

THE  
AUSTRALIAN HEIGHT DATUM  
(A H D)

PREPARED ON BEHALF OF THE  
NATIONAL MAPPING COUNCIL OF AUSTRALIA  
BY THE DIRECTOR OF NATIONAL MAPPING,  
DEPARTMENT OF NATIONAL DEVELOPMENT,  
CANBERRA, A.C.T., AUSTRALIA.

1979

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## 1. INTRODUCTION

1.1 On 5 May 1971 the Division of National Mapping, on behalf of the National Mapping Council of Australia, carried out a simultaneous adjustment of 97 320 kilometres of two-way levelling, holding mean sea level for 1966-1968 fixed at zero at thirty tide gauges around the coast of the Australian continent.

1.2 The resulting datum surface, with minor modifications in two metropolitan areas, has been termed the Australian Height Datum (AHD) and was adopted by the National Mapping Council at its twenty-ninth meeting as the datum to which all vertical control for mapping is to be referred. The datum surface is that which passes through mean sea level at the thirty tide gauges and through points at zero AHD height vertically below the other basic junction points.

1.3 The levelling network in Tasmania was adjusted on 20 February 1979, and established the AHD (Tasmania). The network, which consists of seventy-two sections between fifty-seven junction points, is based on mean sea level for 1972 fixed at zero at the tide gauges at Hobart and Burnie.

## 2. BASIC AND SUPPLEMENTARY LEVELLING

2.1 Two-way levelling of third order accuracy or better, used in the original adjustment of 5 May 1971 which formed the AHD, is called "Basic Levelling". Levelling subsequently adjusted to the AHD is called "Supplementary Levelling".

2.2 Enquiries regarding details of basic and supplementary levelling in a State or Territory should be directed to the Surveyor General except in New South Wales and Tasmania, where enquiries should be made to the Director of Mapping.

## 3. TIDE GAUGES

3.1 The thirty mainland tide gauges and their adjacent bench marks are listed in Annex A, Part 1, with the heights of the bench marks above mean sea level for 1966-1968.

3.2 Similar details for the two Tasmanian tide gauges, with mean sea level for 1972, are shown in Annex A, Part 2.

## 4. FIELD WORK, DATA PROCESSING AND ADJUSTMENT

The adjustment of 5 May 1971 which established the Australian Height Datum, together with the field work and data processing leading up to it, is described in Division of National Mapping Technical Report 12, "The Adjustment of the Australian Levelling Survey 1970-71".

## 5. METROPOLITAN AND BUFFER ZONES

### 5.1 Metropolitan Zones

5.1.1 Bench marks within the metropolitan areas of Perth and Adelaide are held fixed at heights assigned by the Surveyors General of Western Australia and South Australia. The areas in which these heights have been held fixed are termed "Metropolitan Zones".

2.

5.1.2 The assigned heights within the Perth Metropolitan Zone are based on mean sea level at Fremantle over a different epoch from that used in the adjustment of 5 May 1971. These heights differed by not more than 4 mm from those computed in the adjustment.

5.1.3 The assigned heights within the Adelaide Metropolitan Zone are based on a surface determination from a local free adjustment and these heights differ by not more than 40 mm from those determined in the National Levelling Adjustment of 5 May 1971.

## 5.2 Buffer Zones

The small differences between the heights determined by the adjustment of 5 May 1971 and those assigned by the Surveyors General to bench marks on the perimeter of the Metropolitan Zones have been distributed through "Buffer Zones".

## 5.3 Delineation of Zones

The limits of the Metropolitan and Buffer Zones, and the levelling sections in these zones are shown in Annex B (Perth) and Annex C (Adelaide).

## 5.4 Heights in Metropolitan and Buffer Zones

The heights of bench marks in the Metropolitan Zones assigned by the Surveyors General and the adjusted heights of bench marks in the Buffer Zones shall be regarded as being on the Australian Height Datum.

## 6. JUNCTION POINTS

The localities, bench mark numbers, latitudes and longitudes and heights of the junction points in the basic levelling as adjusted on 5 May 1971, or amended up to 30 June 1979, are listed in Annex D. Further modifications of these listed heights may occasionally be necessary and these, after agreement is reached between the Director of National Mapping and the appropriate Council member, will be published in the form of LINADJ computer output to be distributed by the Division of National Mapping.

## 7. FUTURE ADJUSTMENTS

7.1 Heights for any new bench marks within the Perth and Adelaide Metropolitan Zones will be assigned by the Surveyors General.

7.2 All new levelling of topographic value outside these Metropolitan Zones shall be adjusted to the Australian Height Datum either by the Division of National Mapping or by the appropriate Council member, as may be agreed, using computer programs giving identical results, on the same format, and utilising the same junction point identification system, as has been used in the establishment of the Australian Height Datum by the Division of National Mapping. When more than a simple linear traverse has to be adjusted, a least squares adjustment shall be made using program LEVELONE or a program giving identical results.

## 8. ISLANDS

8.1 In most instances it is impracticable to carry instrumental levels across sea gaps. Heights on islands will therefore usually be referred to local tide gauges.

8.2 If the levels on an island are observed to standard third order accuracy and are referred to mean sea level at a satisfactory tide gauge, they are deemed to be part of the Australian Height Datum.

## 9. LEGENDS ON MAPS

9.1 Whenever heights on maps are based on the adjustment of May 1971, the phrase "Australian Height Datum" is to be quoted in the legend though there is no objection to it being followed by "Mean sea level 1966-68" if desired. On the Australian continent the map user will then know that he is using AHD heights. In Tasmania, whenever heights are based on the adjustment of February 1979, the term "Australian Height Datum (Tasmania)" should be used, followed by "Mean sea level 1972" if desired.

9.2 On coastal sheets which contain the phrase "Australian Height Datum", paragraph 8 of this publication makes it clear that heights on islands may be above local mean sea level rather than on the same mathematical model as the mainland.

9.3 Some care may need to be used on bathymetric and hydrographic maps around the coast. If they contain heights which have been instrumentally connected to the adjustments of May 1971 or February 1979, they should refer to the Australian Height Datum. If heights refer only to a local tide gauge, and have not been connected to the Australian Height Datum, the legend should say "Heights based on mean sea level at ..... tide gauge."

9.4 The datum for soundings on hydrographic charts is a low tide level and its relationship to mean sea level and the Australian Height Datum may vary from chart to chart, and in some cases even within the limits of one chart. Datums used for soundings are referred to local bench marks, which may not yet have been connected to the AHD. Details of bench marks and levels used are given on all large scale charts.

TIDE GAUGES, BENCH MARKS AND HEIGHTS OF BENCH MARKS  
ABOVE MEAN SEA LEVEL

PART 1      Mainland

The epoch of mean sea level of all 30 gauges is 1966-1968 except for Karumba which is 1 January 1957 to 31 December 1960.

Tide Gauge	Tide Gauge Bench Mark	Height of Bench Mark above Mean Sea Level (metres)
Port Macdonnell	NMV/E/11	2.106
Victor Harbour	NMV/E/13	3.853
Port Lincoln	NMV/E/16	3.572
Thevenard	NMV/E/18	4.834
Eucla	TG BM	3.365
Esperance	NMV/F/2	3.511
Albany	HR 2	3.243
Bunbury	NMV/F/5	2.207
Fremantle	NMV/F/6A	2.564
Geraldton	NMV/F/7	1.841
Carnarvon	NMV/F/9	3.389
Port Hedland	PWD PH1	4.538
Broome	EP 1	8.854
Wyndham	NMV/F/11	5.977
Darwin	NMV/G/651	6.598
Centre Island	AHS 1	1.500
Karumba	SBM 10222	4.624
Weipa	NMV/B/304A	1.375
Bamaga	PBM 3931	3.097
Cooktown	NMV/B/307A	6.983
Cairns	PSM 16253	3.325
Townsville	NMV/B/309A	4.523
Mackay	NMV/B/311	7.654
Bundaberg	PSM 3853	4.368
Brisbane	TG BASE	5.672
Coffs Harbour	NMV/C/11	5.549
Camp Cove	PM 84	1.518
Port Kembla	BM 6	4.179
Point Lonsdale	GBM 1	6.898
Port Fairy	GBM 94	4.849

