

DEPARTMENT OF NATIONAL DEVELOPMENT.

MINUTE.

NM: 68/171

LEVELLING SECTION. GEODETIC BRANCH 1969 FIELD SEASON.
INSTRUCTIONS

Mr P.W. O'Donnell

General

The work of the 1969 field season will be in the Northern Territory west of the Stuart Highway and between Robinson River and Wollorgorang and in Western Australia.

Object

The object of the field work is to:

Connect selected trigonometric, traverse and Aerodist stations and one Hiran station to the National Levelling Network;

Complete the connection of various Tide Gauge stations to the National Levelling Network;

Check level between permanent bench marks of hitherto unchecked Third Order Levelling;

Carry out one-way third order leveling over various D of I Gravity Traverses;

Provide a levelling connections between traverses on either side of the Western Australia - South Australia Border;

Provide a geodetic connection between two trig stations.

Establish clusters of three Reference Bench Marks at selected localities and to connect them to existing Permanent Bench Marks by Third Order Levelling.

Composition of field party

Mr. H.W. Granger and Mr. P.W. O'Donnell, Surveyors Class 1, will each from time to time be in charge of the field party which will consist of sub-parties as follows:

Sub-party 1

Sub-party 2

Sub-part 3

D.L. Gray, T.O.1

F.C. Reardon; T.O.1

J.R. Woodger, T.O.1

S.D. Klein, FA

K.A. Byrne, F.A.

A.J. Rodgers, F.A.

R.W. Murray, FA

R.A. Mooney, F.A.

H.A. Wilson, F.A.

Relieving Technical Officer: R.J. Bryant.

Supply Truck driver: P.R. Walkley.

Vehicles

The party will be equipped with the following vehicles:

ZSU-208	International C-1300, 4 x 4.
ZSU-210	
ZSU-213	
ZSU-214	
ZSU-219	
ZSU-222	
ZSU-233	
ZSU-255	Bedford, Model RLH C-3S.

Administrative Instructions

Please study the Administrative Instructions for Field Parties, paying particular attention to Chapters 2 (Extra Duty), 7 and 8 (Purchase Orders), 16 (Use of Motor Vehicles), 19 (Travelling).

Communications

Radio call signs on the PMG and WRE Networks are:

	PMG	WRE
H.W. Granger	8 SUI	BW 123
P.W. O'Donnell	8 SUD	BW 118
R.J. Bryant	9 SYH	BW 108
D.L. Gray	9 SYK	BW 109
F.C. Reardon	9 SYO	BW 203
J.R. Woodger	9 SYM	BW 128
P.R. Walkley	8 SXS	BW 214

You should arrange a daily radio schedule between yourselves on the National Mapping Radio Frequencies (see Chapter 10 of the Administrative Instructions for Field Parties).

The party leader shall telegraph "Natmap Canberra" on arrival at Alice Springs and on the completion of the field work.

The party leader shall telephone at least once per fortnight, preferably on Friday mornings before 10.00 EST, on Canberra 45144 reversing the charges. He is to give a description of the work completed by the party and to nominate a Post Office for the forwarding of mail.

On each alternate week the party leader shall inform me by telegram of the work completed during the week.

Claims, Diaries and Field Attendance Records

All Claims, Diaries, Field Attendance Records etc., shall be forwarded to the "Director of National Mapping, PO Box 667, Canberra City, ACT 2601. Attention Mr Cook" by airmail. Claims etc., should be based on a fortnight starting on the Thursday of pay week and finishing on the Wednesday of the next pay week.

Field Work

Details of the field work to be undertaken are contained in the attached Schedule of Work and in the Schedule of Technical Instructions.

D.P. Cook
A/Surveyor Class 2,
9.4.69

Schedule of Technical Instructions

Location of Work

The location of survey work to be done is marked on the attached map in various colours.

