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http://www.ga.gov.au/scientific-topics/positioning-navigation/geodesy/gnss-networks/levelling-connections-between-gnss-sites-and-tide-gauges

Geodetic Connections to Tide Gauge at Spring Bay

RESULTS OF OPTICAL LEVELLING

Benchmark Name	SPM9257	SPM9256	SPM9264	SPM8521	SPM8522	SPM9258	9258RM1	AU074 RM1	AU074	9258RM2	SPM9404	Sensor New	Sensor Old
AHD Ht (m) Apr/May 1991[3]	5.843	8.384	-	7.236	6.919	2.530	-	-	-	-	-	3.522	-
AHD Ht (m) Feb 1992[4]	5.842	8.384	13.010	7.236	6.919	2.528	-	-	-	-	-	3.523	3.523
AHD Ht (m) Aug 1992[3]	5.843	8.384	13.009	7.236	6.919	-	-	-	-	-	-	-	-
AHD Ht (m) Jan 1993[4]	-	8.385	13.011	7.236	6.919	2.528	3.500	-	-	-	-	3.523	3.522
AHD Ht (m) Feb 1994[4]	5.845	8.386	13.010	7.236	6.920	2.528	3.500	-	-	-	-	3.523	3.522
AHD Ht (m) Jun 1995 Aug 1995[3]	-	8.384	13.010	7.236	6.923	2.529	3.501	-	-	-	2.522	-	-
AHD Ht (m) Aug 1995[4]	5.842	8.383	13.009	7.236	6.922	2.530	3.501	-	-	-	-	3.521	-
AHD Ht (m) Jun 1996[3]	-	8.385	13.009	7.236	6.921	2.528	-	-	-	-	-	-	-
AHD Ht (m) Sep 1996[3]	5.843	8.384	13.010	7.236	6.920	2.529	3.500	-	-	-	-	-	-
AHD Ht (m) Jun 1997[3]	5.843	8.384	13.010	7.236	6.921	2.529	3.498	-	-	-	2.522	-	-
AHD Ht (m) Jun 1998[3]	5.843	8.384	13.010	7.236	6.924	2.528	3.498	-	-	-	2.522	-	-
AHD Ht (m) Dec 2000[3]	5.844	8.385	-	7.236	6.924	2.529	3.500	-	-	-	-	-	-

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Benchmark Name	SPM9257	SPM9256	SPM9264	SPM8521	SPM8522	SPM9258	9528RM1	AU074 RM1	AU074	9258RM2	SPM9404	Sensor New	Sensor Old
AHD Ht (m) Jan 2002[3]	5.844	8.385	-	7.236	6.923	2.529	3.498	-	-	-	-	-	-
AHD Ht (m) Apr 2003[3]	5.845	8.386	-	7.236	6.925	2.530	3.502	-	-	-	-	-	-
AHD Ht (m) Nov 2005[3]	5.844	8.386	13.012	7.236	6.923	2.528	3.499	-	-	-	-	-	-
AHD Ht (m) Sept 2008[5]						2.528	3.498	2.855	4.567				
AHD Ht (m) Oct 2008[6]	5.844	8.386	13.013	7.236		2.528	3.498	2.855					
AHD Ht (m) Dec 2008[7]						2.528		2.855		3.497			
AHD Ht (m) Jan 2010[8]		8.386		7.2369	6.9236	2.5288		2.8556					
Comments	Domed stainless steel rod in concrete	Domed stainless steel rod in sandstone	Domed stainless steel rod in sandstone	Brass Lands disc in sandstone outcrop. DATUM FOR HEIGHTS	Brass Lands disc in concrete foundation of catwalk support	Brass Lands disc in concrete deck of structure supporting tide gauge	NTF tide gauge levelling fixture (1993-11/2008)	Stainless Steel Pin Connected to GNSS Antenna Monument	The intersection of the top face of a 600 mm sq Stainless Steel plate and the centre of 5/8" hole .	NTF tide gauge levelling fixture (after 11/2008)	Brass Lands disc in concrete deck under GPS mounting bracket	NOAA tide gauge reference point. Top of sounding tube collar	NOAA tide gauge reference point. Top of sounding tube collar

Notes:

1. An aluminium staff was used to level from SPM9528 to SPM9404 by DPIW. Prior to Nov 2005, a WILD NA2 level with parallel plate micrometer and invar staffs were used for all other leveling by DPIW. In Nov 2005, a Leica DNA03 digital level and invar staffs was used.
2. NOAA levelling was carried out using a Zeiss Ni2 level with parallel plate micrometer and a folding wooden staff.
3. Levelled by DPIW
4. Levelled by NOAA
5. Levelled by DPIW using a Leica DNA03 Digital Level and Invar staff.
6. A new GNSS monument has been established, with a GNSS antenna located on top. Therefore two additional marks have been created – AU074 Intersection of the top face 600mm steel plate and centre of a 5/8" hole and AU074RM1 - Stainless Steel Pin attached to side of steel GNSS monument. Connections made to new marks made by GA using TCA2003 Total Station and calibrated fixed stainless steel height rod and adapter.

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7. An additional aquatrak sensor was placed in November 2008 in the same tube as the existing sensor, this resultant in a disturbance of the SSBM. The new location of this pin was levelled in Dec08 by DPIW.
8. Leveling conducted by GA and DPIPWE using GA TCA2003 total station and calibrated stainless steel height rods to L2A standards to check the stability of the SPBY CORS installation.

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