PART 2      Tasmania

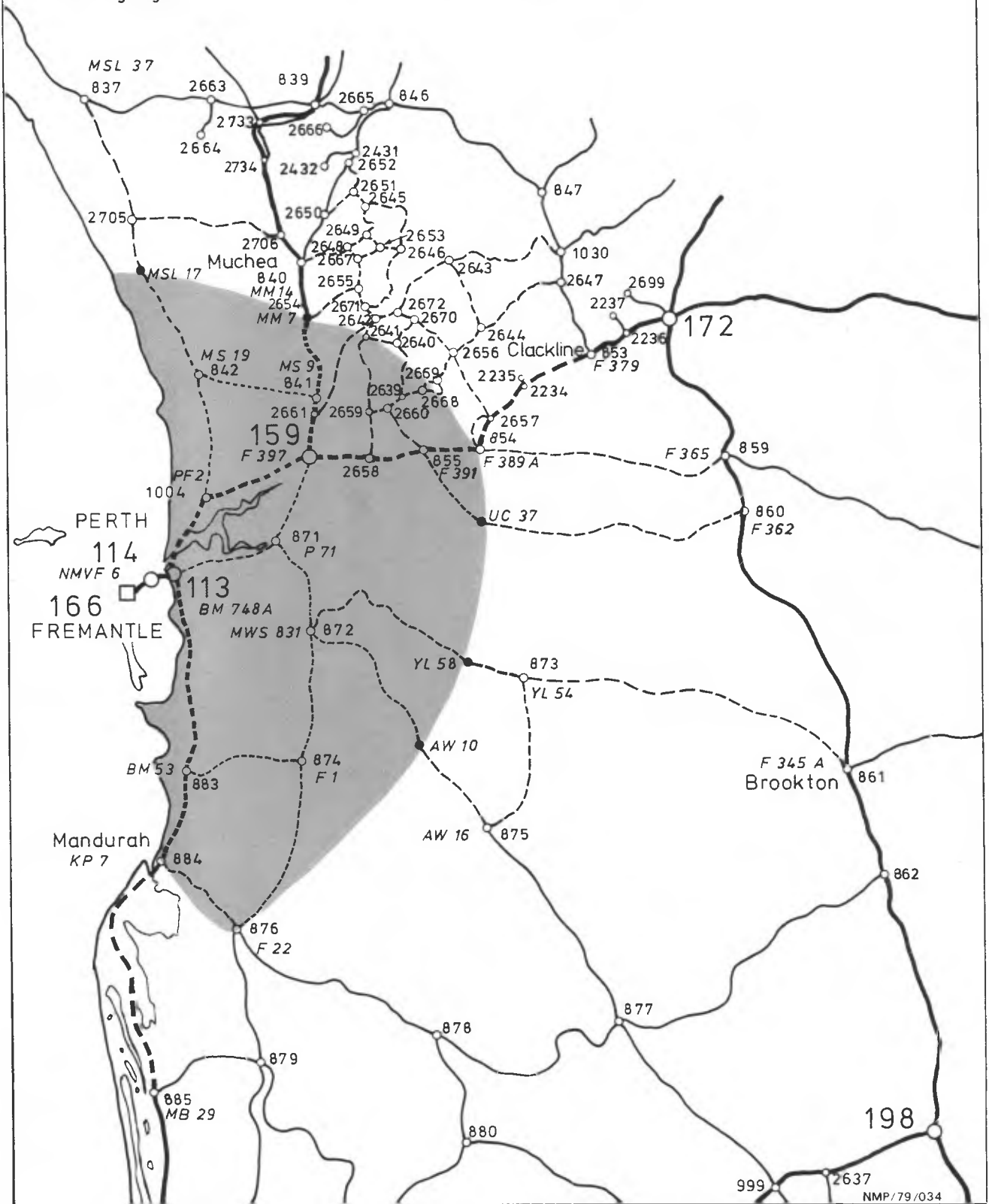
The epoch of mean sea level of both gauges is 1972.

Hobart	SPM 195	1.802
Burnie	BM No 3	4.582

# PERTH METROPOLITAN & BUFFER ZONES

Traverses of original adjustment  
 Traverses influenced by Metropolitan Zone adjustment  
 Traverses influenced by Buffer Zone adjustment  
 Junction points  
 Bench marks at Junction Points  
 not at Junction Points  
 Metropolitan Zone  
 Tide gauges

Basic	Supplementary
—————	—————
- - - - -	- - - - -
- · - · -	- · - · -
○ F 397	○ 159
● UC 37	○ 853
□	



