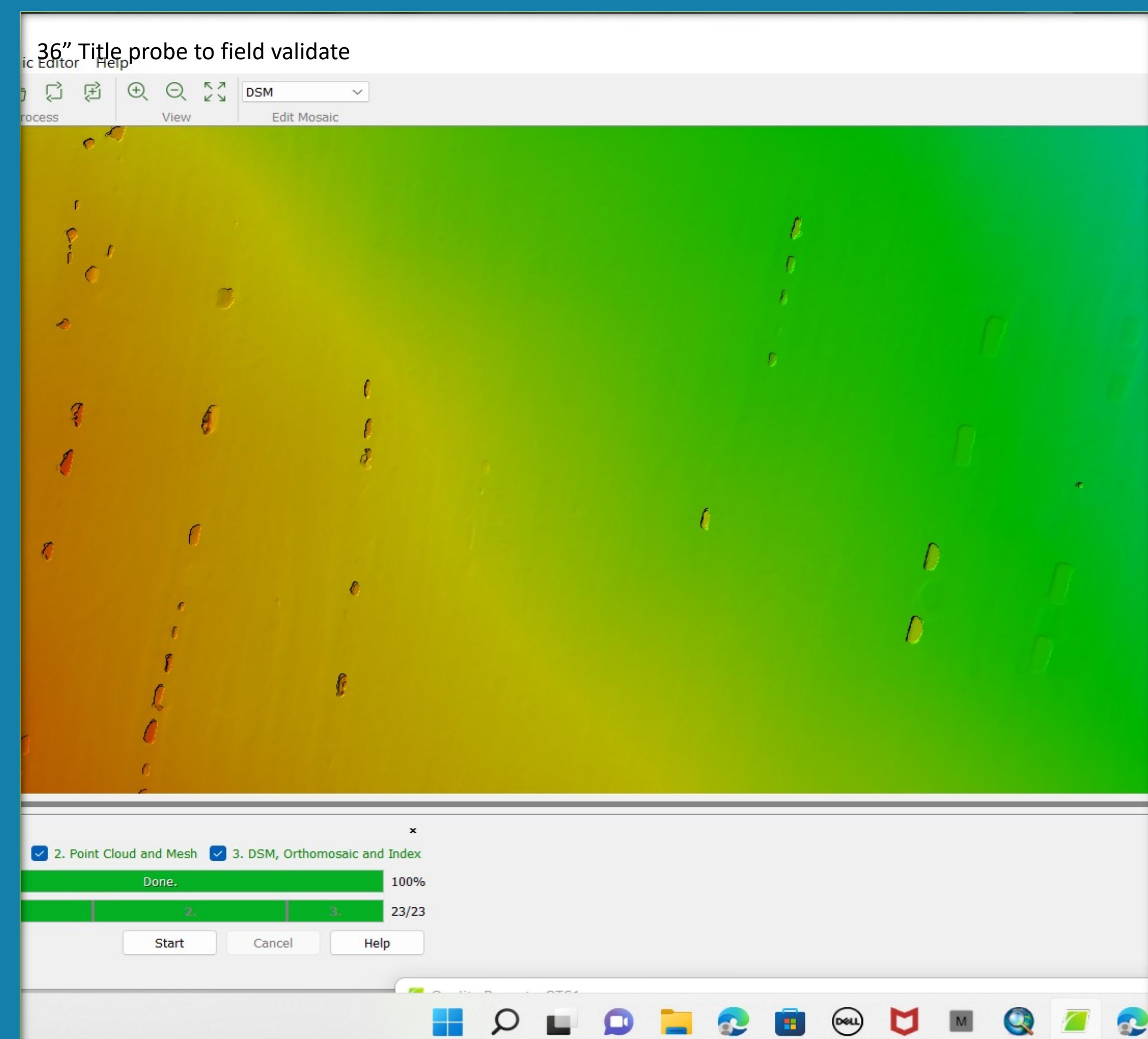


Fig. 1. Left is Preliminary Pix4Dmapper Digital Elevation Map showing possible underground features.