Levelling

All levelling is to be done in accordance with the Specifications for One-Way Levelling or the Specifications for Two-Way Levelling as required.

Marking

Marking is to be done in accordance with the Specification for Permanent Marking and the Specification for Establishing of Reference Bench Marks.

Level Connections to horizontal control stations

The selected stations are to be connected to the National Levelling Network by two-way levelling to existing permanent bench Marks.

Check levelling between these two existing marks shall be one-way only.

Where the distance measured along the levelling route from the nearest of the two existing permanent bench marks to the horizontal control stations exceeds 4 miles, new permanent bench marks are to be established at intervals not exceeding 4 miles.

At the horizontal control station all reference marks and the station mark shall be levelled. Where the station mark is not accessible (stone cairn) the top of the disc or flag of the beacon shall be levelled (see sketch).

The horizontal relation between the station mark (centre) and the

reference marks shall be determined by magnetic bearing to the nearest $\frac{1}{2}$ degree and by distance to the nearest 1/100 ft. All such measurements are to be recorded in the level field book together with a sketch showing the relative position of reference marks and station mark (see sample sketches). Wherever possible distances shall be measured horizontally. Slope distances shall be reduced to horizontal distances and shown as such in the sketch.

Before leaving a horizontal control station all disagreements between previous measurements and present measurements have to be resolved.

Border connection

Two permanent bench marks on one side of the border shall be connected to two Permanent bench marks on the opposite side of the border by two-way levelling (see sketch).

Tide gauge connections

The three tide gauge bench marks shall be connected to two State bench marks by two-way levelling (see sketch).

Check levelling

Check levelling along levelling traverses indicated by the Surveyor General, Western Australia, shall be One-Way levelling.

Reference Bench Marks

Clusters of three Reference Bench Marks shall be established at points indicated by the party leader in the field. Such clusters shall contain one existing permanent bench mark and two newly established ones.

A sketch is to be made showing the relation between the three marks of a cluster and to existing natural or man-made features. Distances to be shown to the nearest foot and magnetic bearings to the nearest $\frac{1}{2}^{\circ}$.

Photo identification of marks

All permanent bench marks along these traverses shall be identified on aerial photographs by pricking their position with a fine needle and annotation on the back of the photograph.

Where an identification is in doubt an easily identifiable point nearby shall be levelled and identified by a pinprick. The difference in height between the bench mark and this point shall be written on the back of the photograph (i.e. +17.4 ft from PBM No or - 19.7 ft from PBM No.....).

Numbering of Permanent Marks

Each permanent mark which has been positively identified with the aid of the Permanent Bench Mark Sketch and which is not numbered shall have its identification number punched into the space provided.

Permanent Bench Mark Record Card

A Permanent Bench Mark Record Card (green card) shall be filled in for newly established marks; existing marks which have been Photo identified and marks which are found damaged or destroyed.

Control Stations Record Cards

Record cards for Control Stations (white) and/or Aerodist Stations (orange) have to be filled in when work is carried out at horizontal control stations.

Map Correction Report

Please note all omissions, errors and outdated information pertaining to the 1:250,000 and 1:1,000,000 maps you have been provided with on the Map Correction Forms issued to you.

Checking of Work

Before leaving the immediate area in which levelling work has been carried out a summary of this work shall be completed in all detail and a check made to see that all levelling is of specified accuracy. Summary sheets for this Purpose will be supplied.

Photography of Marks

Two black and white photographs shall be taken of each horizontal control station at which work is to be carried out and of each newly established permanent bench mark. One photograph shall be a closeup of the station mark or bench mark and the other shall show the immediate area surrounding the station or bench mark.

Photographs shall also be taken of marks found destroyed, damaged or improperly constructed.

A record of exposures is to be kept on the Film Record sheets provided. It is advisable to make a blank exposure at intervals of about 8 exposures and to register these blanks as such. On completion the film is to be numbered on the wrapping paper and on the cassette.