# ADELAIDE METROPOLITAN & BUFFER ZONES

Traverses of original adjustment

Traverses influenced by Metropolitan Zone adjustment

Traverses influenced by Buffer Zone adjustment

Junction points

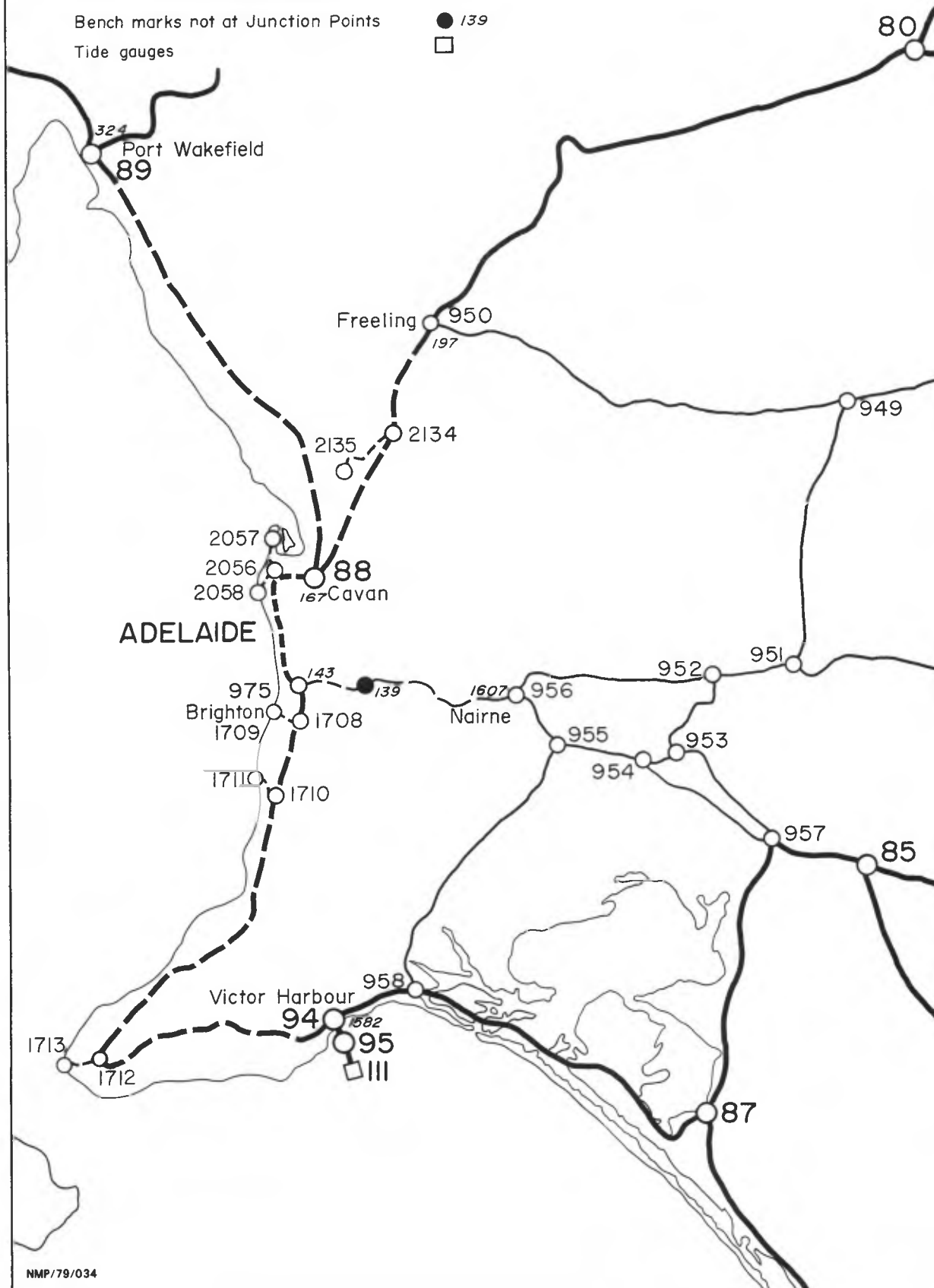
Bench marks at Junction Points

Bench marks not at Junction Points

Tide gauges

Basic

Supplementary





AUSTRALIAN HEIGHT DATUM AS AT 30/06/1979

FOR INFORMATION REGARDING THE INTERMEDIATE  
BENCHMARKS SEE PARAGRAPH 2.2 OF THIS PUBLICATION

JUNCTION POINT	LOCALITY DESCRIPTION	BENCH MARK NUMBER	LATITUDE	LONGITUDE	HEIGHT METRES
1	JOHNSTON GM	ORIGIN	25 57	133 13	566.300
2	COLONA	3229	31 38	132 05	38.143
3	OOLDEA	4638	30 27	131 51	116.930
4	WATSON	4632	30 29	131 31	113.645
5	EMU JUNCTION	4789	28 35	132 12	271.741
6	NULLARBOR	3201	31 27	130 56	60.689
7	EMU	4790	28 33	131 43	288.408
8	COOK	4609	30 37	130 23	119.576
9	VOKES HILL	4811	28 32	130 37	292.788
10	CHEESMANS PEAK	2853	27 20	130 17	460.263
11	MUSGRAVE PARK	3027	26 09	131 09	696.370
12	PILTADI	2884	26 10	130 18	654.512
13	MT DAVIES	2832	26 10	129 08	631.890
14	BLACKSTONE	2844	25 55	128 40	605.696
15	MULGA PARK	74/23	25 55	131 40	623.679
16	MT SARGOOD	7645	24 51	128 51	563.990
17	CURTIN SPRINGS	75100A	25 19	131 53	481.977
18	SANDY BLIGHT	7939	23 15	129 32	474.662
19	TANAMI BO01	NTL1001	19 58	129 42	437.092
20	PAPUNYA	75/46	23 15	131 54	607.387
21	MT HENSMAN	73/93	15 59	128 59	97.768
22	TIMBER CREEK	73/59	15 46	130 31	59.762
23	DARWIN	NMG 21	12 28	130 51	28.542
24	FOUNTAIN HEAD	SH113	13 33	131 24	147.084
25	TOP SPRINGS	73/30	16 37	131 50	173.919
26	PINE CREEK	SH155A	13 50	131 50	207.496
27	MARANBOY	SH245	14 40	132 39	194.158
28	DALY WATERS	NMVG37	16 18	133 23	217.069
29	NEWCASTLE WATERS	L128	17 22	133 24	209.724
30	POWELL CREEK	8812	18 05	133 43	264.021
31	LIVERPOOL RIVER	FQ59	12 22	134 08	6.989
32	CONNORWELL	7812A	23 01	133 36	656.551
33	MONUMENT	8836	19 26	134 12	328.861
34	DARWIN	MSL 27	12 28	130 51	0.000
35	WAUCHOPE	DF38	20 40	134 14	357.762
36	TAYLOR WELL	DI30	21 12	134 08	423.142
37	HARRY CREEK	6849	23 17	133 46	704.496
38	CENTRE ISLAND	MSL 28	15 45	136 49	0.000
39	RYANS BEND	L73	16 07	136 05	45.409
40	CEN ISLE TG BM	AHS1	15 45	136 49	1.500
41	SOUDAN	8947	20 03	137 01	219.700
42	PLENTY RIVER	6824	22 58	135 09	526.667
43	GALLIPOLI HS	CP/15	19 09	137 52	261.171
44	NICHOLSON RIVER	L/04	17 52	139 21	12.735
45	CAMOOWEAL	10155	19 55	138 07	232.940
46		6319	21 31	136 55	257.337
47	KULGERA	72/01	25 50	133 18	509.443
48	RIVERSLEIGH	CU/18	19 08	139 00	169.176
49	LUCY CREEK	6349	22 27	136 17	319.534
50	LAKE NASH	6215	20 58	137 55	192.887
51	YELVERTOFT	89/76	20 11	138 53	286.378
52	NEAR DUCHESS	DU/8	21 19	139 49	368.631
53	BOULIA 1/60	10060	22 55	139 54	156.021
54	SA NT BORDER	NTL 427	26 00	134 54	203.393
55	BIRDSVILLE	10163	25 54	139 21	46.366
56	CLIFTON HILLS	1429	27 04	138 56	30.120
57	NAPPAMERRY	11161	27 37	141 05	53.044
58	INNAMINCKA	3511	27 45	140 45	53.038
59	MT SARAH	2731	26 51	135 15	150.495
60	MUNGERANIE	1402	28 05	138 39	56.543

JUNCTION POINT	LOCALITY DESCRIPTION	BENCH MARK NUMBER	LATITUDE	LONGITUDE	HEIGHT METRES
61	MILPARINKA	PM5409	29 44	141 54	135.855
62	PETERMORRA	3455	29 34	139 49	33.766
63	MOOLAWATANA	4968	30 05	140 02	9.872
64	OODNADATTA	1784	27 33	135 28	118.851
65	MT DUTTON	1776	27 48	135 42	81.388
66	MARREE	1361	29 38	138 03	46.037
67	FARINA	1624	30 04	138 16	92.836
68	WYAMBANA	4919	31 12	139 28	47.729
69	LYNDHURST	1629	30 14	138 19	125.462
70	CUTANA	909	32 11	140 35	205.405
71	OLARY	912	32 17	140 18	280.602
72	CURNAMONA	891	31 38	139 32	88.925
73	COWARD SPRINGS	1730	29 21	136 45	25.884
74	MILDURA	A42-1	34 11	142 10	48.625
75	ANNA CREEK	1747	28 55	136 12	94.866
76	HAWKER	884	31 53	138 25	315.224
77	LOXTON	108/794	34 28	140 33	57.854
78	PETERBOROUGH	969	32 59	138 50	533.034
79	PINNAROO	523	35 20	140 51	112.014
80	MORGAN	61/782	34 01	139 43	30.546
81	WOLSELEY	864	36 22	140 54	109.941
82	PORT AUGUSTA	1686	32 31	137 45	4.151
83	CANNAWIGARA	559	36 15	140 45	68.955
84	PIMBA	2491	31 15	136 48	187.397
85	MOORLANDS	6080	35 18	139 39	9.568
86	KIDMAN SWAMP	1949	36 58	140 56	97.975
87	MENINGIE	4441	35 43	139 20	2.298
88	CAVAN	167	34 51	138 35	11.129
89	PT WAKEFIELD	324	34 11	138 10	3.446
90	MT EBA	2543	30 12	135 39	160.282
91	KINGSTON	2367	36 50	139 51	2.143
92	PORT MACDONNELL	2182	38 02	140 42	8.659
93	PT MAC'ELL TG BM	NMVE11	38 05	140 42	2.106
94	VICTOR HARBOUR	1582	35 33	138 36	5.636
95	VICT HARB TG BM	NMVE13	35 34	138 38	3.853
96	COOBER PEDY	2582	29 01	134 45	220.648
97	WILLOUGHBY	2615	27 58	134 08	266.365
98	MCDOUALL PEAK	2561	29 51	134 55	153.942
99	KINGOONYA	2524	30 55	135 20	144.414
100	MABEL CREEK	2591	28 56	134 20	194.807
101	KOPPIO	56/812	34 25	135 50	135.276
102	PT LINCOLN TG BM	NMVE16	34 42	135 52	3.572
103	PT LINCOLN	MSL 15	34 42	135 52	0.000
104	HILTABA	4470	32 10	135 05	165.430
105	MALBOOMA	4716	30 40	134 11	148.678
106	WIRRULLA	3284	32 24	134 30	79.827
107	GRANITE DOWNS	3092	26 59	133 24	381.875
108	CEDUNA	3265	32 07	133 40	2.935
109	CEDUNA TG BM	NMVE18	32 09	133 39	4.834
110	PORT MACDONNELL	MSL 13	38 05	140 42	0.000
111	VICTOR HARBOUR	MSL 14	35 34	138 38	0.000
112	THEVENARD	MSL 16	32 09	133 39	0.000
113	FREMANTLE	BM748A	32 04	115 45	1.954
114	FREMANTLE TG BM	NMVF6A	32 03	115 45	2.564
115	GERALDTON TG BM	NMVF7	28 47	114 36	1.841
116	GERALDTON	GO	28 46	114 36	3.609
117	CARNARVON TG BM	NMVF9	24 53	113 37	3.389
118	CARNARVON	ZE146	24 52	113 42	7.974
119	PORT HEDLAND	MSL 24	20 19	118 34	0.000
120	MINILYA RIVER	ZH78	23 48	114 00	12.482

