



# Australian Government

## Geoscience Australia

### Geodetic Connections to the Tide Gauge at Davis

| Mark        | MSL HEIGHT (m) <sup>1</sup> |                      |                      |                      |                      |                       |                      |                      |                      | Comment                          |
|-------------|-----------------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------------------|
|             | 1994 <sup>2</sup>           | 1995/96 <sup>3</sup> | 1996/97 <sup>4</sup> | 1998/99 <sup>5</sup> | 1999/00 <sup>6</sup> | Jan 2001 <sup>7</sup> | 2004/05 <sup>6</sup> | 2006/07 <sup>6</sup> | 2008/09 <sup>6</sup> |                                  |
| AUS099      | 27.874                      |                      | 27.869               | -                    | 27.861               | 27.8686               | 27.8637              | 27.8628              | 27.8629              | ARGN GPS                         |
| NM/S/5      | 27.855                      |                      | 27.854               | -                    | -                    | -                     | -                    | -                    | -                    | Directly below AUS099            |
| AUS099 RM1  |                             |                      | 25.542               | -                    | -                    | 25.5415               | 25.5370              | 25.5363              | 25.5358              | ARGN GPS RM 1                    |
| AUS099 RM2  |                             |                      | 27.425               | -                    | -                    | 27.4245               | 27.4202              | 27.4191              | 27.4187              | ARGN GPSRM 2                     |
| AUS099 RM3  |                             |                      | 26.921               | -                    | -                    | 26.9206               | 26.9163              | 26.9155              | 26.9150              | ARGN GPS RM3                     |
| BMR Gravity |                             |                      | 27.592               | -                    | -                    | -                     | -                    | -                    | -                    |                                  |
| MET MARK    | 18.404                      |                      | 18.399               |                      |                      | 18.4013               | 18.3957              | 18.3956              | 18.3954              | Near Mt building                 |
| HBM2        |                             |                      | 4.110                | 4.110                | 4.106                | -                     | -                    | -                    | -                    |                                  |
| HBM1        |                             |                      | 2.867                | 2.866                | 2.863                | -                     | -                    | -                    | -                    |                                  |
| NMV/S/4     | 2.179                       |                      | 2.179                | 2.179                |                      | 2.1790                | 2.1790               | 2.1790               | 2.1790               | Near Beach, West side of Station |
| D3          |                             |                      |                      | 23.087               | 23.080               | 23.0843               | 23.0810              | 23.0803              | 23.0798              | NE of workshop                   |
| D4          |                             |                      |                      | 18.926               | 18.923               | -                     | -                    | Disturbed            | Disturbed            | East of Workshop                 |
| D5          |                             |                      |                      |                      |                      | 19.9195               | 19.9161              | 19.9161              | 19.9154              | East of Science Building         |
| AUS303      |                             |                      |                      | 15.494               | 15.493               | 15.4995               | 15.4953              | 15.4952              | 15.4943              | Approx. 100 m North of Station   |
| AUS302      |                             |                      |                      | 1.660                | 1.670                | -                     | -                    | -                    | -                    |                                  |
| AUS186      | 4.713                       | 4.713                | 4.732                | 4.706                | 4.713                | 4.7202                | 4.7151               | 4.7155               | 4.7145               | Tide Gauge Benchmark             |
| AUS184      |                             | 2.022                | 2.041                | 2.014                | 2.023                | -                     | -                    | -                    | -                    |                                  |



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A number of [survey marks in the Davis area](#) are used to connect) between the permanent Davis GPS tracker ([AUS099](#)) and the tide gauge benchmark (AUS186), using both GPS and conventional optical levelling techniques. Connections from the tide gauge benchmark to the Platypus Engineering bottom mounted tide gauge (installed in 1993) are held by [Antarctic Division](#).

Notes:

<sup>1</sup> The MSL heights are based on a 1993 MSL height determination for NMV/S/4 of 2.179 metres

<sup>2</sup> Class LC\* optical levelling by Hyslop & Gordon, using Aluminium staves. See Antarctic Division 1994/95 report.

<sup>3</sup> Class LC\* optical levelling by Adams & Gordon, using fibreglass staves. All values corrected for thermal expansion/contraction of the staves (King 2000). See Antarctic Division 1995/96 report.

<sup>4</sup> Class LC\* optical levelling by Ward & Digney, using fibreglass staves & a Leica™ NA2000 bar code level. All values corrected for thermal expansion/contraction of the staves (King 2000). See Antarctic Division 1996/97 report.

<sup>5</sup> Class LC\* optical levelling by King, Manson & Palfrey, using Aluminium staves. All values corrected for thermal expansion/contraction of the staves (King 2000). See Antarctic Division 1998/99 report.

<sup>6</sup> Class LB\* optical levelling by Anderson, using Aluminium staves. All values corrected for thermal expansion/contraction of the staves (King 2000). See Antarctic Division 1999/2000 report.

<sup>6</sup> Class L2A\* levelling, using the "Leap-Frog" EDM Height Traversing., by Gary Johnston & Paul Digney (Geoscience Australia) using a Leica TC2003 Total Station - see [Technical Report 5](#).

<sup>7</sup> In 1998/99 and again in January 2001, GPS was observed between AUS099 and the tide gauge benchmark (AUS186). In both cases there was excellent agreement (4 mm & 3 mm respectively) between the levelled difference in height and the orthometric difference in height derived from GPS and corrected for geoid-ellipsoid separation. See section 4.1 of [Technical Report 5](#) for more details.

- See [ICSM Special Publication 1, "Standard Practice for Control Surveys"](#) for an explanation of optical levelling standards.
- King, M (2000), "Report on Temperature Corrections for Levelling Observations made at Australia's Antarctic Bases", An internal report prepared for the Australian Antarctic Division. Prepared June 2000, Revised November 2000.