Bench Mark Identification Numbers.

The following numbers have been allotted to you:

	WA	NT
Mr Reardon	NMV/F/11 to 20	NMV/G/12 to 29
Mr Woodger	NMV/F/21 to 30	NMV/G/30, 31, 32, 36 to 59
Mr Gray	NMV/F/31 to 40	NMV/G/79 to 89

When another officer takes control of a sub-party he shall use those numbers originally allotted to the officer being relieved.

Use of Koni and Topcon Levels

Koni 007 Levels shall be used for:

- check levelling between existing Permanent Bench Marks;
- levelling of clusters of reference Bench Marks;
- Tide Gauge connections;
- Border connections.

Topcon Levels may be used for levelling to all horizontal control stations and must always be used where levelling to such stations traverses rough country.

When a Koni 007 Level becomes unserviceable due to damage or malfunction of the compensator a Topcon Level shall be used for all levelling until a re-placement Koni 007 level has been obtained.

Repair of leveling instruments

The party leader shall be informed immediately in case of an instrument becoming unserviceable. The party leader shall decide whether the instrument needs workshop attention or whether repairs can be carried out by him in the field.

If the party leader decides that the instrument needs workshop attention he shall have it airfreighted to the nominated instrument repair firm and advise the Director of National Mapping accordingly. A note shall be included in the instrument case giving a description of the malperformance of the instrument. The note shall also state that before repairs are to be carried out the repair firm shall submit a quote of repair costs to the Director of National Mapping and then wait for verbal or written instructions from the Director of National Mapping.

Koni 007 Levels shall be sent to either :

NIC Instrument Company, 267 Halifax Street, ADELAIDE.

NIC Instrument Company, 414 Murray Street, PERTH.

Topcon Levels shall be sent to either:

Brookeades Pty. Ltd., 22 Ruddock Road, MORLEY.

Fielder Instrument Company, 341 Princes Highway, CARLTON. VIC.

Field check of levelling staves

Each two weeks the levelling staves shall be checked by measuring the distance between the four brass studs set into the foot graduations of each staff. These measurements shall be made with a 100 foot tape. The temperature of the air shall be recorded at the time of measurement and a pull of about 15 lbs. applied to the tape.

The measurements shall be recorded on the special form provided.

SCHEDULE OF WORK - 1969 FIELD SEASON.

Locality No.	Description of Work.	1:250,000 Map Sheet.
1	Bench marking and level connection, Johnston Geodetic Station.	G 53-5
2	Aerodist connection, NM/G/274.	F 53-14
3	Trig connection, NM/G/50, Hardy.	F 52-12
4	Aerodist connection, NM/G/288.	
5	Aerodist connection, NM/G/283	
6	Trig connection, NM/G/59, The Granites.	F 52-3
7	Trig connection, NM/G/65, Tanami.	E 52-15
8	Aerodist connection, NM/G/234.	
9	Trig connection, NM/F/2, West Wall.	E 52-10
10	Third Order Levelling, Halls Creek to Well 45.	
11	Trig connection, NM/F/210, Crown Head.	F 52-1
12	Trig connection, R 016, Angelo.	E 52-9.
13	Trig connection, R 075, NE Clifton.	E 51-8
14	Trig connection, R 022, Turkey Hill.	E 52-6
15	Trig connection, U 101, Newry.	E 52-3
16	Trig connection, R 028, Pivot.	D 52-14
17	Tide Gauge connection, Wyndham.	
18	Trig connection, R 087, Pago.	D 52-9
19	Trig connection, NM/G/179, Kuriyippi.	D 52-11
20	Trig connection, U 106	D 52-16
21	Aerodist connection, NM/G/192	
22	Aerodist connection, NM/G/233	
23	Third Order Levelling, Robinson River to Queensland border.	
24	Trig connection, R 012, Talbot.	E 52-9.
25	Trig connection, R 001, GL.	E 51-11