JUNCTION POINT	LOCALITY DESCRIPTION	BENCH MARK NUMBER	LATITUDE	LONGITUDE	HEIGHT METRES
121	YANREY	ZJ94	22 52	114 57	87.246
122	YANREY T/OFF	ZJ84	22 34	114 59	40.493
123	BROOME	MSL 25	18 00	122 12	0.000
124	WYNDHAM —	MSL 26	15 28	128 08	0.000
125	WURARGA	ZC73	28 25	116 17	358.097
126	MOORA	MM98	30 38	116 00	202.866
127	MT AUGUSTUS	ZN28	24 22	116 56	393.646
128	LANDOR	ZL63	25 10	116 56	370.600
129	PERENJORI	DM32	29 28	116 18	280.879
130	TOM PRICE T/OFF	XG92	22 36	117 37	608.292
131	YALGOO	ZD13	28 21	116 41	313.688
132	PT HEDLAND TG BM	PWD PH1	20 19	118 34	4.538
133	CARNARVON	MSL 23	24 53	113 37	0.000
134	PORT HEDLAND	ZP 85	20 25	118 42	14.234
135	MOUNT GOULD	ZM70	25 49	117 18	388.294
136	MULGUL	GE24	24 52	118 28	491.118
137	WALLAL	XT70	19 49	120 40	11.823
138	ROY HILL	ZO45	22 40	119 58	411.389
139	PEAK HILL T/OFF	ZZ24	26 02	118 41	488.729
140	MEEKATHARRA	YM117	26 36	118 30	520.303
141	BROOME TG BM	EP1	18 00	122 12	8.854
142	ETHEL CREEK	ZO34	22 53	120 10	427.433
143	MT MAGNET	YM46	28 04	117 50	427.845
144	ROEBUCK PLAINS	XT183	17 51	122 30	35.207
145	YEEDA	XJ73	17 38	123 44	28.200
146	BALLIDU	KD97	30 36	116 46	300.009
147	PAYNES FIND	XM49	29 16	117 41	343.098
148	AT NO 1 RPF	ZY21	26 29	119 43	541.834
149	MT HOUSE	FM/49	17 04	125 43	277.752
150	ANKETELL	XK76	28 01	118 51	483.373
151	WILUNA TOWN SITE	ZX118	26 35	120 14	517.779
152	WYNDHAM TG BM	NMVF11	15 28	128 08	5.977
153	6 MILE HOTEL	FJ/01	15 30	128 09	5.980
154	AT 163MP RPF	XK46	29 02	118 27	452.156
155	GERALDTON	MSL 22	28 47	114 36	0.000
156	ROSES BORE	DG/10	17 47	127 48	372.886
157	HALLS CREEK	FO 03	18 20	127 33	433.474
158	OLD HALLS CREEK	DO/03	18 15	127 46	372.389
159	HELENA VALE	F397	31 54	116 02	27.121
160	AT 128MP RPF	XK32	29 32	118 29	370.725
161	GARRY JUNCTION	FT/105	22 30	125 16	345.576
162	KIDSON FIELD	FT/110	22 46	125 08	366.400
163	NTH OF AGNEW	ZX 52	27 59	120 30	502.740
164	WINDY CORNER	FT/125	23 34	125 11	394.033
165	CARNEGIE	82/56	25 48	122 59	446.572
166	FREMANTLE	MSL 21	32 03	115 45	0.000
167	YOUNG RANGE	82/29	25 10	124 43	426.528
168	6KM S MOONDON	MK37	30 33	118 13	406.262
169	BUNBURY	MSL 20	33 19	115 38	0.000
170	LEONORA	ZW89	28 53	121 20	372.627
171	COSMO NEWBERRY	XN19	28 00	122 53	518.026
172	NORTHAM	NM2	31 39	116 41	149.224
173		XP144	26 20	126 13	483.748
174	WARBURTON	81/45	26 08	126 34	457.371
175	WARBURTON ROAD	XO138	27 56	123 31	412.498
176	ALBANY	MSL 19	35 02	117 53	0.000
177	MENZIES	ZW49	29 41	121 02	433.953
178	ESPERANCE	MSL 18	33 52	121 54	0.000
179	NEALE JUNCTION	XP79	28 18	125 49	343.619
180	BURRACOPPIN	MSC7	31 24	118 29	355.339

JUNCTION POINT	LOCALITY DESCRIPTION	BENCH MARK NUMBER	LATITUDE	LONGITUDE	HEIGHT METRES
181	MERREDIN	BRM11	31 29	118 16	316.797
182	KALGOORLIE	SCK67	30 46	121 27	358.990
183	COOLGARDIE	SCK56	30 57	121 10	422.974
184	EUCLA	MSL 17	31 44	128 53	0.000
185	ZANTHUS	XA94	31 02	123 34	269.346
186	RAWLINNA	XC62	31 01	125 19	181.103
187	REID	XD111	30 49	128 25	162.276
188	MARBELLUP	F271	34 59	117 43	12.131
189	ALBANY TG BM	HR2	35 02	117 53	3.243
190	EUCLA	3160	31 41	128 53	87.023
191	EUCLA TG BM	PLAQUE	31 44	128 53	3.365
192	COCKLEBIDDY	275 MP	32 02	126 08	89.011
193	NORSEMAN	ZU78	32 12	121 46	270.943
194	BALLADONIA	ZV72	32 21	123 37	182.395
195	ESPERANCE	ZU1 GJ1	33 51	121 54	4.255
196	ESPERANCE TG BM	NMVF 2	33 52	121 54	3.511
197	AT R.P.F.	XF53	33 38	120 26	213.835
198	NARROGIN	BM2	32 56	117 10	374.636
199	BROOMEHILL	F200	33 53	117 39	305.785
200	BUNBURY	JA100	33 19	115 38	1.826
201	BUNBURY TG BM	NMVF5	33 19	115 38	2.207
202	SBM 1 BRISBANE	PSM10001	27 28	153 01	16.292
203	SOUTH GRAFTON	PM7865	29 43	152 57	9.281
204	WARWICK	10075A	28 13	152 02	458.605
205	IPSWICH	10021	27 37	152 46	22.385
206	GOONDIWINDI	10026	28 33	150 18	216.926
207	MUNGINDI	PM7632	28 59	149 00	160.873
208	ESK TURNOFF	862	27 35	152 42	50.380
209	QLD/NSW BORDER	PM5446	29 00	147 49	150.861
210	ENNGONIA	SSM3285	29 18	145 50	132.338
211	TOWNSVILLE	MSL 4	19 15	146 50	0.000
212	HUNGERFORD	SSM7233	29 00	144 23	127.464
213	ST GEORGE	10027	28 02	148 35	201.083
214	BOLLON	10176	28 02	147 29	182.645
215	MOONIE	8344	27 43	150 22	278.523
216	NEW WELL	8637	28 15	141 40	86.685
217	CUNNAMULLA	10036	28 04	145 41	188.939
218	THARGOMINDAH	10116	28 00	143 49	128.604
219	TOOWOOMBA	10022	27 34	151 57	596.756
220	NOCKATUNGA	8656	27 42	142 42	106.046
221	MACKAY	MSL 5	21 06	149 13	0.000
222	KIHEE	8695	27 23	142 37	120.579
223	BUNDABERG	MSL 6	24 46	152 23	0.000
224	QUILPIE SBM	10037	26 37	144 16	197.291
225	BETOOTA	8924	25 42	140 45	70.202
226	CHARLEVILLE	10035	26 24	146 14	295.446
227	ADAVALE	10127	25 55	144 36	233.413
228	WINDORAH	10165	25 25	142 39	127.989
229	NEAR WINDORAH	54/02	25 27	142 49	124.276
230	DALBY	10028	27 11	151 16	344.223
231	MITCHELL	10038	26 29	147 58	338.087
232	ROMA	10023	26 34	148 47	300.356
233	MILES	10031	26 40	150 11	306.659
234	BRISBANE	MSL 7	27 21	153 11	0.000
235	CHINCHILLA	10074	26 45	150 38	305.263
236	KARUMBA	MSL 29	17 28	140 50	0.000
237	LONGREACH	10055A	23 27	144 15	188.534
238	WINTON	10059	22 23	143 02	184.748
239	JULIA CREEK	10062	20 39	141 45	122.423
240	TAROOM SBM	10032	25 39	149 48	197.645