Buried Grave Marker

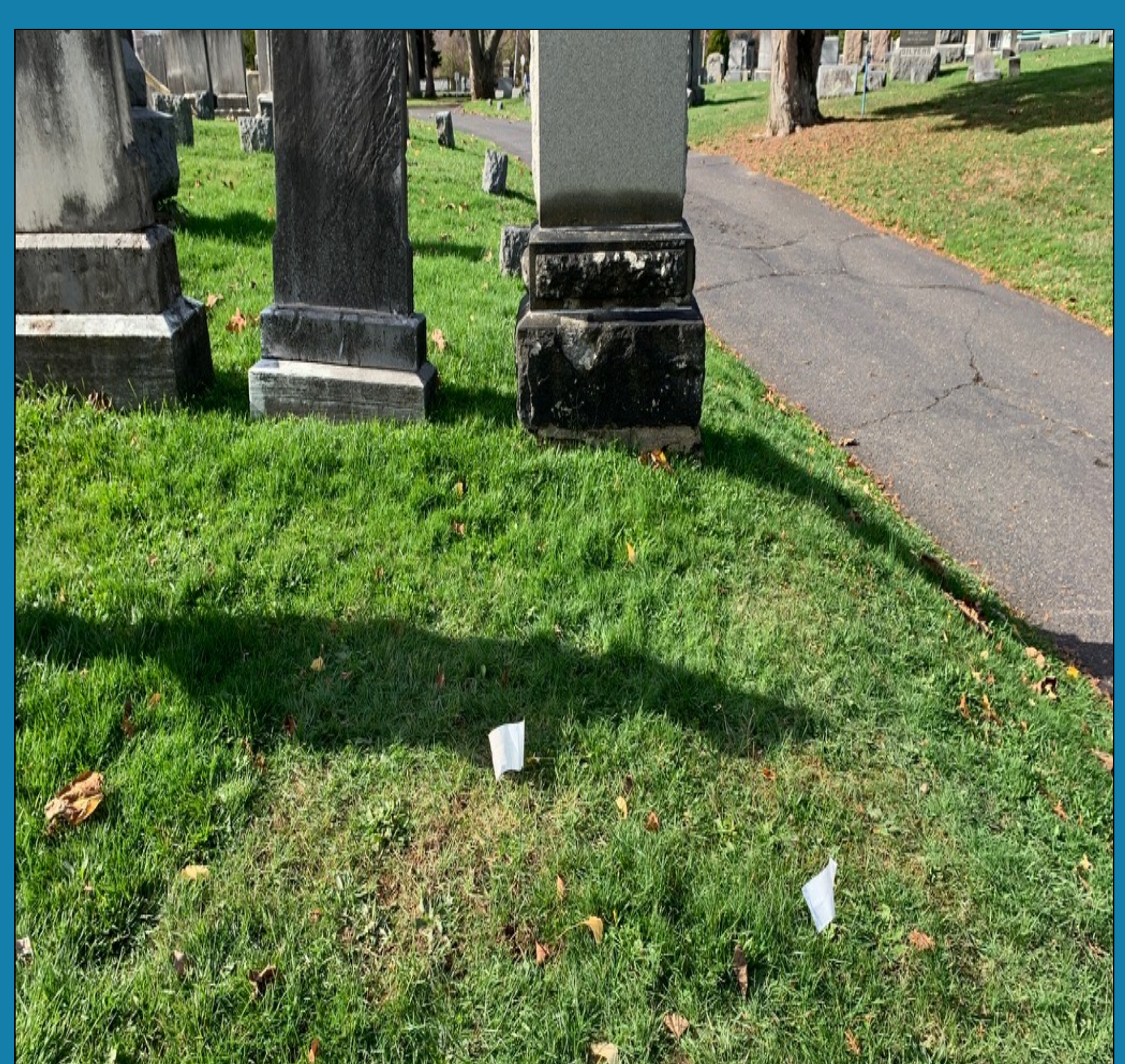
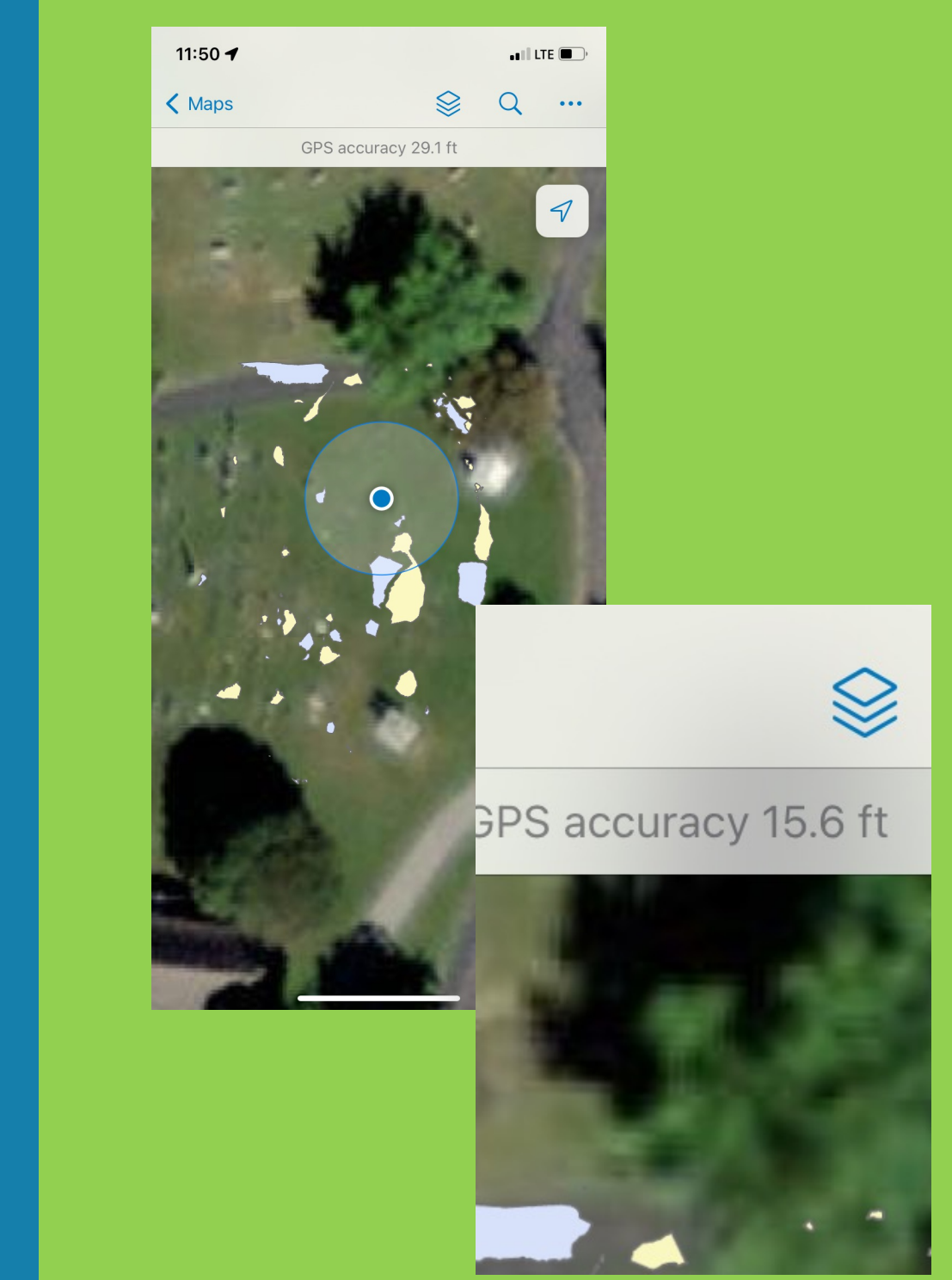


Fig. 2 Right is a found buried grave marker. (photo credits: Fig. 3 Victoria Sharp and Dr. Geoffrey Fouad; Fig. 1 and 2, Victoria Sharp, 2022)

## Field Validation



ArcGIS Field Maps track archaeologist real-time x-y position to the grey and beige layers for ease of field validation.

## Results & Conclusions

- Non-invasive drone survey produced high-resolution maps that were used to field validate surface depressions.
- 7 of 8 depressions field validated found hidden grave markers.
- Burial list and gravesite area can be matched up for Heritage Tourists.
- Cemetery stewards can plot hidden graves for burial management.



Fig. 3 Far Top Right shows underground graves (grey) and grave markers (beige) within ArcGIS Pro Orthomosaic map overlaid with Raster-to-Polygon Layers. Fig. 4 Far Middle Right shows ArcGIS Field Maps installed on Iphone. (photo credits: Fig. 3, Victoria Sharp and Dr. Geoffrey Fouad; Fig. 4, Victoria Sharp, 2022)

*Future Work:*  
Validation of unmarked graves by way of cemetery documentation.