

Calibration of Barcoded Staves

Last updated December 2020

The Landgate barcode staff calibration range is located at the Land Surveyors Licensing Board's examination site at Boya and consists of 2 observing pillars and a series of 21 stainless steel pins set in a solid granite outcrop. The pins have been placed at optimum distances from the pillars and cater for testing over a 4 metre height difference. The relative height differences between the pins have been accurately determined by repeat observations using precision levels in conjunction with calibrated invar staves. Landgate regularly monitor and re-measure the test range to ensure its ongoing accuracy and stability.

1 Landgate data processing service.

The barcode staff calibration range is re-calibrated on a regular basis. Landgate now offers a barcode staff calibration data processing service to ensure staves are calibrated using the latest range data.

Please download the following documents from the Landgate instrument calibration webpage

- [Access details](#) of the Boya barcode staff calibration range
- [Diagram of the pin configuration](#)
- [Barcode Staff Booking Sheet](#)
- [Sample data text file](#)

2 How to calibrate barcode staves

1. Use the barcode staff booking sheet to record all tests and calibrations made on the range. Check the bubble of the digital level and adjust if necessary. Check the staff bubble to be used and adjust if necessary. Do a collimation test on the digital level and use its software to compute and store the constants calculated. For this purpose, four co-linear spikes in concrete 20 m apart have been established adjacent to the range.
2. Set the digital level on the high observing pillar (MV 83) and shade it from the sun or observe on an overcast day. Pillar B (low pillar) is utilised by Landgate when calibrating the range.
3. Position staff on the highest pin and allow several minutes for it to settle and adjust to the ambient air temperature. Record the air temperature with a shaded thermometer.

4. If the level used can take multiple measurements and record the mean and standard deviation (e.g. Leica 3003 & DNA03), set it to record at least five measurements at each pin and do one set of observations. If not, do a minimum of three complete sets of observations for redundancy. A set of observations for a standard four metre staff consist of:
 - backsight to the staff at Pin Number 1
 - intermediate sights to the staff at Pin Numbers 2 to 20
 - foresight to the staff at Pin Number 21
5. Record the air temperature at the completion of the test.
6. Download the level data and create a text or csv file in the correct format. (see below)
7. Send the file to Landgate for processing and a calibration certificate for the staff will be provided.
8. Landgate recommends that staves be re-calibrated at least every 5 years or more often if joints exhibit noticeable wear or any other repairs are made to the staff.

3 Digital data submission

Submit data via email to Geodesy@landgate.wa.gov.au

Data should be submitted to Landgate in a correctly formatted text or csv file.

File Format

All Fields are separated by a comma

Field 1 = Pin number

Field 2 = Staff reading

Field 3 = Number of readings

Field 4 = Standard deviation

Example of a Text File

```
1,0.07417,10,0.000090
2,0.16503,10,0.000070
3,0.32868,10,0.000020
4,0.47489,10,0.000090
5,0.68799,10,0.000070
6,0.87413,10,0.000040
7,1.07422,10,0.000030
8,1.27955,10,0.000050
9,1.52628,10,0.000030
10,1.79376,10,0.000040
11,2.12703,10,0.000080
12,2.3912,10,0.000050
13,2.51647,10,0.000110
14,2.64608,10,0.000050
15,2.87513,10,0.000120
16,3.05758,10,0.000060
17,3.20978,10,0.000040
18,3.36207,10,0.000120
19,3.52057,10,0.000200
20,3.6692,10,0.000070
21,3.87885,10,0.000100
```

Also supply a copy of the completed barcode booking sheet
Expected delivery of certificate within 7 days from data submission.

For further information, or to have your barcode staff independently tested contact Survey Services.

Phone: +61 (0)8 9273 7114

Email: Geodesy@landgate.wa.gov.au