JUNCTION POINT	LOCALITY DESCRIPTION	BENCH MARK NUMBER	LATITUDE	LONGITUDE	HEIGHT METRES
241	ALPHA AA/21	10091	23 39	146 38	350.218
242	BAMAGA	MSL 1	10 51	142 22	0.000
243	DONORS HILL	18021	18 43	140 31	54.038
244	RICHMOND	10068	20 44	143 08	212.845
245	HUGHENDEN	3817	20 51	144 12	327.005
246	NORMANTON SBM	10070	17 40	141 05	9.153
247	KARUMBA SBM	SBM10222	17 28	140 50	4.624
248	MAGGIEVILLE	DB/41	17 28	141 11	8.537
249	CROYDON	10156	18 12	142 15	115.169
250	EMERALD	10047A	23 32	148 10	179.317
251	GREGORY HIGHWAY	AH/43	22 29	147 29	288.810
252	JUNC BN TRAVERSE	16616	18 53	144 32	591.535
253	CHARTERS TOWERS	10143	20 05	146 16	316.346
254	ST RONANS	14245	18 09	144 49	793.934
255	WALSH TEL OFFICE	BM/37	16 40	143 54	153.836
256	DUARINGA	10109	23 43	149 40	83.140
257	WEIPA	MSL 30	12 39	141 51	0.000
258	WEIPA TG BM	NMVB304A	12 39	141 51	1.375
259	WOODSTOCK	7203	19 35	146 50	63.027
260	DESAILLY CREEK	BM/08	16 30	144 55	320.549
261	BOWEN RIVER	AO/01	20 46	147 50	126.586
262	FAIRVIEW HS	EJ/43	15 30	144 17	165.933
263	SEARY CREEK	EK/48	13 11	142 48	127.272
264	SBM TOWNSVILLE	10011	19 15	146 49	7.169
265	TOWNSVILLE TG BM	NMVB309A	19 15	146 50	4.523
266	BROKEN RIVER	AO/15	21 13	148 16	293.763
267	SBM MAREEBA	10067	17 00	145 25	406.384
268	GIRU	AF/39	19 34	147 07	7.026
269	WANDOO JUNCTION	AN/11	21 46	148 56	187.973
270	CAIRNS SBM	10016A	16 55	145 47	2.998
271	GOOMERI	10185	26 11	152 04	249.226
272	RED ISLAND POINT	3931	10 51	142 22	3.097
273	COOKTOWN	10013	15 28	145 15	4.898
274	COOKTOWN TG BM	NMVB307A	15 28	145 15	6.983
275	BAN BAN SPRINGS	DF/05	25 40	151 48	149.242
276	BOWEN SBM	10009	20 01	148 15	6.913
277	MACKAY SBM	10007	21 09	149 11	6.340
278	ROCKHAMPTON SBM	10006A	23 23	150 31	10.936
279	MACKAY TG BM	NMVB311	21 06	149 13	7.654
280	NEAR BOOYAL	DE/06	25 13	152 02	88.910
281	SBM GIN GIN	10186	25 00	151 58	67.467
282	CHILDERS	10080	25 14	152 17	113.419
283	SBM GYMPIE	10002	26 11	152 40	76.270
284	BUNDABERG	10004	24 52	152 21	12.082
285	BUNDABERG TG BM	PSM 3853	24 46	152 23	4.368
286	PLATFORM BM	TG BASE	27 21	153 11	5.672
287	CAIRNS TG BM	PSM16253	16 55	145 47	3.325
288	COOKTOWN	MSL 2	15 28	145 15	0.000
289	CAIRNS	MSL 3	16 55	145 47	0.000
290	SYDNEY CITY	LD PLUG	33 52	151 13	8.775
291	EDEN TG BM	A8415	37 04	149 54	2.950
292	EDEN	PM2398	37 04	149 54	34.128
293	PAMBULA	SSM1206	36 57	149 52	26.420
294	PT KEMBLA TG BM	BM6	34 28	150 53	4.179
295	COBARGO	PM2381	36 23	149 53	78.029
296	CANN RIVER	A212-19	37 34	149 09	94.262
297	BATEMANS BAY	PM2357	35 42	150 11	2.758
298	BOMADERRY	PM2097	34 51	150 36	52.932
299	BOMBALA	PM7658	36 55	149 14	705.332
300	UNANDERRA	PM2081	34 27	150 51	8.397

JUNCTION POINT	LOCALITY DESCRIPTION	BENCH MARK NUMBER	LATITUDE	LONGITUDE	HEIGHT METRES
301	ORBOST	GBM 154	37 43	148 27	8.681
302	NINNIE	342-11	37 41	148 02	202.906
303	BUCHAN	341-1	37 30	148 10	79.663
304	COOMA	PM142	36 14	149 08	789.209
305	JINDABYNE	SMA66-2	36 24	148 37	1044.065
306	OMEQ	64-16	37 06	147 36	649.367
307	BUNGENDORE	SSM 6506	35 15	149 26	691.267
308	KIANDRA	17/1	35 52	148 30	1361.639
309	COLAC COLAC	701-4	36 13	147 51	330.659
310	NSW BORDER	28/110	36 07	148 02	348.636
311	BERRIMA	SSM1929	34 30	150 20	653.010
312	TOOMA	28/120	35 58	148 04	311.030
313	SHELLEY	695-3	36 10	147 35	719.797
314	KIEWA	667-9	36 16	147 00	196.078
315	JINGELLIC	PM10249	35 55	147 42	217.615
316	GOULBURN	PM3135	34 45	149 43	631.018
317	ALBURY	PM2856	36 05	146 55	157.673
318	BOWNA	SSM2815	35 56	147 08	214.485
319	LOWER TARCUTTA	PM4047	35 12	147 45	290.980
320	GUNDAGAI	SSM5365	35 05	148 05	219.185
321	BAROOGA	SSM2743	35 54	145 43	115.714
322	ECHUCA	GBM 246	36 09	144 44	96.680
323	BOWNING	SSM4988	34 46	148 49	545.793
324	WAGGA WAGGA	PM4056	35 07	147 22	178.595
325	FINLEY	PM4370	35 38	145 35	109.256
326	DENILIQUIN	PM5935	35 32	144 59	91.763
327	NARRANDERA	PM4072	34 45	146 33	152.028
328	WADDI	SSM4187	34 36	145 59	124.922
329	BALRANALD	PM5809	34 40	143 33	64.109
330	HAY	PM5805	34 31	144 50	89.514
331	PT KEMBLA	MSL 31	34 28	150 53	0.000
332	WENTWORTH	PM5992	34 06	141 55	34.513
333	COWRA	SSM2456	33 50	148 41	284.177
334	MARSDEN	SSM2657	33 45	147 32	208.081
335	POONCARIE	PM3675	33 24	142 34	52.999
336	MOSSGIEL	PM5890	33 15	144 34	90.404
337	WILLANTHRY	PM5884	33 22	145 50	140.830
338	LAKE CARGELLIGO	PM5882	33 18	146 22	162.873
339	IVANHOE	PM5541	32 54	144 17	85.637
340	EDEN	MSL 10	37 04	149 54	-0.158
341	MENINDEE	PM3684	32 16	142 21	70.052
342	FORBES	PM4281	33 25	147 58	233.751
343	BROKEN HILL	PM4817	31 58	141 28	298.576
344	CONDOBOLIN	PM866	33 05	147 10	198.230
345	CAMP COVE	MSL 9	33 50	151 17	0.000
346	BARRIER HIGHWAY	PM4878	31 43	143 28	93.107
347	WILCANNIA	PM4875	31 34	143 23	77.477
348	PENRITH	PM2022	33 45	150 41	25.948
349	BATHURST	PM1653	33 25	149 34	693.097
350	LAKE BANCANNIA	SSM3651	30 49	141 48	145.835
351	BARNATO TANK	PM4903	31 36	144 58	151.400
352	COFFS HARBOUR	MSL 8	30 18	153 08	0.000
353	COBAR	PM4917	31 30	145 51	238.366
354	91 MILE BORE	SSM3453	29 42	143 22	137.800
355	WANAARING	SSM3431	29 42	144 08	107.375
356	NYNGAN	PM4998	31 34	147 12	171.270
357	TRANGIE	PM5014	32 02	147 59	217.368
358	WELLINGTON	SSM990	32 32	148 57	301.557
359	DUBBO	PM39	32 15	148 36	263.999
360	SYDNEY TG BM	PM84	33 50	151 17	1.518

JUNCTION POINT	LOCALITY DESCRIPTION	BENCH MARK NUMBER	LATITUDE	LONGITUDE	HEIGHT METRES
361	BOURKE	PM5212	30 06	145 57	105.446
362	WAUCHOPE	PM7460	31 28	152 48	27.587
363	GILGANDRA	PM2281	31 43	148 40	282.580
364	BREWARRINA	PM5218	29 58	146 52	117.598
365	COONAMBLE	PM5451	30 58	148 23	179.869
366	ULAN	PM5374	32 17	149 44	424.111
367	WALGETT	PM5085	30 01	148 07	132.579
368	ON TG (DEST'D)	NAIL	30 18	153 08	5.593
369	COLLARENEBRI	SSM3485	29 33	148 36	144.158
370	MULLALEY	PM1640	31 06	149 55	315.163
371	COFFS HARBOUR	PM7851	30 18	153 07	21.683
372	NARRABRI	PM3913	30 20	149 47	212.644
373	GUNNEDAH	PM2264	30 59	150 16	269.452
374	MOREE	PM3932	29 28	149 50	208.559
375	MUSWELLBROOK	PM229	32 16	150 54	144.283
376	HEXHAM	PM5639	32 50	151 41	1.932
377	TAMWORTH	PM2533	31 06	150 54	385.328
378	BENDEMEER	SSM1299	30 53	151 09	814.575
379	SINGLETON	PM1703	32 34	151 11	40.502
380	GLEN INNES	PM7608	29 45	151 44	1071.704
381	POINT LONSDALE -	GBM 1	38 18	144 37	6.898
382	LIGHTHOUSE BM	NW CNR	38 18	144 37	12.920
383	YARRAM	GBM 146	38 34	146 41	21.363
384	LEONGATHA	GBM 143	38 29	145 57	85.661
385	MARK ON DECK	TG BM	38 24	142 15	3.301
386	PORT FAIRY	GBM 94	38 23	142 14	4.849
387	COLAC	GBM 14	38 19	143 38	137.133
388	PORTLAND	GBM 103	38 21	141 37	8.662
389	TERANG	GBM 71	38 15	142 54	149.602
390	CAMPERDOWN	GBM 68	38 14	143 09	190.424
391	PORT FAIRY	MSL 12	38 24	142 15	0.000
392	HEYWOOD	GBM 157	38 09	141 38	30.349
393		2168	38 02	140 57	22.677
394	MORTLAKE	GBM 124	38 05	142 49	133.981
395	SA BORDER	GBM 226	37 46	140 58	68.111
396	PENSHURST	GBM 171	37 52	142 18	217.761
397	HAMILTON	GBM 134	37 45	142 03	205.786
398	SA BORDER	597-8	37 29	140 58	68.620
399	CASTERTON	GBM 220	37 35	141 25	68.022
400	COLERAINE	216-B	37 36	141 42	93.174
401		2071	37 24	140 50	61.250
402	LISMORE	GBM 82	37 57	143 21	180.195
403	CRESSY	GBM 18	38 01	143 40	135.654
404	DUNKELD	130-A	37 39	142 21	247.671
405	CAVENDISH	A38-9	37 31	142 03	215.381
406	GLENTHOMPSON	127-D	37 38	142 33	266.048
407	LAKE BOLAC	GBM 115	37 43	142 51	212.656
408	POINT LONSDALE -	MSL 11	38 18	144 37	0.000
409	APSLEY	732-9	36 58	141 05	108.338
410	EDENHOPE	731-21	37 02	141 18	159.285
411	SKIPTON	GBM 86	37 41	143 22	287.557
412	GEE LONG	GBM 43	38 09	144 21	33.525
413	MANANGATANG	A51-10	35 03	142 53	52.709
414	KANIVA	A84-1	36 23	141 16	126.501
415	ARARAT	357-1	37 17	142 56	324.560
416	HORSHAM	A41-3	36 43	142 12	126.998
417	STAWELL	357-19	37 04	142 47	226.250
418	BEAUFORT	A31-1	37 26	143 23	388.477
419	DIMBOOLA	A82-2	36 27	142 02	112.099
420	LANG LANG	A1-15	38 15	145 33	5.118

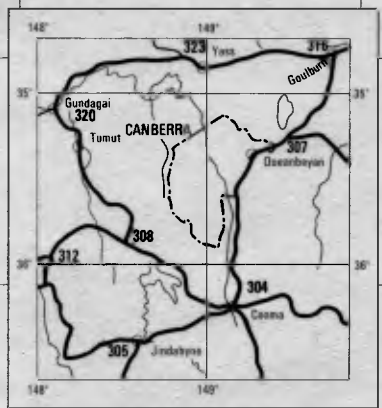
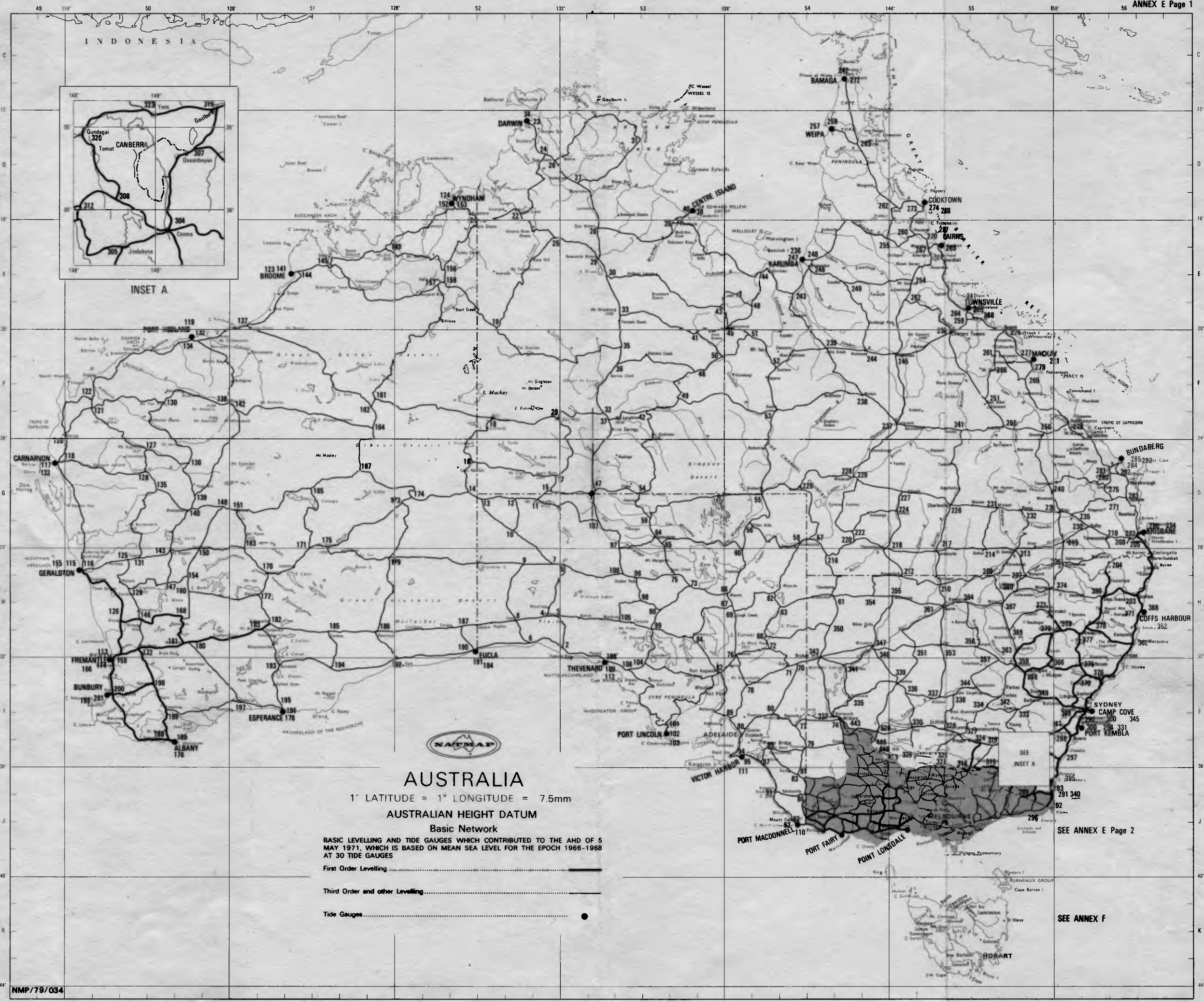
JUNCTION POINT	LOCALITY DESCRIPTION	BENCH MARK NUMBER	LATITUDE	LONGITUDE	HEIGHT METRES
421	WARRACKNABEAL	A35-9	36 15	142 24	107.903
422	BALLARAT	GBM 53	37 34	143 51	434.916
423	AVOCA	A56-4	37 05	143 28	232.882
424	LITCHFIELD	A59-5	36 18	142 51	116.699
425	ST ARNAUD	A58-1	36 37	143 15	260.516
426	LASCELLES	A46-9	35 37	142 35	78.029
427	BIRCHIP	A60-4	36 00	142 55	103.626
428	OUYEN	A48-7	35 05	142 19	54.919
429	MARYBOROUGH	GBM 197	37 03	143 45	258.010
430	HATTAH	A49-7	34 46	142 17	48.695
431	LOGAN	466-16	36 37	143 30	172.169
432	SEA LAKE	A65-1	35 30	142 51	56.671
433	WYCHEPROOF	486-24	36 04	143 14	106.607
434	MITTYACK	A50-10	35 12	142 41	67.784
435	TRARALGON (DIST)	GBM 142	38 12	146 32	39.929
436	DUNOLLY	GBM 243	36 51	143 44	207.435
437	CHARLTON	A73-3	36 17	143 22	129.052
438	DUMOSA	490-9	35 56	143 13	97.630
439	BALLAN	GBM 47	37 36	144 11	502.527
440	WEDDERBURN	481-16	36 25	143 37	182.161
441	TOWANINNY	490-22	35 49	143 22	92.479
442	BANNERTON	A45-2	34 43	142 48	61.914
443	EUSTON	SSM4293	34 35	142 45	51.008
444	ULTIMA	575-2	35 28	143 16	81.961
445	BORUNG	A74-4	36 17	143 45	117.753
446	PIANGIL	A62-3	35 03	143 20	62.252
447	BRIDGEWATER	422-7	36 36	143 56	137.126
448	SWAN HILL	A99-21	35 20	143 33	67.852
449	CASTLEMAINE	GBM 203	37 04	144 14	282.159
450	MUNICA	A74-11	36 19	143 58	106.418
451	SALE	GBM 147	38 07	147 04	8.144
452	BACCHUS MARSH	GBM 32	37 42	144 27	108.451
453	KERANG	500-8	35 44	143 55	77.081
454	MALMSBURY	GBM 227	37 12	144 24	482.629
455	BENDIGO	GBM 234	36 45	144 16	274.302
456	TENNYSON	A76-1	36 18	144 23	103.769
457	PATHO	A95-30	36 01	144 26	86.423
458	ELMORE	A85-1	36 29	144 36	128.668
459	MOE	GBM 141	38 11	146 16	70.372
460	HEATHCOTE	398-3	36 55	144 42	230.218
461	STANHOPE	A85-13	36 27	144 58	105.436
462	KILMORE EAST	R 86	37 17	144 59	270.111
463	STRATHMERTON	GBM 272	35 56	145 30	107.881
464	SHEPPARTON	A86-13	36 23	145 25	113.556
465	MOORILIM	406-19	36 37	145 19	120.451
466	DESTROYED	261-14	37 50	147 55	84.748
467	SEYMOUR	GBM 148	37 02	145 08	137.011
468	WILLIAMSTOWN	W TB TWR	37 52	144 55	3.322
469	EUROA	GBM 149	36 45	145 34	173.212
470	MULWALA	SSM2758	35 58	146 01	126.419
471	COROWA	SSM2775	36 00	146 23	137.828
472	BENALLA	ST116	36 33	145 58	169.100
473	MERTON	305-17	36 59	145 43	334.902
474	CATHKIN	402-24	37 09	145 35	176.982
475	WANGARATTA	GBM 150	36 21	146 19	148.617
476	SPRINGHURST	R 327	36 11	146 28	190.287
477	CHILTERN	R343	36 09	146 37	202.207
478	TARRAWINGEE	339-9	36 24	146 27	161.382
479	STRATFORD	GBM 139	37 58	147 06	37.195
480	WODONGA	GBM 91	36 08	146 53	164.552



JUNCTION POINT	LOCALITY DESCRIPTION	BENCH MARK NUMBER	LATITUDE	LONGITUDE	HEIGHT METRES
481	BEECHWORTH	457-18	36 21	146 41	547.137
482	TAGGERTY	461-16	37 19	145 43	204.609
483	MANSFIELD	326-9	37 03	146 05	315.191
484	WHITFIELD	334-6	36 46	146 25	246.281
485	FERNBANK	544-1	37 55	147 19	57.476
486	MYRTLEFORD	GBM 136	36 34	146 43	208.303
487	LILYDALE	GBM 151	37 45	145 22	148.742
488	JAMIESON	332-24	37 17	146 09	299.496
489	GERMANTOWN	411-36	36 45	147 01	338.517
490	MT BERNARD	525-11	37 01	147 05	1468.654
491	DANDENONG	A1-1	38 00	145 14	21.735
492	HEYFIELD	A8-5	37 59	146 47	45.120
493	WHITES CORNER	A4-4	37 54	145 55	285.948
494	COBBANNAH	540-6	37 38	147 12	355.546
495	BRUTHEN	343-9	37 43	147 50	20.556
496	BAIRNSDALE	GBM 140	37 50	147 38	13.064
497	DROUIN	GBM 152	38 08	145 51	138.044

AUSTRALIAN HEIGHT DATUM (TASMANIA) AS AT 30/06/1979

JUNCTION POINT	LOCALITY DESCRIPTION	BENCH MARK NUMBER	LATITUDE	LONGITUDE	HEIGHT METRES
3000	HOBART TG BM	195 SPM	42 52	147 20	1.802
3001	W END TAS BRIDGE	4182 SPM	42 52	147 20	0.994
3002	SCOTTS PK D/SITE	4325 SPM	43 02	146 17	300.018
3003	MCPARTLAN PASS	4157 HEC	42 51	146 11	338.746
3004	FRODSHAMS PASS	4551 HEC	42 49	146 23	534.059
3005	TIM SHEA TRACK	4356 HEC	42 42	146 28	527.830
3006	NEAR NIVE BRIDGE	2422 SPM	42 22	146 31	244.999
3007	GLENORA	2492 SPM	42 41	146 52	64.645
3008	GRANTON	181 SPM	42 45	147 13	2.421
3009	OATLANDS	6281 SPM	42 18	147 23	402.297
3010	BUCKLAND	6440 SPM	42 37	147 44	55.260
3011	FALMOUTH	6472 SPM	41 31	148 16	5.890
3012	FINGAL	6160 SPM	41 38	147 58	235.525
3013	CONARA JUNCTION	6269 SPM	41 51	147 27	191.203
3014	PERTH	L114 BM	41 34	147 11	163.923
3015	LONGFORD BRIDGE	L109 BM	41 36	147 06	138.083
3016	DELORAINE	820 SPM	41 32	146 40	237.433
3017	GREAT LAKE JUNCT	817 SPM	41 59	146 41	1054.748
3018	BRONTE JUNCTION	7614 SPM	42 10	146 29	673.454
3019	DERWENT BRIDGE	7619 SPM	42 08	146 14	728.925
3020	DOVE MILL ROAD	3447 HEC	41 36	146 08	282.633
3021	LEMANA STATCROSS	L75 BM	41 32	146 36	240.245
3022	DEVONPORT	L38 BM	41 11	146 22	3.974
3023	TURNERS BEACH	L30 BM	41 10	146 14	5.472
3024	MARINE/EDWARDS	376 SPM	41 04	145 55	3.386
3025	GUILDFORD	2620 HEC	41 26	145 42	619.883
3026	MURCHISON HWY JN	7683 SPM	41 53	145 23	186.140
3027	GRANVILLE T/OFF	5286 HEC	41 49	145 07	238.019
3028	SAVAGE RIVER	5393 HEC	41 31	145 13	356.361
3029	BRICKMAKER BAY	6252 SPM	40 51	145 21	5.246
3030	BURNIE	L2 BM	41 03	145 54	3.739
3031	BELL BAY	6517 SPM	41 07	146 53	47.547
3032	TOMAHAWK JUNCT.	6497 SPM	40 57	147 50	68.037
3033	BURNIE TG BM	BM NO.3	41 03	145 55	4.582
3034	HOBART TG ZERO	TG ZERO	42 52	147 20	0.000
3035	BURNIE TG ZERO	TG ZERO	41 03	145 54	0.000
3036	RISDON	A4	42 50	147 19	6.701
3037	MATHINNA	6543 SPM	41 28	147 54	285.006
3038	ST LEONARDS	L123 BM	41 29	147 13	11.553
3039	GREAT LAKE NORTH	3068 HEC	41 49	146 51	1115.454
3040	ARTHURS LAKE	3540 HEC	41 58	146 52	1006.907
3041	TODDS CORNER TK	2138 HEC	41 59	146 47	1058.142
3042	LITTLE LAKE BAY	700 HEC	41 47	146 42	1033.031
3043	LAKE ST CLAIR	123 HEC	42 06	146 12	738.556
3044	STONY CREEK	6608 SPM	41 58	146 06	783.853
3045	KIA-ORA HUT	6611 SPM	41 54	146 05	861.581
3046	PELION HUT	6613 SPM	41 50	146 03	852.832
3047	TRACK TO PELION	7704A BM	41 48	146 01	428.961
3048	PATONS ROAD	7703 RM2	41 42	146 05	311.889
3049	QUEENSTOWN	7676 SPM	42 05	145 33	140.559
3050		L71 BM	41 30	146 34	239.127
3051	GEORGETOWN GAUGE	6336 SPM	41 07	146 49	3.790
3052		375 SPM	41 04	145 55	3.612
3053	PIGEON HILL	7563 SPM	41 07	145 54	217.958
3054		5135 HEC	41 52	145 23	188.403
3055	BOCO SIDING	4407 HEC	41 39	145 37	408.265
3056	COOEE	2679 SPM	41 03	145 53	4.309



INSET A



# AUSTRALIA

1° LATITUDE = 1° LONGITUDE = 7.5mm

AUSTRALIAN HEIGHT DATUM

Basic Network

BASIC LEVELLING AND TIDE GAUGES WHICH CONTRIBUTED TO THE AHD OF 5 MAY 1971, WHICH IS BASED ON MEAN SEA LEVEL FOR THE EPOCH 1966-1968 AT 30 TIDE GAUGES

First Order Levelling

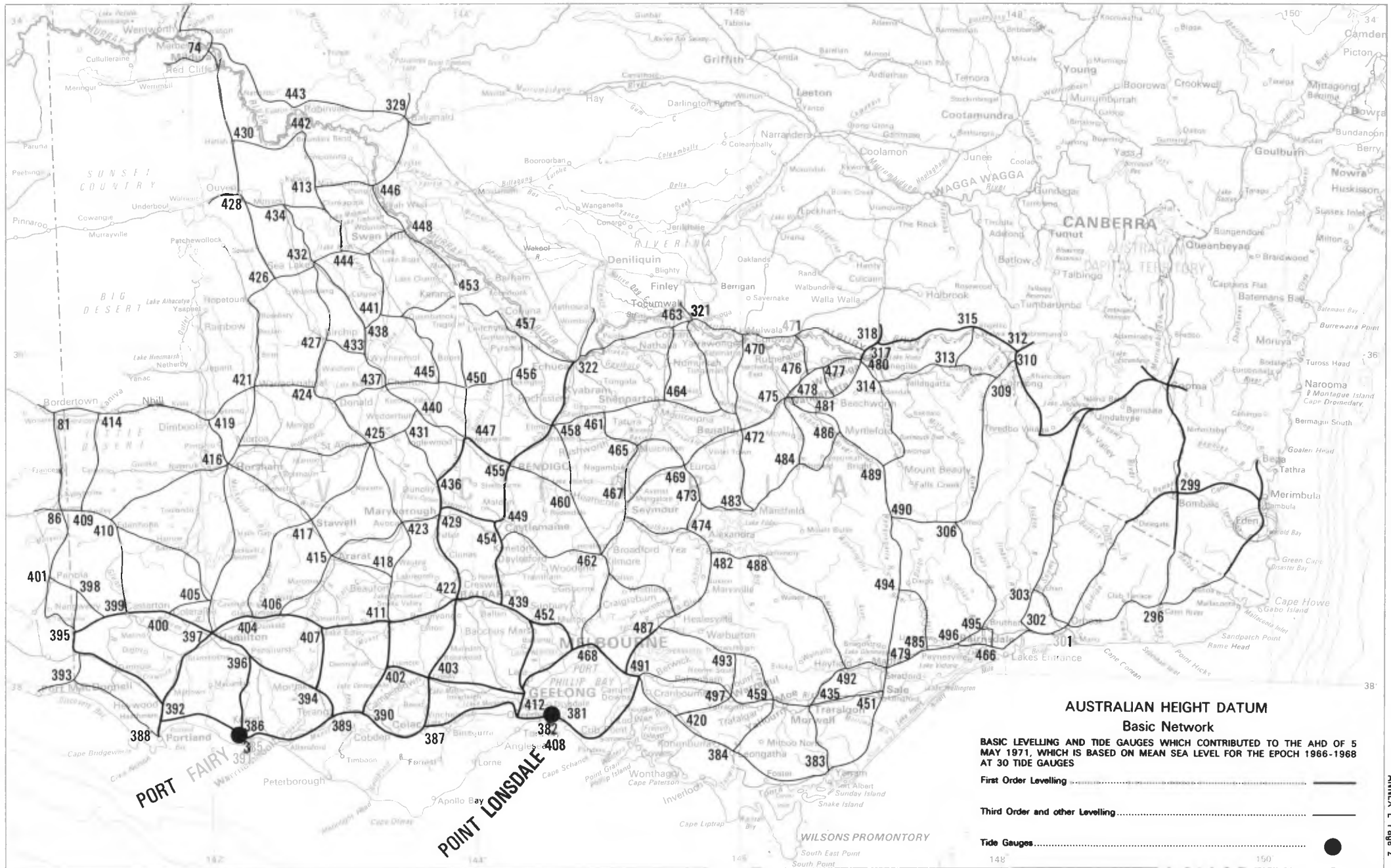
Third Order and other Levelling

Tide Gauges

SEE INSET A

SEE ANNEX E Page 2

SEE ANNEX F





**AUSTRALIAN HEIGHT DATUM  
(Tasmania)—Basic Network**

BASIC LEVELLING AND TIDE GAUGES WHICH CONTRIBUTED TO THE AHD (TASMANIA) OF 20 FEBRUARY 1979, WHICH IS BASED ON MEAN SEA LEVEL FOR THE EPOCH 1972 FOR THE TIDE GAUGES AT HOBART AND BURNIE

Third Order Levelling .....  
Tide Gauges .....